ECONOMIC DEVELOPMENT STRATEGY

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IMPACT OF IMPLEMENTATION OF THE EUROPEAN FOUNDATION FOR QUALITY MANAGEMENT EXCELLENCE MODEL AND ISO ON ORGANIZATIONS` PERFORMANCE BASED ON MATHEMATICAL MODELS

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Abstract

In this paper, first some of the weaknesses of the EFQM model are studied, then with the usage of the structure of input-output governing of the model and using the Data Envelopment Analysis, a method is offered to recognize the lack of the proportion between Enablers and the results of organization which may occur due to problems and obstacles hidden in the heart of organization. In this study two window analysis of BCC and CCR with input nature were used to investigate the trend of performance changes in the Persian cutting industry during 2015.In this paper, Information has been obtained from individuals and groups through the use of survey research for decades, and the total reliability of the questionnaires was reported by using Cronbach's alpha. Questionnaires used were «job satisfaction and organizational commitment with the reliability of 0.766», «Job attachment questionnaire with reliability of 0.846», «organizational climate questionnaire with the reliability of 0.960». Studied population included 105 employees in the Persian cutting industry. Questionnaires were distributed randomly to the group,and finally, 67 questionnaires had been completed, and the analysis was once performed on 67 participants. The results confirmed that five factors such as » job satisfaction, organizational commitment, job attachment, job attitude and organizational climate «showed a significant difference before and after using the EFQM and ISO models. Organizational climate for the purpose of comparing the mean and standard deviation before and after the use of EFQM and ISO it was once referred to that it declined from (61.16) before implementation of these two models to (56.36) after implementation with a standard deviation of (11.63) and (9.66) after implementation of this models. Therefore, the relationship used to be reversed.

Keywords: EFQM; ISO, Job Satisfaction; Organizational Commitment; Job Attitude; Organizational Climate

1. Introduction

In an increasingly competitive world, characterized by globalization and hyper-competition, the economic agents are forced to differentiate their products and services, in order to survive and grow in the arena of economic exchanges. Competitive advantage is no longer an element of a favorable situation, but the result of a practical transposition of a strategicvision, being able to differentiate the economic agent from its competitors through the excellent performance achieved by them.

There is an improvement concern about the quality and safety of health care services. Quality management systems are broadly have been used in healthcare [12, 61]. Many industry's departments have applied a quality management system to improve the efficiency and quality of healthcare services [77, 51]. One general strategy that is used is the framework described via the International Organization for Standardization (ISO), the ISO 9001 standard. ISO used to be situated in 1947 to provide standardization for technical specifications for products traded in the international marketplace.

The ISO 9001 family of quality administration system standards can be applied to any kind of organization in search of to enhance the quality of the manufacturing of its goods or services. This standard represents an international agreement on goods management performance, which assists ensure that employees constantly deliver the product or service that meets the quality necessities of the organization's clients, continuously enhance the organization's performance, and enhance customer satisfaction [70].

Another international model that is used to conduct quality enhancement strategies is the European Foundation for quality administration (EFQM) Excellence Model. EFQM used to be established in 1988 with the approval of the European Commission. The EFQM Excellence Model is a multidimensional model based on eight principles of excellence. This model has been well approved in the public sector in Europe in recent years. Its non-prescriptive framework is based on nine criteria (European Foundation for Quality Management, 2000). Five of the standards refer to 'enablers' (leadership, people, policy and strategy, partnership and resources, and processes) and four of the criteria refer to 'results' (people result, customer results, society results, and key performance results) [72]. The EFQM Excellence Model is a valuable tool to assist organizations in recognizing quality management gaps and displaying their improvement. It emphasizes the idea of self-assessment and the detection of strengths and weaknesses the use of the criteria's guiding principles. This framework is widely used in the industry, as well as in the healthcare sector [9, 58].

There are several systematic reviews concerning the effect of social enhancement strategies in healthcare. Some of the published studies in those systematic literature reviews have studied the effectiveness of Six Sigma and Lean Six Sigma [16,78]. Other reviews have looked at broader system-wide quality improvement (QI) models, or collaborations [68] and have highlighted their context-dependent nature, the degree of overlap among models, and the need for an effective organization-specific implementation method and infrastructures for success [57, 62]. Others have examined the context concerning the effectiveness of QI methodologies, such as plan-do-check-act (PDCA) cycles, the plan-do-study-act (PDSA), statistical process control (SPC) or statistical quality improvement (CQI), total quality management (TQM), Six Sigma, and Lean Six Sigma, in increasing the quality of care for surgical patients [56]. We did not find any systematic review of the effect of the ISO 9001 standard and the EFQM model, which is the title of this review. This systematic review aimed to examine the literature concerning the effects of ISO 9001 and the EFQM model on improving the industry's performance

In today's world thinking about the speed and volume of facts and challenges confronted using organizations, the essential for having criteria for status determination and planning based on factors of weakness and strength is sensed higher than ever. Two Rewards for quality and its particular models have received the attention of theoreticians of organizations for the latest few decades. Two The Deming and Malcolm Baldridge prizes are amongst them. Two Europe, particularly after the summative motion of the countries of this continent toward complete political-economic unification and cohesion, has sensed the essential for settlement on assigning such prizes higher than before.Two On this basis, the European quality foundation consisting of fourteen industrial countries in this continent has suggested the European Foundation for Quality Management Excellence Model (EFQM). Two Considering the political challenges faced for means of our country and sanctions implemented via big powers, the essential for accepting the EFQM is undeniable.

Organizational excellence models or leadership in business have been used as a powerful tool for evaluation of how well-established various organizations are. With the application of these models, organizations can, on the one hand, evaluate their success in the implementation of improvement programs at various time factors and on the other hand evaluate their performance with different organizations and primarily via the best in the business. Models for leadership in business are a response to the question of what types of organization are a better one. What goals and concepts do it follow and what criteria govern over their competitors?

Newsday, most countries in the world with reliance on these models have built rewards and prizes at the national and regional level which are motivators for companies and businesses in reaching excellence, growth, and creation of wealth. Two Excellence models via placing the quality of

production (product or services) and participation of all company members axial can gain consumer satisfaction and provide interests of benefactors and at the equal time encourage and promote personal and organizational learning via an emphasis on creativity and innovation [1].

Even though Iranian companies have followed the implementation of such approachesvia tremendous interest, yet, most improvement measures have been accepted in western countries and taken structure. Their implementation in Iran is not free of problems. Studies have a report that regularly most problems are reported from the employee's aspects. The reason is that these systems have mostly emphasized continuous implementation and refinement of the system of process orientation and participation of employees. Traditionally Iranian companies have been associated with duty oriented, hierarchal and hydraulic bureaucratic structures which can be rooted in causes of such deficiencies.

The essential and importance of the existence of a system of evaluation of performance in every organization are to the level that its lack is considered one of the signs of disease in the organization in various dimensions including analysis of the use of resources and facilities, goals and strategies. Therefore, each organization with the purpose of awareness of the level of desirability and value of its activities mainly in a complex and dynamic environment has an extreme need for self-evaluation [21].

Self-evaluation which can be used as a development process for judgment of efficiency of predetermined programs wishedthe use of special tools and modes [20]. Up to now various types of leadership models have been illustrating and used between which EFQM is the most well-known and has the most application in performance evaluation of organizations.

The EFQM model believes that advancement (for customers, employees, and society) results from strategic leadership and policies for participation, resources, and processes. Two Contrary to many accreditation frameworks that only pay attention to movements (processes), this model equally will pay attention to each action (enablers) and consequences [55].

Therefore, the organizational betterment model EFQM assist the companyin takingpracticalsteps in the direction of all dimensions of enhancement of efficiency and efficacy and as such provides for consumer and benefactor satisfaction. Two This model withthe participation of personnel and involving them in matters provides the same opportunity for learning and creativity for all scathed organizational success is approved in the long term [73].

With the implementation of this model in the Persian cutting industry, the activities of this section occur in the frame of a specific model which means the creation of common language for change of situation. Moreover, there will be a possibility for self-evaluation and comparison of activities of the mentioned company with similar companies and provision of feedback and ultimately the realization of the company's mission and reaching excellence [10].

