A Framework for Organizational Knowledge Assessment by Combining BSC and EFQM: A Case of Beasat Industry Complex, Iran

Peyman Akhavan[1], Hossein Shirazi[2], Abbas Sabzaligol[3] and Amir Pezeshkan[4]

In today's knowledge-based organizations, knowledge is the most valuable and important asset which needs special attention and constant evaluation. This paper examines the different knowledge assessment models conducted in different organizations. Based on the stakeholders' expectations, conditions of the organization and characteristics of its operational processes, a framework for organizational knowledge assessment was developed with a combination of Balanced Scorecard (BSC) and European Framework for Quality Management (EFQM) models. This model was implemented in 'Beasat Industrial Complex' which led to the organization's ability to evaluate the organizational knowledge as its most important asset.

Introduction

Undoubtedly, knowledge and other intangible assets can be included in the management principle, 'if we cannot measure something, we can never manage that'.

Generally, there are two goals in measuring knowledge assets: (1) To evaluate an organization in order to find the relationship between its real value and the market value (external perspective); (2) To recognize knowledge components of an organization and managing them to enhance the organizational performance (internal perspective) (Cina *et al.*, 2003). So, regarding the importance of evaluating intangible assets of organizations and the idea that knowledge is the most important and strategic asset of knowledge-based organizations enabling them to survive and compete with other actors in their business competition, past studies have developed different models to evaluate organizational knowledge (Marr and Spender, 2004).

However, from a practical view, in most of the organizations, the concept of knowledge evaluation was neglected and managers in many organizations do not use explicit processes to evaluate organizational knowledge (Jafari *et al.*, 2010) and other intangible assets;

[1] Associate Professor, Iran University of Science and Technology, Tehran, Iran; and is the corresponding author. E-mail: akhavanatiust.ac.ir

[2] Associate Professor, Iran University of Science and Technology, Tehran, Iran. E-mail: shirazih@yahoo.com

[3] M.Sc. Student, IT, Iran University of Science and Technology, Tehran, Iran. E-mail: sabzaligol@gmail.com

[4] Research Scholar, Department of Strategic Management, School of Business, Old Dominion University, USA. E-mail: apezeshk@odu.edu

or sometimes the actions which are made are not effective enough (Rodgers, 2003). One of the main reasons behind this fact is the complicated and intangible nature of the knowledge (Akhavan *et al.*, 2009) and other intellectual capitals (Liebowitz and Suen, 2000).

After a precise review of previous research on intellectual capital and organizational knowledge evaluation, the study identifies special needs and conditions of the case under study to develop a model which is both supported by the previous literature and customized based on the case situation. As a result of this process, a combination of concepts introduced by two models—Balanced Scorecard (BSC) and European Framework for Quality Management (EFQM)—was identified to best suit the purpose of this study. Based on these two models, a framework was developed and approved by the experts and managers. Finally, the suggested framework was implemented in Beasat Industrial Complex and the results were explained.

Literature Review

To avoid any inconsistency in terms of interpreting the concepts used in the paper, some definitions of key terms have been presented.

Knowledge

Knowledge here is a combination of experiences, values, existing information and special systematic outlook which presents a frame to evaluate and use the new experiences and information (Chourides *et al.*, 2003). Knowledge is a set of regulations and realities that experts may obtain during years (Martin, 2004; and Akhavan *et al.*, 2009). Nonaka (1994) defined knowledge as a purified belief which increases the capacity for effective actions. The relationship between data, information and knowledge can be seen in Figure 1.

Figure 1: Data, Information and Knowledge

Data
Information
Knowledge
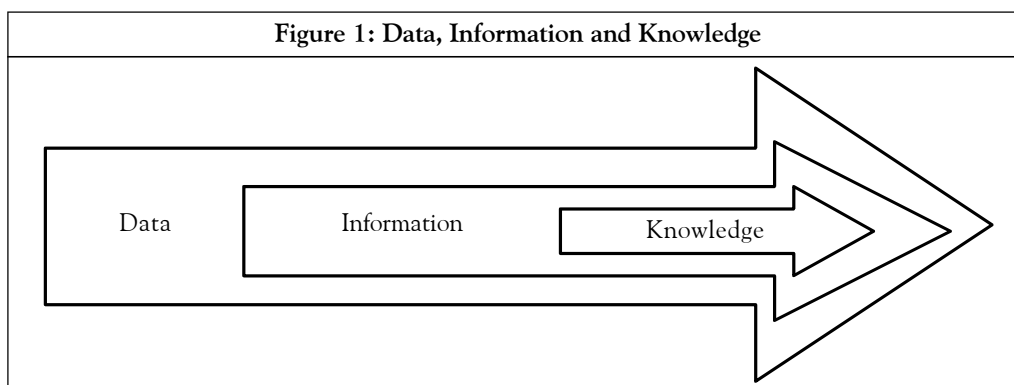
Intellectual Capital (IC)