Considering the above mentioned, this research seeks to answer the following question:

What is the influence of using EFQM on the performance of the Persian cutting industry?

2. Related Research

The PubMed (1994 to September 2013), Embase through Scopus (1997 to September 2013), and Cochrane Library (Issue 3, 2013) databases were searched. Also, Elsevier (1996 to September 2013) and Springer (1835 to September 2013) were searched as the leading publishers in the field of health sciences.

The search terms were devised to cover the industry's performance improvement as well as the names of and equivalent for ISO 9001 or International Organization for Standardization, EFQM or European Foundation for Quality Management. These terms included: ***''industry's''***, ***''industry's performance''***, ***''quality improvement''***, ***''quality management***, 'AND' with each of the following terms: ***''ISO 9001''***, ***''International Organization for Standardization''***, ***''EFQM''***, ***''European Foundation for Quality Management''*** in the title or abstract.

We included empirical studies through any design that had been used in ISO 9001 or the EFQM model to improve the industry's performance. Studies that had addressed the use of an intervention, such as ISO 9001 or the EFQM model, and that had evaluated the effect of that intervention on industry's performance over a specific period, were included. Theoretical studies, editorials, letters, opinions, audits, and reviews were excluded. Studies that analyzed healthcare professionals' perceptions about ISO 9001 or the EFQM model were excluded from this present study. We also excluded self-

assessment papers that only addressed the industry's scores.

All the articles that were retrieved from the search strategy were imported into an Endnote database. Their titles, abstracts and, if necessary, the full texts were then scanned by a reviewer and checked by a second reviewer against the inclusion criteria. The statistical method used for this analysis was Cohen's Kappa coefficient, which was calculated as 0.7.

Data were collected and tabulated into a data eradication sheet that was designed explicitly for this paper. The collected data containthe authors' names, country, year of publication, intervention, improvement aims, setting, length of the program, study design, and study outcomes.

The quality assessment for non-experimental studies has not been well developed [13]. Therefore, a combination of available checklists has been used to design a list of criteria that was applied to appraise the quality of the included studies [13; 82]. The following criteria were used to appraise the quality of the contains studies: the adequacy of the description of methods, the appropriateness of the research methods to the study question, the quality of the data collection, the quality of the data analysis, and the quality of the data presentation.

2.1. Main principle of EFQM the European excellence model

This model that consists of five main factors has been proven in Fig. 1, and the relationship among the constituents has been demonstrated with each other [36]. Moreover, this model has been built depend on fundamental values and principles which contains result orientation, customer orientation, leadership and persistence in goals, management primarily based on realities and processes, employee improvement and participation, improvement, innovation and persistent learning, development of companies and their social authority.

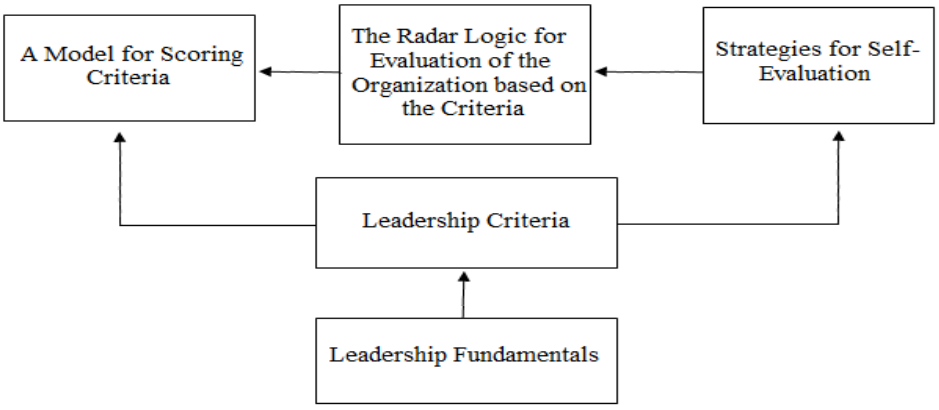

Fig. 1. Components of the European Foundation for Quality Management Excellence Model and their relationship with each other

Source. European Foundation for Quality Management, 2012

Position of the European Foundation for Quality Management Excellence Model (EFQM) model as a tool for default finding in the organization:

1. The conventional methods of evaluation based on the EFQM model are a questionnaire, workshop, proforma, matrix or simulation of reward.
2. In summation of results and description of indices, generally, methods of decision making are througha questionnaire, workshop, proforma, and matrix or reward simulation.
3. Determination of the causes of occurrence of the problem is the essential default finding the section, and in practice with the beginning of this stage, default finding goes to the side.
4. Prioritization of causes should be based on the scientifically accepted method.
5. In determination and illustrations of strategies, the level of their influence on other indices and explanation should be considered.
6. Prioritization of strategies should be performed at least depends on indices such as cost, time, influence, effectiveness, etc.

The most important pillar of the European foundation for quality management excellence

model is the discussion associated with its self-evaluation. The self-evaluation process where several methods have been advised for it in the organization is a guarantee for assurances in the propagation of the model in the organization.

In this method, the model initially offered primary and more straightforward ways of self-evaluation and examined the organization relative to the model, and when the risk of eliminations of the model implementation is resolved, strategies are reported that involve most of the organization.

With regard to shaping the first remarkable award of quality such as Deming award in 1951 in Japan and Malcom Baldrige award in America in 1987and acquired achievement in Japanese and American organization, 14 well - known European companies assembled together in Brookcle, Belgic, in 1988 and established a foundation with the title of "European Quality Management the mission of this foundation".

The mission of this foundation was defined as "creating progressive force in order to sustainable quality in European" and its landscape was "European quality management in the world".

Efficiency model EFQM is a non - prescriptive model which had been formed from 9 measures. These measures are the core and heart of this model and consider as the appraisal base of an organization.

The measures of EFQM model are divided into two groups.

A- Enablers: They had been had first five measure of this model and they are some factors which enable organization to reach high results.

B- Results: They are results which an efficient organization access to them in various area and they are indicating the achievement from suitable performing of enablers.

In EFQM model, the measures have 1000 score all together (500 score for enablers and 500 score for results).In other words, if an organization succeeded to completely operate this model in its organization, can receive1000 score [54].In Fig. 2, you can see these measures, interaction manner and the relation with each other and each one score.

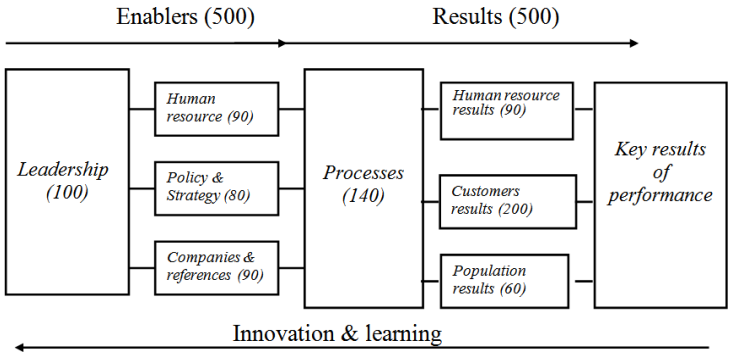

Fig. 2. EFQM model reported by Najmi, M. Hoseini, S. Efficiency model of EFQM from idea to action, P. 22

2.2. DEA and Errors of Assessment in EFQM

As has been mentioned in the previous section, some of the criteria recognized in EFQM model are qualitative and measuring of these criteria would not be easily possible. As the incorrect assessment may give an unreal image of the organization and then the organization would fall non-existence, so it deems necessary to design a control system which, in such situation, may alarm and warn the organization that the assessment is untrue.

Because some of nine criteria in the model are so qualitative that the measurement needs the experienced individuals and experts, there is a probability of arising errors in the self-assessment based on EFQM.

About difficult scoring to “Enablers,” probability of mistake scoring in this area is very high. So, it seems necessary to design a system to control the accuracy of the results. To this end, we propose the method which Golany and Roll (1997) have designed to standardize through DEA. For more description, we assume that the assessment criteria in the organization include one Enabler criteria and one Result criteria. We collect the results of assessment obtained by expert assessors in the past from different organizations to make standard level. In Figure 3, the DMUs A, B, C, D, E, and F are such units. Efficiency frontier is making by A, B, C and D. Gained frontier indicates that we expect to obtain a scale of “Results” in the organization by using the specified scale of “Enablers.” About the

criteria of EFQM being qualitative, assessment error may be ignored, more or less. For example, the units E and F which are not on the efficiency frontier, but about closeness to efficiency frontier, result in acceptable evaluation. Thus, inefficient units are divided into two groups. The first group consists of inefficient DMUs or organizations whose assessments are not acceptable, and the second group contains efficientunits or organizations whose assessment results are acceptable. In Fig. 3, the units Gand H are DMUs which are scored by expert assessors. For DMU G two possibilities areunder consideration:

1) The error has occurred in scoring.
2) There are problems in the organization, which are not observed by managers.

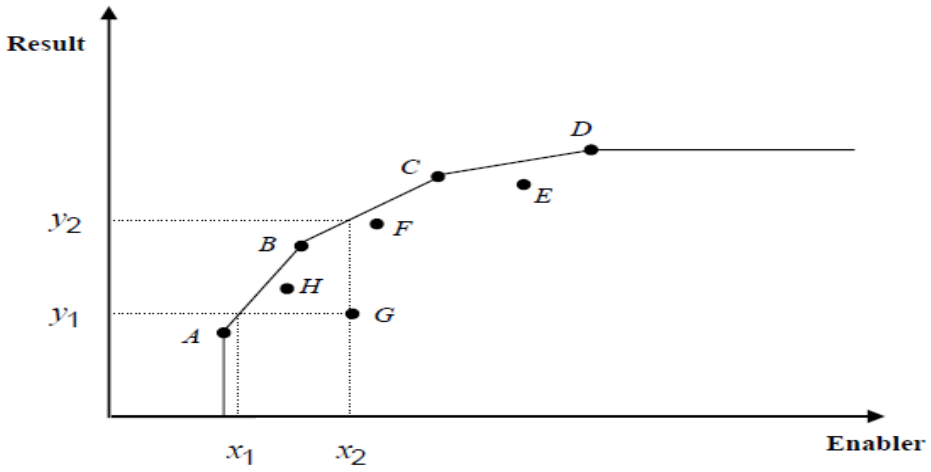

Fig. 3. DMUs Units

If we accept that assessment of organization A and B have been realistic, the expectation is that organization G with use of amount x_2 Enabler achieves amount y_2 Result, while this organization has achieved to y_1 Result. As mentioned, this could be due to assessment error or a problem within the organization has caused this situation. Therefore, it seems necessary to restudy the assessment in order to find the cause and in the case of occurring error, scores should be amended. If the second situation happened, the cause should be studied. In order to distinguish the organizations which their assessment results are not acceptable, the proposed method by Golany and Roll (1997) is used.

Organizations which have been assessed by the EFQM model are considered as DMU. The five criteria of "Enablers" are Inputs, and the other four results criteria are considered as Outputs.

We collect the information relating to these units which were a success or not in the pastbut were given the scores by expert assessors. We evaluate these units by DEA. Some ofthem place on the efficiency frontier. These units will make the standard DMUs.After the standard units are recognized, again with adding DMUs which have been giventhe scores in a certain period to the units above, once more the evaluation beingdone by CCR model? If a DMU causes that a standard DMU is inefficient, then the dataof the organization is in question, and therefore it should be studied again. In the case ofconfirmation, the accuracy of the relevant data should be presented as a standardorganization. Otherwise, the given scores will not change the standard frontier.

Once more the organization is being studied by ignoring the standard units and thencalculating the ratio of two efficiencies for each organization (DMU) and gaining theaverage of the obtained numbers. Again, we calculate the distance of each number fromaverage and calculate the average of these distances, with the subtraction of average from thegained number; we will have the number which will be the base for accepting the resultsof EFQM. If the gained result of an assessment of a DMU is lesser than this number, eitherit has not been calculated correctly, or the obstacle factors which are not able to berecognized by assessment indexes have played the role to make this result.

Because we expect that the organization is using leadership with a certain power, policyand strategy, people, partnerships and resources and processes, each has been shown by anumber, and achieve to series of results close together. The flow chart of the methods is shown in Fig. 4.

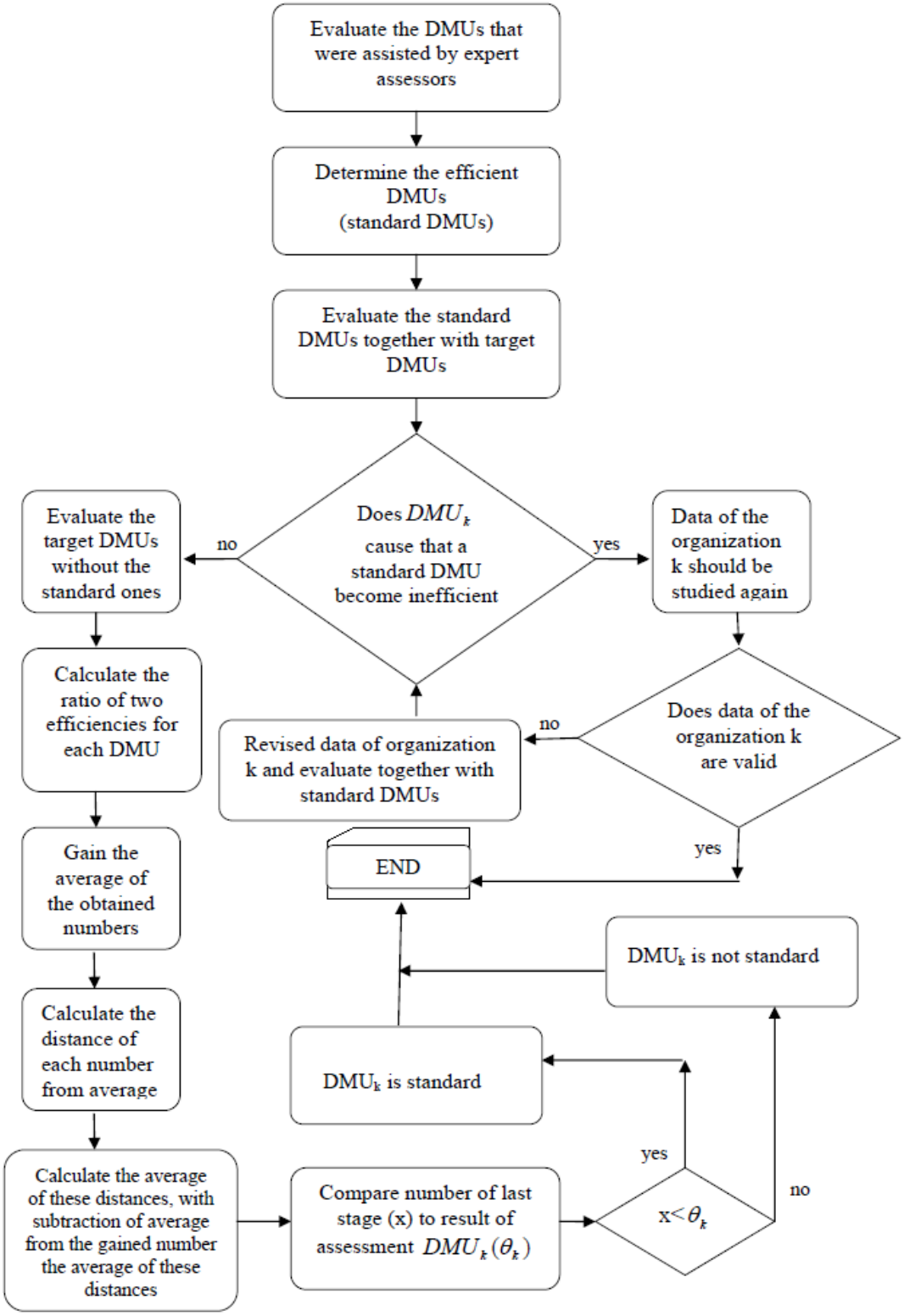

Fig. 4. Assessment of DMUs

2. Conceptual overview in literature

Review the aim of organizational excellence models which include encouragement of systematic self-evaluation, close collaboration among organizations, encouragement of exchange of information, promotion of awareness of essential to achieve

quality and encouragement of company to use the process of improvement of quality management, clarifies the importance of use of such a model for the Persian cutting industryin achievement of these objectives and realization of its mission.