IC has a great contribution to better perception of knowledge assets (Namvar *et al.*, 2010) and is the first step to make knowledge understandable and practical (Liebowitz, 2001).

Because of its dynamic nature, defining IC accurately is difficult (Zhou and Fink, 2003). Most of the time IC is synonymous with intellectual, intangible and knowledge assets. Sometimes there is a general definition: "the difference between market value of the company and its recorded value" (Chen *et al.*, 2005).

According to Martin (2004), IC is the collection of organization members' knowledge and the scientific translation of this is the trade brands, trade signs and the process related to it. The total organizational hidden resources which have not been completely recorded in traditional accounting reports constitute IC. Therefore, IC and other constructions which form IC are not tangible for traditional accounting system.

Reviewing the Measurement Frames of IC

It is difficult to measure knowledge in an organization (Tuomi, 1999). But since knowledge is very important for the organization's competitive capability, its evaluation is really important (Jafari *et al.*, 2008). A review of the management frames shows that little attention has been paid to the measurement of knowledge. Since reviewing these frameworks precisely is not the scope in this paper, we just present a list of frameworks in Exhibit 1 (compiled after Glazer, 1998; Skyrme and Amidon, 1998; De Pablos, 2002; Marr *et al.*, 2004; and Mavridis, 2004).

Exhibit 1: List of the Measurement Frames of IC	
• Balanced Scorecard	• Value Chain Scoreboard
• Performance Prism	• Dependency Network Diagram
• Skandia Navigator	• *Tableau de board*
• IC-Index Approach	• Technology Dealer
• IC Audit Model	• Strategic Management Approach Based on Merit (Competence)
• Intangible Asset Monitor	• Making Profit Map
• Knowledge Assets Map	• Calculated Intangible Value
• Value Added Intellectual Capital	• Intellectual Capital Guide
• Methodology of Comprehensive Evaluation	• Knowledge Value Added
• Infovalue	• Value Enhancer
• Economical Value Added	• Behavior Frame of Knowledge Management
• Index Approach of Tobin's *q*	
• Service Quality Accounting Approach	

Perfect Model (EFQM)

The European foundation for quality management began to plan the perfect model of EFQM in 1989 and introduced it in 1991. In 1999 and 2003, its new versions were presented, which included considerable changes in criteria and guide points. This method consists of nine criteria which are in two parts:

A. (Making Able): The first five criteria enable the organization to achieve results.

B. Results: Final results which perfect organizations achieve in different fields, showing the achievement of desired performance in the first part (making able).

The philosophy of EFQM is based on the eight conceptions of widespread quality management: (1) Result-tendency; (2) Customer-basis; (3) Leadership and stability of target; (4) Management based on processes and facts; (5) Developing staff's participation; (6) Learning, innovation and constant improvement; (7) Developing partnership; and (8) Social responsibilities.

Selecting the Knowledge Evaluation View

From the different views of knowledge evaluation (based on literature review) mentioned above, it is necessary to select a perspective which is most appropriate to the general condition of industry and requirements of a sound model of knowledge evaluation. In this direction, the stakeholder perspective was utilized. At the first step, needs and expectations of main stakeholders were recognized. Then, they were translated into model features. Finally, based on the literature review, a suitable approach was selected to describe the stakeholders' expectations. Results are shown in Table 1. BSC has been selected as a reference model which reflects the demands of all groups of stakeholders. After extracting the stakeholders' expectation features, they were combined with EFQM model.

Table 1: Complex Stakeholder Analysis				
S. No.	Stakeholder Group	Expectative Demands	Features of Selected Model	Useful Models
1.	Holding	Although subset industries are state sections, supporting them is because of creating worth (like the private section), in other words, continuation of these industries activities needs the economic justification.	The selected model should be adapted to the features of state and private section.	Market Capitalization Methods (MCM), Return on Assets (ROA) and Direct Intellectual Capital (DIC) views are not suitable for state section because of their financial nature. Scorecards (SC) are suitable for this purpose.
2.	Senior industrial managers	Intangible assets have been recognized and their relationship with goals should be analyzed. This demand is caused by strategic attitude of managers. It means that it is possible to consider the level of intangible assets.	It should be possible to relate the intangible assets to the organizational goals.	Models which have explanatory and organizational approach to the organizational knowledge assets are superior.

Table 1 (Cont.)

S. No.	Stakeholder Group	Expectative Demands	Features of Selected Model	Useful Models
3.	Key experts and connoisseurs	Based on the literature, because presenting a monetary (rail) attitude about intangible indices is something superficial, it is better to present a non-monetary report about organization knowledge.	Market-based and economy-based models will not be used.	SC methods will be suitable because they report different indices of executing IC in frame of scorecards.
4.	Key experts and connoisseurs	In accordance with the key experts and industrial connoisseurs opinions, most of the knowledge resources which are worth creating for organization and necessary to be included in the process of knowledge evaluation, were presented in the previous report (such as customers, productions, staffs, construction, privileges and achieved certificates, contractors network, researches, processes and informational system).	Selected model should cover the variables which affect the knowledge evaluation in the complex.	Balanced Scorecard, Skandia, IC index, supervision on intangible assets, knowledge asset map.
5.	Knowledge inspectors and auditors	The models presented should be most proportional to the present complex activities and should mostly enjoy information and indices of other systems.	The model should be able to connect to the organizational elevation view (in the form of EFQM) and it is better to use the same indices for organizational knowledge asset level report.	Examining different studies, the relationship between BSC and EFQM model is one of the scientific borders.