With referral to the nature, process, objectives, and characteristics of EFQM it is evident that this technique is a managerial one and related to the domain of control and evaluation in the organization. To prove this claim, familiarity via control, its illustration and process and also EFQM becomes crucial. In theories of management from the classical period up to now, control reported as one of the stages or concepts of management. The first management theory POSDCOREB contains planning, organizing, staffing, directing, coordinating, reporting and budgeting. Reporting and budgeting are placed in the control domain. Later, Henry Fayol in his fourteen concepts has introduced control as a section of management. Currently, between experts of the science of management, control is considered a principle, a stage or an essential managerial duty. Some summarize the principles of management into five items planning, organizing, resource provision, directing and control. Others acknowledge the same axioms under the titles of the process of management, and yet, some others know them as duties. With the assumption of acceptance of any of these methods, control is considered the final step in the process of management. In the current decades, Mr. Deming in his famous cycle has introduced control as evaluation or control which is also known as the PDCA cycle [22].

Control known as control, check, evaluation or monitoring has been introducedthrough almost all as understanding the current situation, comparing it with goals and indices, understanding deficiencies and lagging and its correction. Based on this illustration, the process of control is:

1. Understanding or determination of objectives and indices
2. Comparison of the current situation with objectives and indices
3. Understanding the current situation
4. Understanding deficiencies, defects, and lags
5. Endeavor for revision

The stages of self-evaluation begin with creation and commitment to self-evaluation and continue with the establishment of communication and direction and end with the determination of operational plans and implementation of programs and ultimately reevaluation and this cycle persist. Now if we compare the process of these three essential techniques via the process of control in management, we will notice that all these models and techniques are placed in the domain of control [19].

Therefore, it can be concluded that in the model of leadership of an organization concerning the European model, companies via the evaluating themselves (self-control) while receiving appropriate feedback and recognizing their points of strength and weakness will be able to present methods for sustained improvement and revision (identification of improvable points). This cycle is considered controlling initiative and sustained improvement in the Deming process. Therefore, it can be stated that: the mission of EFQM is depended on understanding the current organizational situation and comparing it with performance goals, indices and standards and sustained improvement in performance.

Among few types of research in this country up to now, research by engineers Mr. Pour Samimi, Majid Akhavan and studies via the Institute of standard and industrial research in Iran in 2002 have more scientifically analysed the effects of the establishment of quality management systems (Standard Series ISO-9000).

The most important results of this paper are as follows:

- Senior management has played the primary role in attention to ISO-9000 standards.
- Systematization of tasks has been mentioned as the most important reason for the acquisition of certification.
- Training of personnel is the most acute problem in the path of the standard establishment.

The interest of company directors in the acquisition of certification solely with the purpose of advertisement and not the goal of improving company situation has been among the mentioned factors.

Jelodari Mameghani in his article titled “Economy, management and quality in 2006” after mentioning the advantages of institution of a

comprehensive system of quality management in companies and the essential for commitment of senior managers and employee to implementation of all vital items and belief in value creation states that: if we approve the assumption and establishment of systems of quality management is not solely for acquisition of a certificate and document, this establishment need to be able to advance organizational tactics in the direction of developed profitability and economization and other words, the methods under consideration in quality management systems will be effective when they are able to create added value in the organization and processes. If organizational operations are successfully managed with a procedural approach, the following financial impacts will result in the company [34]:

- Improvement in the process of allocation of resources.
- Declined costs are impinging upon the organization.
- Accessibility to high values and decline costs of processes.
- Improvement in the process of return of capital.
- Declined time of delivery of the product to the market.
- Declined time of production halts and product finalization time.
- Improved effectiveness of internal and external communications.

Asar GM and Lang Bouton authored an article in 2002 which defines the findings in a case study evaluating the situation of comprehensive quality management in a Higher Education Institute (HEI) in Britain with the use of self-evaluation of the European quality management method (EFQM). The strategy has been used in this case study includes six colleges in the same institute (HEI). This strategy contains implementation (application) of principles of employee development such as training of university executives, deputies and all active personnel in quality and institutional function development depend on the EFQM model and combining it with the Institute of quality improvement of Britain. In this study, analyzing of resulting models for development, improvement, implementation, and quality in a stage before selection and application is emphasized. This study identifies the difference of methodology among EFQM and educational (institutional) criteria for the Malcolm Baldrige national quality prize as a crucial domain [23].

Saizarbitoria and Casadesu (2006) in their article titled "Delphi method involving motivation in ISO-9000 and EFQM" had the purpose of examining the motivations for implementation of QM2 (quality management) amongst Spanish companies with attention to models newly popularized (ISO 9000 and EFQM) using a new methodology, particularly the Delphi method. This article in addition to the usage of the Delphi method also takes advantage of other previous evaluations and information from precise interviews using specialists in the Delphi panel. This article indicates that various specialists agree on the point that external factors force companies to implement the ISO 9000 standards. Two on the other hand, for implementation of TQM, systems, it mentions a variety of reasons. The conclusion of this article presents a deeper understanding of reasons for implementing ISO 9000 and EFQM based totally on the opinion of directors, consultants, specialists and members of institutes.

Joyce (2006) authored an article with the aim of the analysis of the complete process of self-analysis of the EFQM model in a public university in Spain. Universities can be evaluated explicitly in three sections: education, research, and services. This paper evaluates quality in the services section. With an analysis of the process of self-evaluation and its benefits and problems and also crucial factors, we can gain insight into the reason for its success. In this case study, primary and secondary data related to five major service sections in this university that have been successful in the process of self-evaluation are analyzed. The research begins with an evaluation of texts related to self-evaluation in HEI and next discusses the methodology section. This case study describes the stages of the creation of a self-evaluation model, problems in the way, benefits gained and main factors involved. Using this process, points of strength and domains needing revision can be identified so an action plan can be designed and related to strategic design and evaluation of functioning.

McCarthy and Greatbanks (2006) have authored an article titled "Effect of the excellence model EFQM in leading German and British organizations." The purpose of this research was to see if a difference existed among German and

British companies regarding leadership activities and concepts link with appropriate leadership application with each other or not. The design of the research surveyed study with analysis of documents related to self-evaluation distributed between the European Quality Award organization or its equivalent in Germany and Britain which included 300 companies. The response rate was 20 percent. 20 evaluators assessed the survey, and the results showed that German and British organizations are different regarding leadership activities and also concepts identify with appropriate leadership application [48]

Moreover, three studies were undertaken in Spain, one in the United Kingdom (UK), one in Germany, one in the Netherlands, and one in Israel. Two studies were published after 2010. Five studies had a quasi-experimental design; one study had a survey design, and one was an observational study. Four papers reported a follow-up period greater than two years, and all of the included studies were performed in industry's [67; 79].

Furthermore, three studies addressed the level of patient satisfaction. Sanchez et al. [67] reported that the patient satisfaction rate developed to 96.2% and 93.1%, respectively, in outpatient clinics and the emergency department with a four-year follow up; however, the satisfaction rate decline in inpatients after applying the EFQM model. Rodriguez-Cerrillo et al. In [64] also reported that patient satisfaction improved from 92% in 2008 to 98.8% in 2010 after applying the ISO 9001 standard. Vitner and colleagues [79] also reported a service satisfaction improvement ranging among 4.8 and 5 (based on a scale of 1 to 5) in 66% of the items in the patients' survey after implementing the ISO 9001 standard.