Combined Frame

As we mentioned in the explanation of stakeholders' expectations, since Beasat Industrial Complex is implementing EFQM model in order to achieve organizational perfection and excellence, using EFQM view in our suggested framework for knowledge evaluation can
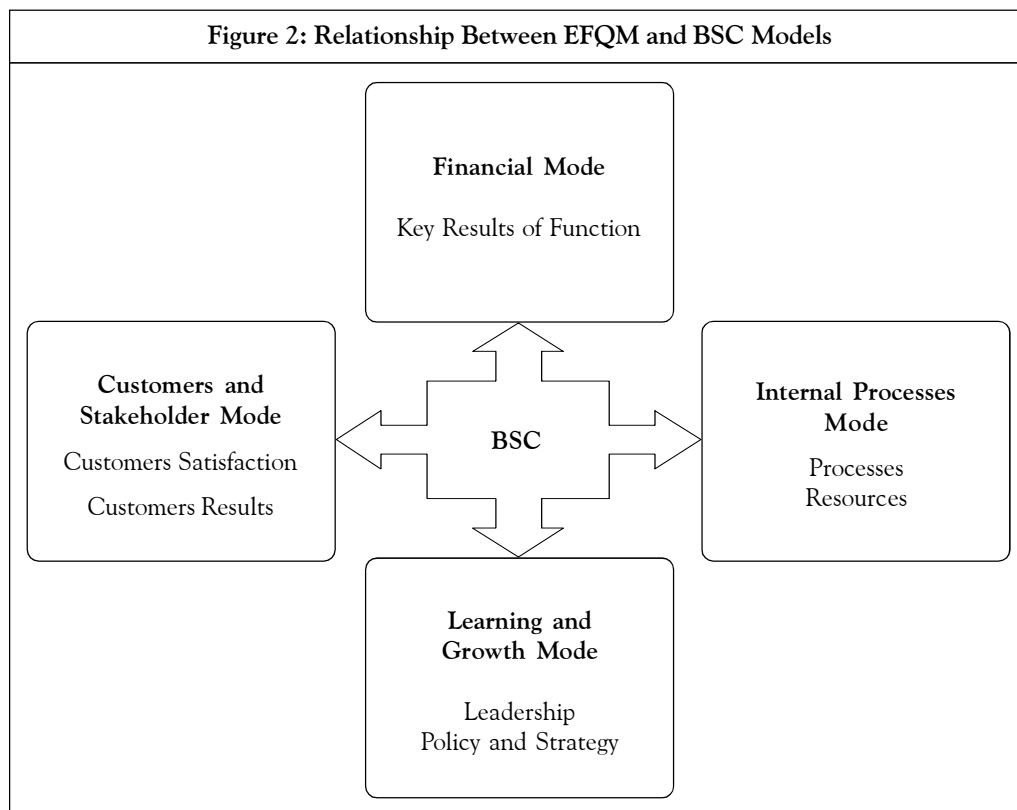
generate synergy in the organization and enhance the likelihood of successful implementation of the framework throughout the organization.
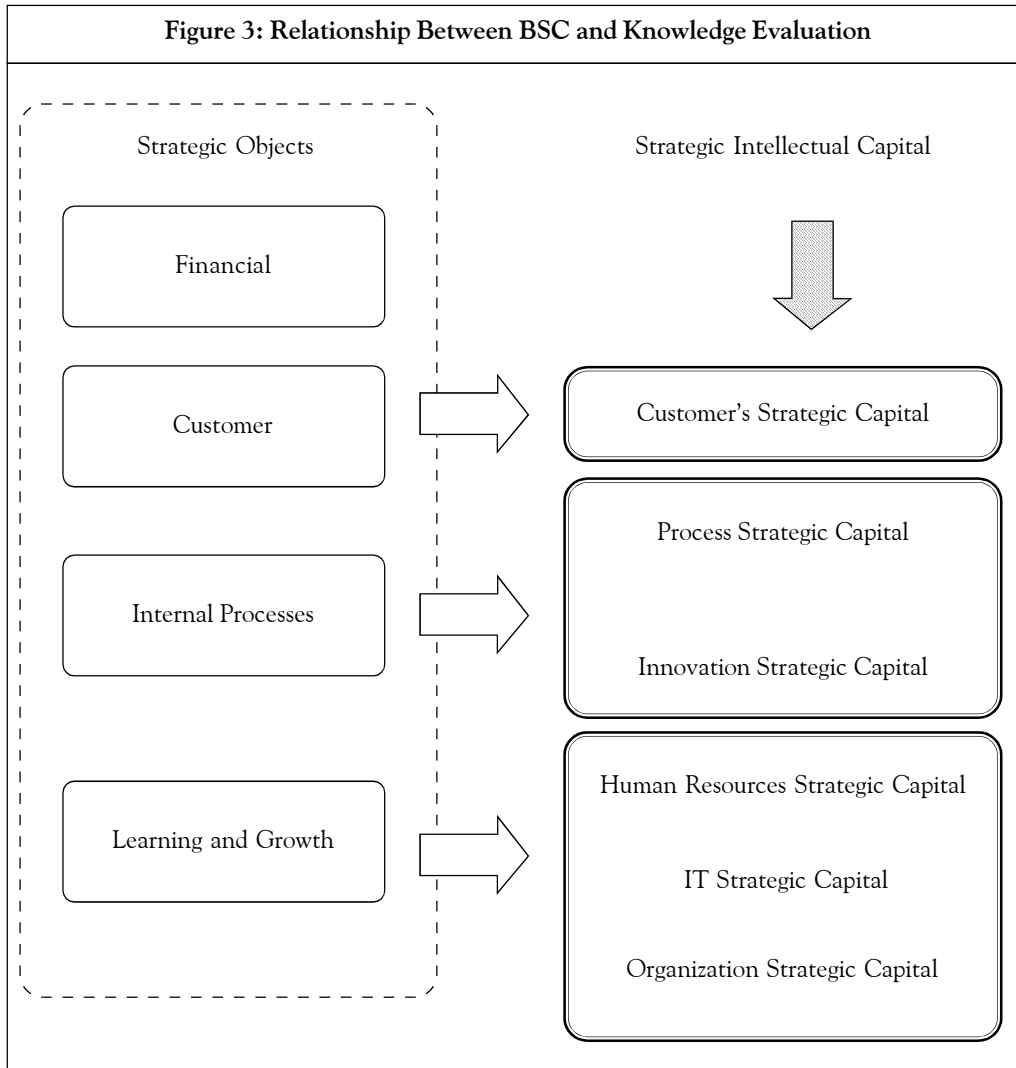
To present a combined framework, it is necessary to recognize and explain the relationship between nine fields of EFQM and four aspects of BSC (Figure 2). BSC and EFQM have different approaches in the evaluation of organizational performance. BSC concentrates on accepted strategies of organization and presents a means for management processes and individual observations of casual-effect relationship, whereas EFQM is based on strategic planning and 'acceptable logic' and includes a standard set of strategic goals to the entire organization (Wongrassamee *et al.*, 2003). It just shows the 'total' causal relationships which connect strategic goals together and facilitates utilizing of the planning process and comparing outputs of model with all of the international organizations.

These two models have some weaknesses as well as strengths based on their special goals. BSC is a means in strategic management, EFQM is a means to recognize capacities of organizational improvement and it cannot be used as an effective tool in strategic management.

However, users of the perfect model emphasize the use of this model in order to recognize improvement capacities by BSC as a means for strategic management activities.

On the other hand, in order to enjoy BSC model in measuring organizational knowledge, it is necessary to restore a clear relationship between different fields of IC and BSC (see Figures 2 and 3).

Figure 2: Relationship Between EFQM and BSC Models

Financial Mode

Key Results of Function

Customers and Stakeholder Mode

Customers Satisfaction

Customers Results

BSC

Internal Processes Mode

Processes
Resources

Learning and Growth Mode

Leadership
Policy and Strategy

Figure 3: Relationship Between BSC and Knowledge Evaluation

Earlier, the relationship between IC and BSC was discussed under two aspects:

- BSC guides the creation, formation and measurement of IC.
- BSC strengthens IC management.

In general, we can classify studies on BSC and IC into three categories:

- Comparison between BSC and IC.
- Relationship between BSC and IC: measurement and management.
- Utilizing BSC to measure IC performance.

Considering the concepts described in Figures 2 and 3 and their relationship, Table 2 illustrates the framework for evaluating organizational knowledge.

Table 2: Total Obtained Frame for Evaluating Organizational Knowledge		
BSC	IC	EFQM
Financial mode	Assets	Key results of performance Partnerships and resources (a-4) Partnerships and resources (b-4) Partnerships and resources (c-4)
Customer mode	Customer capital	Customer results Community results Process (c-5)
Internal processes mode	Process capital Innovation capital	Process Partnerships and resources (b-4) Partnerships and resources (c-4)
Learning and growth mode	Human capital IT capital Organizational capital	Leadership Policy and strategy Staffs (human resources) Staffs results

The table is similar to the current views in measuring knowledge based on BSC model executed in different ports.
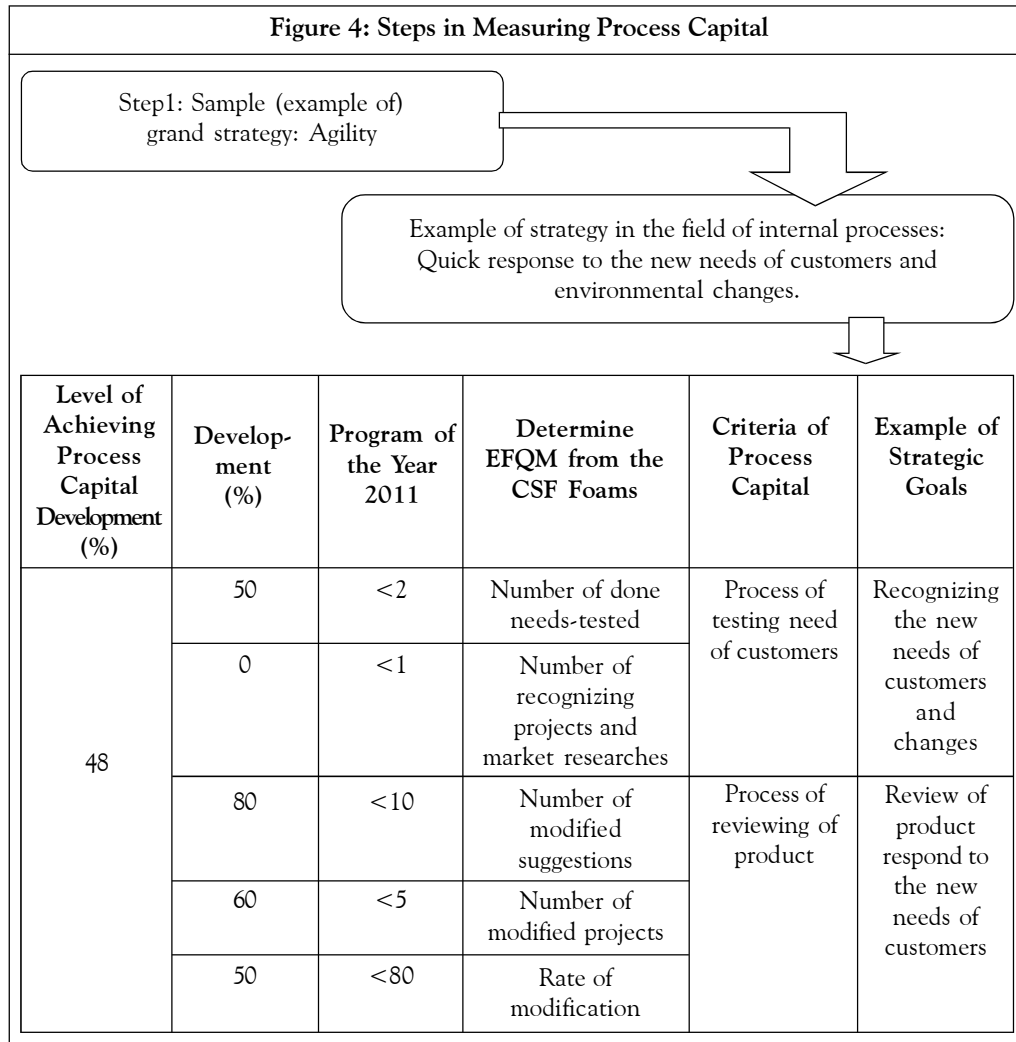
The main steps of evaluating organizational knowledge based on the suggested framework are:

- Determining grand strategies of company.

- Translating grand strategies into strategic themes in any of the four layers of BSC.

- Determining strategic goals in each level of BSC.

- Translating strategic goals into intangible assets criteria in each level of BSC.

- Determining the key factors of success (CSF) related to the strategic goals in EFQM model and Table 2 (as a standard of measuring any IC criteria).

- Determining quantitative goals for every CSF.

- Measuring the achievement of determined goals.

- Calculating the level of achievement of intangible capitals.

To examine the practical reliability of the developed framework in real world, it was implemented and executed in Beasat Industrial Complex as a case study. Beasat Industrial Complex was found in 1988 to produce breathing protectors. After producing breathing protectors, the main production is medical and laboratory equipment. In recent years, this industrial complex was able to meet the local demand and tried to export its products to other countries.

This was possible by creating technological knowledge instead of buying and transferring knowledge. The result was achieved by educating skillful human resources capable of saving millions of dollars for the organization. They are trying to run a new facility to produce blood bags which are expected to contribute to the organizations' income considerably.

Because most of the complex information was confidential, one of the complex grand strategies (Agility) has been selected for this study. Figure 4 shows the eight steps mentioned in the process of measuring the capital for this organization.

Figure 4: Steps in Measuring Process Capital

Step1: Sample (example of) grand strategy: Agility

Example of strategy in the field of internal processes: Quick response to the new needs of customers and environmental changes.

| Level of Achieving Process Capital Development (%)	Development (%)	Program of the Year 2011	Determine EFQM from the CSF Foams	Criteria of Process Capital	Example of Strategic Goals
48	50	<2	Number of done needs-tested	Process of testing need of customers	Recognizing the new needs of customers and changes
	0	<1	Number of recognizing projects and market researches		
	80	<10	Number of modified suggestions	Process of reviewing of product	Review of product respond to the new needs of customers
	60	<5	Number of modified projects		
	50	<80	Rate of modification		

As the main results of measuring organizational knowledge is complex we can mention:

The average results obtained from primary evaluation of industry connected to the Crucial Success Factors (CSF) are equal to 69%.

This industry should develop some programs for the factory less capital. These indices are (crucial success factors which have the score of 50 or less): decreasing losses, number of customer complaints, returned production, success rate of selling new production, speed of improvement in the process and production, number of scientific essays, number of scientific gifts and positions, cost of staff training, number of staffs suggestions and speed of answer to the demands.