Additionally, three studies addressed the average length of an industry's stay. Sanchez et al. [67] showed that implementing the EFQM guidelines resulted in a reduction in the mean length of industry's stays from 6.1 days in 2000 to 5.9 days in 2003 in acute care industries with a four-year follow-up. Vallejo and colleagues [74] also observed a reduction in the mean length of industry's stays from 14.8 in 2003 to 13.8 in 2005, with a three-year follow up after implementing EFQM measures. Rodriguez-Cerrillo et al. [64] reported no change in the mean length of industry's stays in a three-year to follow up after implementing ISO 9001.

Two studies addressed the delay in receiving health services. Sanchez et al. [67] reported a reduction in the amount of time a patient has to remain on the surgical waiting list [67]. The average delay declines from 57.1 days in 2000 to 53.8 days in 2003 after using the EFQM model. Vallejo and colleagues [74] found a decline in the number of medical records that had a delay in reporting from 1 in 2003 to 0 in 2005 after implementing the EFQM model.

Moreover, two studies addressed the industry's re-admission process. Vallejo and colleagues [74] found that emergency re-admission was reduced from 20 in 2003 to 12 in 2005, with a three-year follow-up, after implementing the EFQM model. Rodriguez-Cerrillo et al. [64] reported that the percentage of unscheduled returns to the industry'sdecline from 7% to 3% after using ISO 9001.

Finally, two studies addressed the industry's admission process. Vallejo and colleagues [74] showed that the number of admissions developed from 282 in 2003 to 297 in 2005, with a three-year follow-up, after using the EFQM model. Vitner and colleagues [79] stated that the number of admissions improved to 78%, 19 months after using ISO 9001.

Regarding the remaining outcomes, only one study was found for each of those outcomes, and the results of these studies are reported below.

Rodriguez-Cerrillo et al. [64] described no medical equipment failures and an improvement in the external suppliers' performance. They found that, after implementing ISO 9001, 100% of the patients that required oxygen or aerosol therapy had access to the required equipment in their homes by the time they returned from the industry's, while this was not possible two years before. They also showed that, after implementing ISO 9001, in 97% of the cases protocols were followed, six medication-related incidents were identified, and all patient problems requiring an urgent consultation were satisfactorily resolved.

Leigh et al. [41] observed that confidence, competence, and retention of newly qualified nurses improved and the number of newly qualified nurses leaving in the first 18 months of their employment was reduced after implementing the EFQM model.

Sanchez et al. [67] presented that the duration of primary care medical consultations developed

from 7.4 min in 2000 to 8.5 min in 2003, with a four-year follow-up. Moreover, after using the EFQM model, the percentage of patients waiting less than one month for specialized care decline from 63.1% in 2000 to 61.1% in 2003, the prevalence of patients admitted by an infection episode declined from 6.7% in 2000 to 6.6% in 2003, and the percentage of minimally invasive tumors detected in the early detection breast cancer program decline from 43.3% in 2000 to 40.9% in 2003.

In addition, after using ISO 9001, van den Heuvel et al. [75] presented that patient safety developed from 38% in 1998 to 63% in 2001, and the rate of improvement in the policy and management category was 58% in 2001.

Beholz et al. [11] presented that costs for medical goods decline by € 187.36 from 2001 to 2003, representing a 6.1% drop; and, from 2001 to 2002 the total absolute savings in laboratory costs was 35.2%. The 32-day mortality rate for all operations showed a slight develop in 2001, reaching 4.2%. In 2002 and 2003, the industry's mortality declines to 3.7%. After using ISO 9001, returns of the questionnaire-based analyzing of satisfaction of cooperating cardiologists continuously developed from 57.1% in 2001 to 65.4% in 2002 and 70.6% in 2003.

3. Conceptual Modeling: Definition, Purpose, and Benefits

It should be mentioned that the cases mentioned and analyzed in this article agree with the research by Marta Zarraga-Rodriguez and M Jesus Alvarez in 2013 with the topic of "Does the EFQM model assist in the identification and strengthening capability for information and employee preformation?" Additionally, the conceptual model reported has been diagramed with consideration of the viewpoints in this research [45].

In recent years, organizations have increasingly become interested in the topic of commitment, and job satisfaction of employees [43] and this attention is due to various advantages related to this topic such as improvement of employee performance and decline turnover, etc. [83].

Employee job satisfaction is positive feelings that they have towards their occupation. Job satisfaction is a type of positive psychological feeling individuals have relative to their work and is born from factors equally conditions of the work environment, organizational system of the occupation, relationships dominating over the work environment and cultural factors.

Hersey and Blanchard in their research have stated that active managers agree in a set consisting of the following commitments:

1. Commitment to customers. A successful director or employee can show commitment to their job with the way of provision of services for customers and considering them important.
2. Commitment towards the organization. Effective directors or employees take pride in their organization and emanate this pride in their behavior. They perform their commitment in various ways and endeavor via the creation of appropriate organizational climate, support of higher managers and observance of fundamental organizational values to achieve this important matter.
3. Commitment towards oneself. Directors and employees persistently report a strong and positive image to others and act as a positive force in all situations. This matter should not be confused via selfishness or self-orientation. Commitment is identified via showing independent initiatives, acquisition of necessary skills for implementation of management and acceptance of constructive criticism.
4. Commitment towards individuals and the working group. Successful managers or employees are committed to individuals in their working group and show special peace of mind relative to them.
5. Commitment to work. Active directors or employees endeavor with maintenance of correct focus on work, being action-oriented and clarifying the importance of work give meaning to the work of others and themselves and via assessing the focus of other employees on work and appearance of necessary guidance, they try to gain confidence in successful completion of tasks [65].

Job attachment refers to a state of determination of psychological identity or the level to which a job is a center for an individual's identity. High job attachment means that the individual relates to the specific job and is reportedthrough it. Having employees via high job attachment can benefit the organization. The reason is that when individuals are submerged in their occupation, their motivation improves and this can positively influence their job performance. On the other hand, job attachment is an important attitude and variable in maximization of the effectiveness of the organization [52].

The attitude is a physiologic tendency that forces the person to seek a specific goal with good intention and without interest. Therefore, the individual's previous experiences from a special policy havean essential role in his or her current beliefs regarding the value and efficiency of the policy. If the past experiences are positive, it is logical to expect that the individual's attitude towards the policy in the future will be positive [47].

The attitude is an opinion about individuals, things or events and represents the types of a person's feeling about them.

Dunham and colleagues (1989) have stated that three attitudes towards changes exist which are emotional, cognitive and behavioral.

- **The cognitive component of attitude** includes information that an individual has regarding someone or something else which in the opinion of the individual should be correct.
- **The emotional component** includes the feelings of a person towards an object. This attitude frequently includes evaluation of emotions, and as an example when a person does not like something, he or she has expressed his or her attitude towards it.
- **The behavioral tendency** is related to the method an individual has in mind to behave concerning a particular matter.

Clarity of role means the level to which employees have a precise perception of their duties and performance in specific conditions [46].

Organizational climate (Fig. 5) is a relatively stable set of perceptions of company members about the characteristics of the company's culture, and this perception influences the feeling, attitude, and behavior of members in the workplace [27]. Organizational climate refers to a collection of measurable characteristics of the work environment that is perceived directly or indirectly via the individuals that work or live in that environment and influences their motivation and behavior [44].