The total picture of the level of achievement of IC development is shown in Figure 5. Based on this, the level of development in IT capital has a considerable increase which is because of attention in recent years towards IT. Another reason is the great support offered by one of the top managers who is an IT expert.

Figure 5: Level of Achievement of Intellectual Capitals Development
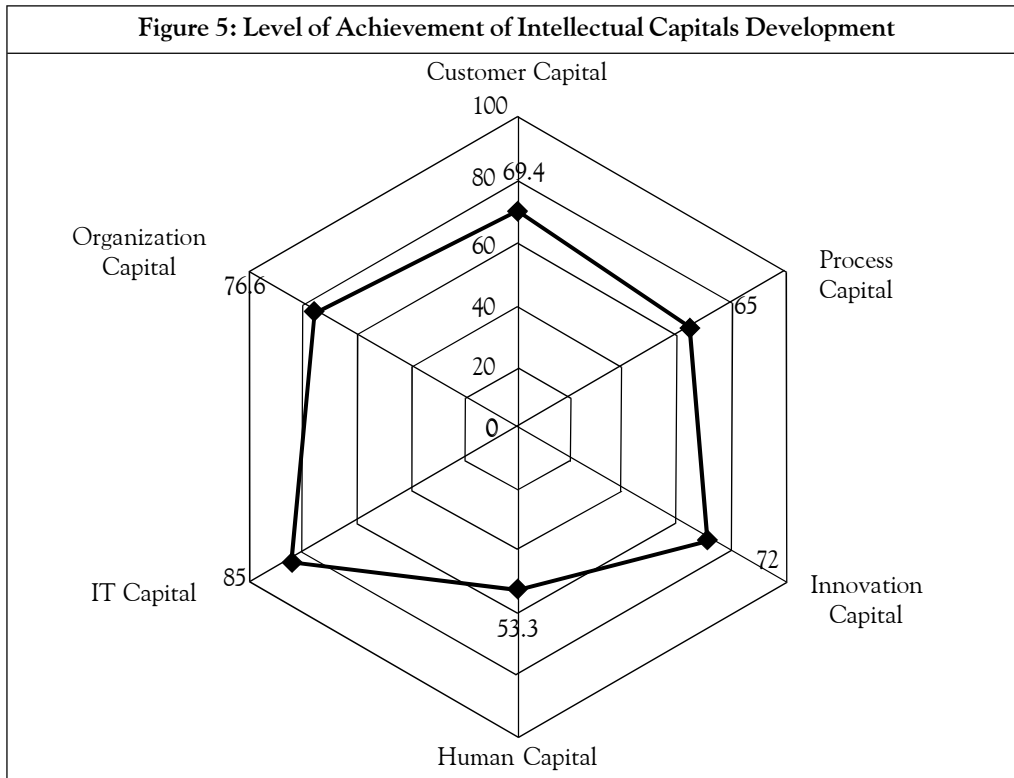
Conclusion

The study combined the two popular models, BSC and EFQM, to develop a framework for measuring the organizational knowledge.

The framework developed was implemented by the organizations and managers by integrating the organizational goals and expectations with the different levels to the process of knowledge development in the organization which is one of the main concerns of strategic managers in the business world. This framework helps to break down the organizational grand strategies to objective goals and directs these objective goals to each level of BSC. Then using the EFQM rationale, some operational factors which determined the achievement of these goals were assessed. Based on the results of evaluating the level of goal achievement in each section, managers can decide how to improve IC in their organizations.

In the special case of Beasat Complex, the results illustrated in Figure 5 could help managers to identify the contribution of each category of IC to organizational goals achievement. Then, they make a required decision whenever there is a need for more support or change of work processes.

Limitations of the Study: Similar to any other research, this research has some limitations. First, we believe that the suggested framework needs to be implemented and examined in more organizations in different industries so that its practical reliability becomes stronger. It can also be improved and modified through reimplementation. Also, to keep the information confidential as managers in Beasat desired, we could not report information completely about processes other than IT. Future research can elaborate on the framework by comparing and contrasting other functional areas in an organization. ∎

Bibliography

1. Akhavan P, Hosnavi R and Sanjaghi M (2009), "Identification of Knowledge Management Critical Success Factors in Iranian Academic Research Centers", *Education, Business and Society: Contemporary Middle Eastern Issues*, Vol. 2, No. 4, pp. 276-288.

2. Chen M C, Cheng S J and Hwang Y (2005), "An Empirical Investigation of the Relationship Between Intellectual Capital and Firm's Market Value and Financial Performance", *Journal of Intellectual Capital*, Vol. 6, No. 2, pp. 159-176.

3. Chourides P, Long Bottom D and Murphy W (2003), "Excellence in Knowledge Management: An Empirical Study to Identify Critical Factors and Performance Measures", *Measuring Business Excellence*, Vol. 7, No. 2, pp. 29-45.

4. Cina C, Molinero C M and Queiroz A B (2003), "The Measurement of Intangible Assets in Public Sector Using Scaling Techniques", *Journal of Intellectual Capital*, Vol. 4, No. 2, pp. 249-275.

5. De Pablos P (2002), "Evidence of Intellectual Capital Measurement from Asia, Europe and the Middle East", *Journal of Intellectual Capital*, Vol. 3, No. 3, pp. 287-302.

6. Glazer R (1998), "Measuring the Knower", *California Management Review*, Vol. 40, No. 3, pp. 175-194.

7. Jafari M, Fathian M, Jahani A and Akhavan P (2008), "Exploring the Contextual Dimensions of Organization from Knowledge Management Perspective", *Vine: The Journal of Information and Knowledge Management Systems*, Vol. 38, No. 1, pp. 53-71.

8. Jafari M, Rezaeenour J, Akhavan P and Mehdi N F (2010), "Strategic Knowledge Management in Aerospace Industries: A Case Study", *Aircraft Engineering and Aerospace Technology: An International Journal*, Vol. 82, No. 1, pp. 60-74.

9. Liebowitz J (2001), "Knowledge Management and Its Link to Artificial Intelligence", *Expert Systems with Applications*, Vol. 20, No. 1, pp. 1-6.

10. Liebowitz J and Suen Y (2000), "Developing Knowledge Management Metrics for Measuring Intellectual Capital", *Journal of Intellectual Capital*, Vol. 1, No. 1, pp. 54-67.

11. Marr B and Spender J (2004), "Measuring Knowledge Assets Implications of the Knowledge Economy for the Performance Measurement", *Measuring Business Excellence*, Vol. 8, No. 1, pp. 18-27.

12. Marr B, Schiuma G and Neely A (2004), "Intellectual Capital: Defining Key Performance Indicators for Organizational Knowledge Assets", *Business Process Management*, Vol. 10, No. 5, pp. 551-569.

13. Martin W J (2004), "Demonstrating Knowledge Value: A Broader Perspective on Metrics", *Journal of Intellectual Capital*, Vol. 5, No. 1, pp. 77-91.

14. Mavridis D G (2004), "The Intellectual Capital Performance of the Japanese Banking Sector", *Journal of Intellectual Capital*, Vol. 5, No. 1, pp. 92-115.

15. Namvar M, Fathian M, Akhavan P and Gholamian M R (2010), "Exploring the Impacts of Intellectual Property on Intellectual Capital and Company Performance: The Case of Iranian Computer and Electronic Organizations", *Management Decision*, Vol. 48, No. 5, pp. 676-697.

16. Nonaka I (1994), "A Dynamic Theory of Organizational Knowledge Creation", *Organization Science*, Vol. 5, No. 1, pp. 14-37.

17. Rodgers W (2003), "Measurement and Reporting of Knowledge-Based Assets", *Journal of Intellectual Capital*, Vol. 4, No. 2, pp. 181-190.

18. Skyrme D J and Amidon D M (1998), "New Measures of Success", *Journal of Business Strategy*, Vol. 19, No. 1, pp. 20-24.

19. Tuomi I (1999), "Data is More Than Knowledge Implications of the Reversed Knowledge Hierarchy for Knowledge Management and Organizational Memory", *Journal of Management Information Systems*, Vol. 16, No. 3, pp. 107-121.

20. Wongrassamee S, Gardiner P D and Simmons J E L (2003), "Performance Measurement Tools: The Balanced Scorecard and the EFQM Excellence Model", *Measuring Business Excellence*, Vol. 7, No. 1, pp. 14-28.

21. Zhou A and Fink D (2003), "The Intellectual Capital Web: A Systematic Linking of Intellectual Capital and Knowledge Management", *Journal of Intellectual Capital*, Vol. 4, No. 1, pp. 34-48.