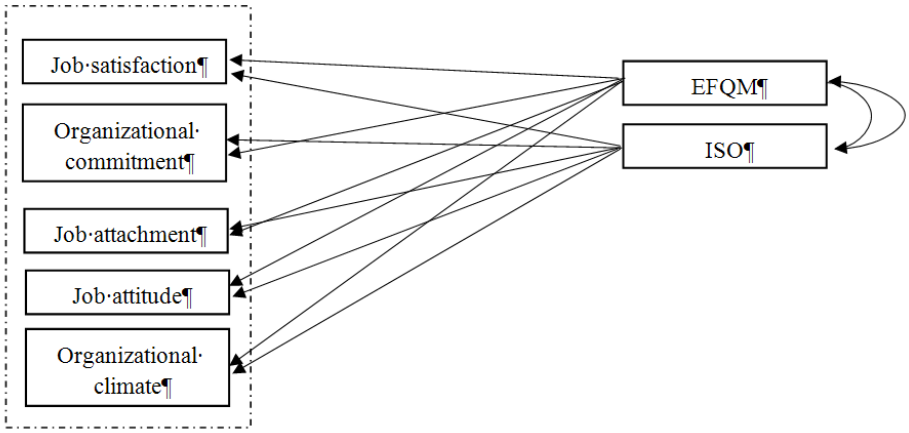

Fig. 5. Hypothesized Theoretical Model

Hypothesized Theoretical Model. This figure illustrates (a) Impact of EFQM on job satisfaction, organizational commitment, job attachment, job attitude and organizational climate (b) Impact of ISO on job satisfaction, organizational commitment, job attachment, job attitude and organizational climate OC = organizational commitment, EFQM = European Foundation for Quality Management Excellence Model.

4. Methodology

The information has been obtained from individuals and groups through the use of survey research for decades. It can range from asking a few targeted questions of individuals on our population to obtain information related to behaviors and preferences, to a more rigorous study using multiple valid and reliable instruments.

Window data envelopment analysis method is one of the multi-variable decision-making methods which is able to process several concurrently in the presence of controversial signs apart from considering the time factor and presenting the result as efficiency which shows the performance trend changes.

Cronbach's alpha is generally used as a measure of the reliability of a set of questions in a survey instrument. It measures the interrelatedness of a set of items, although a high value for alpha does not imply unidimensionally. It was first named as alpha by Cronbach. Cronbach alpha is used to evaluate the internal consistency of the data and is an estimate of the reliability of the data collected from a sample of examinees. Questionnaires have been used were «job satisfaction and organizational commitment (Moghimi) with the reliability of0.766», «Job attachment questionnaire(Thomas Ladahl and Kejner) through reliability of 0.846», and «organizational climate questionnaire (Salsman and Deep) via the reliability of 0.960 [50].

Among a total of 105 employees occupied at the Persian cutting industry, questionnaires were randomly distributed between a group. Ultimately 67 questionnaires were completed, and relevant analysis was performed on them. It should be mentioned that in this paper correlation tests of Chi-square and the Wilcoxon rank sign and coupled t-tests were used.

4.1. Window data envelopment analysis

The technique for data envelopment analysis is one of the new techniques which has widely been utilized to assess the performance of units. This technique is a mathematical programming method to assess the efficiency of decision-making units which have several inputs and outputs [38]. Because the method mentioned is based on a series of optimization issues, there are not any parameters for analysis. Thus, the method mentioned is considered to be a non-parametric method [7]. The data envelopment analysis model was first introduced by Charnes, Cooper, and Rhodes in 1978 and was known as CCR model which is derived from the first letter of the three persons mentioned [38]. In the CCR model, it is presupposed that there is a constant return to scale. By constant returns to scale we mean that the outputs change with a ratio that the input amounts change [37]. Six years after the presentation of CCR model the second model of this type was introduced by Banker, Charnes, and Cooper which was called BCC and was designed based on the variable return to scale [8]. The difference between the two models of CCR and BCC is related to variable or constant returns to scale. In variable returns to scale, it is supposed that the outputs do not change in proportion to the input [37]. Each of these models can be studied using the two input-oriented or output-oriented approaches [6]. In DEA models, a unit which is efficient and its slack variables' amount is zero has a stronger efficiency. We can use it as a referent unit. However, the efficient units in which one or some slack variables are non-zero are called weak units. The reason is the multiple optimality of the model. This weak efficient unit cannot be chosen as a referent unit for units with non-zero slack variables [49]. One of the faults of the primary DEA models is ignoring the time factor in assessing the performance. In fact, in these models, the measurement of efficiency is done temporarily, and it is carried out in a certain time (for example in a fiscal year). The window analysis as one of the subunits in DEA models has opened new doors to compare the units dynamically (during different periods) for efficiency assessment [26]. In window analysis, each decision-making unit is considered as an independent unit which results in increasing the number of data. Thus, in issues with limited numbers of the sample, this method will be a goodresolution. The other advantage of window analysis is that the performance of a decision-making unit will be assessed by comparing it with itself and other decision-making units during the period [5]. In fact, in this method, the performance of each decision-making unit is assessed during the time in a way that as if each period has a different identity. To explain it simply, we can say that unlike the data envelopment analysis which studies the data solely during a specific time like vertical analysis, window analysis, like horizontal analysis, assesses the data during specified periods [3]. Because this method presupposes that the technical efficiency of all units in a window is measured in comparison with each other, it is implied that there are not any technical changes in any one of the windows. This is an overall issue in window DEA. This problem can be solved to some extent by reducing window width. In order to validate the window analysis, we should choose the width of categories in a way that the ignorance of technical changes seem reasonable although there is not any theoretical support to determine window size [71].

To formalize, consider N *DMU's* $(n=1\ldots N)$ which are observed in T periods $(t=1\ldots, T)$ and which all use r inputs to produce s outputs. The sample thus has $N\times T$ observations, and an observation n in period t, $DMU^n t$ has an r-

dimensional input vector $X^nt= (X^n1t, X^n2t..., X^nrt)$ and a s-dimensional output vector $Y^nt= (Y^n1t, Y^n2t..., Y^nst)$. The window starting at time *k*, $(1 \le K \le T)$ and with the width *w*, $(1 \le W \le T-K)$ is denoted by *KW* and has $N \times w$ observations.

The matrix of inputs for this window analysis is given by:

$$X_{kw} = (x_k^1, x_k^2, ..., x_k^N, x_{k+1}^1, x_{k+1}^2, ..., x_{k+1}^N, ..., x_{k+w}^1, x_{k+w}^2, ..., x_{k+w}^N) \quad (1)$$

and the matrix of outputs is:

$$Y_{kw} = (y_k^1, y_k^2, ..., y_k^N, y_{k+1}^1, y_{k+1}^2, ..., y_{k+1}^N, ..., y_{k+w}^1, y_{k+w}^2, ..., y_{k+w}^N) \quad (2)$$

The input-oriented DEA window problem for DMUnt under a constant return to scale (CRS) assumption, is given by [5]:

$$\begin{aligned} &\theta'_k = \min_{\theta,\lambda}(\theta) \\ &s.t. \\ &-x_{kw}\lambda + \theta x'_t \ge 0 \qquad t = 1, ..., T \\ &\quad y_{kw}\lambda - y'_t \ge 0 \qquad t = 1, ..., T \\ &\lambda_n \ge 0 \qquad (n = 1, 2, ..., \mathrm{N} \times \mathrm{W}) \ \ Model\,(1) \end{aligned} \quad (3)$$

The input-oriented DEA window problem for DMU^nt under a variable return to scale (VRS) assumption, is given by:

$$\begin{aligned} &\theta'_k = \min_{\theta,\lambda}(\theta) \\ &s.t. \\ &-x_{kw}\lambda + \theta x'_t \ge 0 \qquad t = 1, ..., T \\ &\quad y_{kw}\lambda - y'_t \ge 0 \qquad t = 1, ..., T \\ &\sum_{n=1}^{\mathrm{N} \times \mathrm{W}} \lambda_n = 1 \\ &\lambda_n \ge 0 \qquad (n = 1, 2, ..., \mathrm{N} \times \mathrm{W}) \ \ Model\,(2) \end{aligned} \quad (4)$$

4.2. BCC and CCR models

In BCC & CCR models which place on efficiency border, their maximum efficiency is equal to 1 (one) which in this case the studied unit itself as a combination with coefficient 1 (one) had been considered as itself appraisal criterion, but a suggestive model of Anderson - Peterson do not allow this situation.

On the other hand, they reject being a reference of decision - maker unit for the unit itself.

More important, formulating various AP models such as CCR and BCC are corresponding to them. The mathematical programming problem may thus be stated as:

$$\max h_0(u, v) = \sum_r u_r y_{r0} / \sum_i v_i x_{i0} \quad (5)$$

Subject to

$$\begin{aligned} &\sum_r u_r y_{rj} / \sum_i v_i x_{ij} \le 1 \ for\ j = 1, 2, ..., n \\ &u_r, v_i \ge 0 \ \ for\ all\ i\ and\ r \end{aligned} \quad (6)$$

A fully rigorous development would replace;

$$u_r, v_i \ge 0 \ with \frac{u_r}{\sum_{i=1}^{m} v_i x_{i0}}, \frac{u_r}{\sum_{i=1}^{m} v_i x_{i0}} \ge \varepsilon \succ 0 \quad (7)$$

non-Archimedean element is smaller than any positive real number. See Arnold *et al.,* [63]. This condition guarantees that solutions will be positive in these variables. The above ratio form yields an infinitenumber of solutions; if *(u*, v*)* is optimal, then *(au*, av*)* is also optimal for a>0. However, the transformation developed by Charnes and Cooper [14; 15] for linear fractional programming selects arepresentative solution [i.e., the solution *(u, v)* for which $\sum_{i=1}^{m} v_i x_{i0}$]and yields the equivalent linearprogramming problem in which the change of variables from *(u, v)* to *(μ, v)* is a result of the Charnes-Cooper transformation:

$$\max z = \sum_{r=1}^{s} \mu_r y_{i0} \quad (8)$$

Subject to:

$$\begin{aligned} &\sum \mu_r y_{i0} - \sum_{i=1}^{m} v_i x_{i0} \le 0 \\ &\sum_{i=1}^{m} v_i x_{i0} = 1 \\ &\mu_r y_i \ge 0 \end{aligned} \quad (9)$$

For which the LP dual problem is: (DLP_0)

$$\theta^* = \min \theta$$

Subject to:

$$\begin{aligned} &\sum_{j=1}^{n} x_{ij}\lambda_j \le \theta x_{i0}, i = 1, 2, ..., \mathrm{m}; \\ &\sum_{j=1}^{n} y_{rj}\lambda_j \ge y_{r0}, r = 1, 2, ..., s; \\ &\lambda_j \ge 0, j = 1, 2, ..., n. \end{aligned} \quad (10)$$

The dual problem of (LP_0) is expressed with a

real variable θ and a non-negative vector $\lambda = (\lambda_1, ..., \lambda_n)^T$ of variables. The result of this model for inefficient units are equal with the CCR model, but for efficient units. It produces the score higher than 1 or equal with it, which in this case, efficient units are ranking with the score higher than one or equal withit.

On the other hand, when the target function of an efficient unit is investigating, the limitation of that unit will be omitted inter the limitation of the model until the rank of concerned unit specifies among the efficient units [53]. Banker et al., [9] extended the earlier work of Charnes et al., [15] by providing for variable returns to scale (VRS). Tone (2001) introduced the so-called slacks-based measure (SBM) which is invariant to the units of measurement and is monotone increasing in each input and output slack.

5. Data analysis

«Significant difference exists among employee job satisfaction before and after implementation of ISO and EFQM.»

Correlation value obtained is 0.75 which is more than 0.05 (Table). Therefore, the above hypothesis is approved, and there is a meaningful difference among job satisfaction of employees before, and after implementing EFQM and in consideration of the positive correlation coefficient, this effectiveness is positive.

«Significant difference exists among employee organizational commitment before and after implementation of ISO and EFQM.»

Table

Results of the hypothesize

Results		Number	Mean	Standard deviation	Correlation coefficient	Wilcoxon test statistics	p-value
Job satisfaction	Before implementation	67	40.67	13.18	0.75	-5.453	0.000
	After implementation	67	48.61	14.57			
Organizational commitment	Before implementation	67	61.57	13.27	0.49	-4.440	0.000
	After implementation	67	68.16	16.27			
Job attachment	Before implementation	67	58.39	10.09	0.84	-1.894	0.058
	After implementation	67	59.83	12.70			
Job attitude	Before implementation	67	50.75	8.000	0.59	-5.107	0.000
	After implementation	67	56.64	10.774			
Organizational climate	Before implementation	67	61.16	11.63	0.75	-4.434	0.000
	After implementation	67	56.36	9.66			

Correlation value obtained is 0.49 which is more than 0.05. Therefore, the above hypothesis is approved, and there is a meaningful difference among organizational commitments of employees before, and after implementing EFQM and in consideration of the positive correlation coefficient, this effectiveness is positive.

«Significant difference exists among employee job attachment before and after implementation of ISO and EFQM.»

Correlation value obtained is 0.84 which is more than 0.05. Therefore, this hypothesis is approved, and there is a meaningful difference among job attachments of employees before and after implementing EFQM, and in consideration of the positive correlation coefficient, this effectiveness is positive.

«Significant difference exists among employee job attitude before and after implementation of ISO and EFQM.»

Correlation value obtained is 0.59 which is more than 0.05. Therefore, this hypothesis is approved, and there is a meaningful difference among job attitude of employees before, and after implementing EFQM and in consideration of the positive correlation coefficient, this effectiveness is positive.

«Significant difference exists among employee job climate before and after implementation of ISO and EFQM.»

Correlation value obtained is 0.75 which is more than 0.05. Therefore, the above hypothesis is approved, and there is a meaningful difference among organizational climates of employees before and after implementing EFQM. Witha comparison of the mean and standard deviation before and after application of EFQM, it is noted that the mean decline from (61.16) before to (56.36) after implementation and standard deviation declined from (11.63) before to (9.66) after implementation of this method. Therefore, the correlation is reversed.

4. Discussion and Conclusion

The EFQM model and the ISO 9001 standard are becoming the most recommended methods and guidelines for creating and continuing good quality clinical services; however, there has been a debate about the advantages and disadvantages of these models [42; 30] These models have been applied successfully to different aspects of the industry's performance. This review included studies that assessed the ISO 9001 standard and the EFQM model in order to consider the evidence from the context to determine how these quality management guidelines might apply to this field. We searched the primary databases and publishers in the field of health sciences and tried to include articles covering the major outcomes in order to test the effectiveness of these models from first principles rather than from simple observations.

The research results reveal the fact that the elements of the EFQM model and ISO are interdependent and that they can be grouped in the following three strategic directions: resources and market orientation, vision and strategic orientation and employees and production. Depending on the hierarchic position, these elements are perceived and evaluated differently by the employees of the company. The top management rates the resources and the market orientation with the highest importance, while the middle management perceives the vision and strategic orientation as the most important one. This perception can be determined by the fact that relation with the customers and the resource procurement represent the highest challenge for the top management and the success of the company. The middle management considers the items from the direction vision and strategic orientation as the most important one, while the personnel with execution functions rate the employees as the most important one.

In the model, there are elements that relate well to each other and which can be grouped, but there are elements, such as the employees or the society, which influence more than one factor. For this reason, it is difficult to categorize them. As referred in this research, the grouping of the elements is done based on the environment in which they interact. There are elements grouped in a strategic direction related to the external environment, to the internal environment and one with the "brain" of the company, who has the vision and the strategic thinking. Incidentally, this is also the novelty brought by this research. Most analysis done for the development of a company, are mainly focused on the internal or external factors of a company, few of them being connected with the decision makers in the company, who play an essential role in its development.

Another important aspect that could influence the results of such research is the type of business. The analyzed company is a manufacturing company, where most of the employees are directly involved in the production process. This fact can influence the outcome in the sense that all decisions are taken from the perspective of the production process, rating it with higher importance. There is the possibility that a similar study conducted in a service-oriented company or having another department as preponderant, could lead to slightly different results. This hypothesis can be tested in future studies. One potential source of error is the subjectivity of the respondents, which otherwise is difficult to remove from any survey. However, the employees are the ones who know the company best and can most accurately evaluate their priorities and the way it operates.

In conclusion, we consider that the existence of such a model is important both for the evaluation of a company and for developing its strategy. The results of this research show that the decisions taken in the company should not be taken alone, based on a single element of the excellence model, but they require an overall perspective, especially considering the correlations among them. Besides this, the presented model points out how decisions are taken based on the key elements of a company and the interdependences among them. Not less important is the emphasis of the importance given by all management levels to some decisions. Based on the results of the research, there can be observed the orientation of the management of a company towards resources and customers, pointing out the optic of the company according to the actual tendencies.

In summary, the results of the research hypotheses are as follows:

Complete understanding and correct using of the EFQM and ISO models in an origination required the comprehensive familiar of this model and the different strategies of self-assessment of organization and proportion; due to being qualitative more than enough of current assessment criteria's, the experienced assessors are very reporting. Consequently, there are too many possibilities to occur errors in point-giving to the criteria and to the sub criteria. On the other hand, sometimes, there should be possible that coordination between enablers and the results has been made due to same problems within the organization which recognizing of this failure allows the organization to be aware of problem inside it. In this article the structure of input-output governing EFQM and ISO models, which has been taken from nine criteria, is used and, with the help of CCR model, technical efficiency concept, the existence of probable errors in assessment and or possible non-coordination between enablers and their result, have been studied carefully.

There are several limitations when looking for the results of using ISO 9001 and the EFQM model to assess the industry's performance. Only a few of the studies met all of the inclusion criteria for each model. Most of the studies included industry's that had utilized these models and reported that they could be effectively used without assessing their results, or they presented a self-assessment instead of specifically setting up and designing studies to test the effectiveness of these models from first principles. Many of the quality improvement models require noticeable data collection and staff must be trained in how to implement the model; most models also require a degree of statistical analysis. If using these models can result in significant cost savings, there is an excellent reason to invest in staff training and technology to assist support this process. However, without investing in these projects, sufficient evidence is unavailable to suggest sector-wide implementations.

Five studies had a quasi-experimental design and indicated outcomes before and after applying ISO 9001 and the EFQM model, so their results are more reliable than the results of studies with survey design or an observational design. In the observational studies, we could not correlate the progress of the outcomes to use of the quality improvement models. On the other hand, in the research design, the results could be subjective.

Studies with a rigorous, low-risk methodology or design are necessary when it comes to reporting results related to the use of these models. Randomized controlled trials (RCTs) are needed or, at least, studies with a non-randomized time series design, in order to indeed indicate the critical outcomes and potential harms of using these models. We searched the main databases and publishers in the field of health sciences, although this might not guarantee that we have found all the pertinent articles in this field; this is a limitation of any systematic review. These studies showed that the evidence underlying quality improvement is positive but limited, and the effects cannot be predicted with great certainty, so the results should be interpreted and used with caution.

Generally, there is a lack of robust and high-quality empirical evidence regarding the effect of ISO 9001 and the EFQM model on the quality and performance of industries. However, the limited evidence shows that, to some extent, ISO 9001 and the EFQM model might improve the industry's performance. Also, no negative evidence was found about the effect of ISO 9001 and the EFQM model on the industry's performance.

7.5. Research suggestions

Implementation of the organizational excellence model leads to the creation of a competitive atmosphere for excellence of active companies and as a result encourages them in performance of self-evaluation operations and understanding of their points of strength and improvable contexts and creation of the necessary atmosphere for exchange of successful experiences among active organizations and strengthening of the process of sustained improvement in active organizations in the relevant industry and empowerment of active companies in the domain of the industry in line with provision of services via better quality.

With self-evaluation based on the EFQM excellence model which is a key process for improvement, identification of points of strength and opportunities for improvement can be achieved which in turn help to model activities to be focused on domains which have the highest benefits for the company. With the implementation of this model in the Persian cutting industry and execution of the suggested approaches and follow up of results of the implementation of these approaches, many challenges can be resolved, and steps can be taken in the path to excellence. In this line, it is suggested that the system of evaluation of performance be created for identification and encouragement of effective individual, so employee job attitude is improved, and for enhancement of organizational climate, necessary context building for creation of opportunity for participation of employees with the purpose of identification of points of strength and weakness of the organization by senior management is supported.

Based on the information from this evaluation, the following actions are suggested for provision of the interests of the Persian cutting industry:

- Design and establishment of an evaluation system for leadership style;
- Re-engineering of the company structure with procedural attitude;
- Formulation of a system of opinion surveys from benefactors (employees, customers, society, stockholders, contractors);
- Formulation of a system of evaluating employee performance and reevaluation of the system of encouragement;
- Formulation of a comprehensive system for training employees and directors;
- Formulation of a comprehensive plan for communications management;
- Formulation of a comprehensive system for evaluation of contractors;
- Formulation of a system of management and energy audit;
- Formulation of a system of repair and preventive maintenance;
- Development of methods for improvement of process and problem solving with an emphasis on employee creativity.

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Вплив впровадження моделі досконалості Європейського фонду управління якістю на продуктивність організацій на основі математичних моделей

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У статті вивчаються деякі слабкі сторони моделі EFQM, потім із застосуванням структури керування введенням-виведенням у моделі та використанням аналізу розширення даних пропонується метод визначення відсутності пропорції між активізаторами та результатами організації, які можуть виникнути через проблеми та перешкоди, приховані в самій організації. У цьому дослідженні було використано BCC та CCR аналізи із вхідним характером для дослідження тенденції змін ефективності діяльності перської галузі фрезерування протягом 2015 року. У цій статті подано інформацію, отриману від осіб та груп за допомогою опитування протягом десятиліть, а повна достовірність анкетування повідомлялася за допомогою альфа Кронбаха. Були використані анкети: «задоволення роботою та організаційна прихильність з достовірністю 0,766», «Анкета на роботу з достовірністю 0,846», «Анкета організаційного клімату з достовірністю 0,960». Населення, залучене в дослідження, включало 105 працівників у галузі перського фрезерування. Анкети були розподілені випадковим чином у групах, і в результаті було заповнено 67 анкет, а аналіз був проведений один раз на 67 учасників. Результати підтвердили, що п'ять факторів «задоволеність роботою, організаційна відданість, прихильність до роботи, ставлення до роботи та організаційний клімат» значно відрізнялись до та після використання моделей EFQM та ISO. Організаційний клімат з метою порівняння середнього та стандартного відхилень до та після використання EFQM та ISO зменшився з (61.16) до впровадження цих двох моделей до показника (56.36) після впровадження цих моделей із стандартним відхиленням (11.63) та (9.66). Тому співвідношення раніше були зворотні.

Ключові слова: EFQM; ISO; задоволеність роботою; організаційна відданість; ставлення до роботи; організаційний клімат

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Влияние внедрения модели совершенства Европейского фонда управления качеством на производительность организаций на основе математических моделей

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В статье изучаются некоторые слабые стороны модели EFQM, потом с применением структуры управления вводом-выводом в модели и использованием анализа расширения данных предлагается метод определения отсутствия пропорции между активизаторами и результатами организации, которые могут возникнуть из-за проблем и препятствий, скрытых в самой организации. В этом исследовании были использованы BCC и CCR анализы с входным характером для исследования тенденции изменений эффективности деятельности персидской области фрезерования в течение 2015 года. В этой статье представлена информация, полученная от лиц и групп с помощью опроса в течение десятилетий, а полная достоверность анкетирование обеспечивается с помощью альфа Кронбаха. Были использованы анкеты: «удовлетворение работой и организационная приверженность с достоверностью 0,766», «Анкета на работу с достоверностью 0,846», «Анкета организационного климата с достоверностью 0,960». Населения, вовлеченное в исследования, включало 105 работников в области персидского фрезерования. Анкеты были распределены случайным образом в группах, и в результате было заполнено 67 анкет, а анализ был проведен один раз на 67 участников. Результаты подтвердили, что пять факторов «удовлетворенность работой, организационная преданность, привязанность к работе, отношение к работе и организационный климат» значительно отличались до и после использования моделей EFQM и ISO. Организационный климат с целью сравнения среднего и стандартного отклонения до и после использования EFQM и ISO уменьшился с (61.16) до внедрения этих двух моделей до (56.36) после внедрения со стандартным отклонением (11.63) и (9.66). Поэтому соотношения ранее были обратные.

Ключевые слова: EFQM; ISO; удовлетворенность работой; организационная приверженность; отношение к работе; организационный климат

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