Balanced Scorecard; a Tool for Measuring and Modifying IT Governance in Healthcare Organizations

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Abstract—**Nowadays healthcare organizations satisfy most of their needs and in some cases achieve a competitive advantage with using new technologies. Information technology is one of those technologies that is most popular in both operational and administrative activities. So in this way IT plans should be driven by an organization called IT governance organization. The ultimate goal of designing, developing and implementing the IT governance is to combine business and IT to access better financial results and find relationship between business and IT to achieve objectives with better financial measures. Thus IT balanced scorecard process which is leading to corporate contribution is a rational process and is used in this article as one of research methods. Balance scorecard is a well-known method in performance evaluation and also as controlling and monitoring mechanism in strategic management. In this article IT balanced scorecard is used as a framework for evaluating performance of IT governance in a health care organization, and evaluated and scored firm's position in four aspects: corporate contribution, stakeholders, operation excellence, and future orientation. As a result, addition to current IT governance position in the organization some strategies suggested for improving use of IT as an enabling business tool.**

Index Terms—**Balanced scorecard, evaluating performance, IT governance, Healthcare organization.**

I. INTRODUCTION

These days, health care organizations face so many difficulties in measuring and evaluating organizational performance evaluation and also environmental evaluation, because manager tries to match organization performance and strategic goals. In this way healthcare organization experienced acceptable development in Information Technology. In healthcare organizations because of variety of process and transactions, IT plays key role in organizational governance. In this paper as the first step some definitions and key factors mentioned, some barriers that may causes in IT governance process, and also introducing IT governance and its methods and techniques.

A. IT governance

IT governance is an integral part of organizational governance and consists of the leadership, organizational structures, and processes that ensure that the organization's

IT sustains and extends the organization's strategies and objectives [1]. Board of directors and executive management has the responsibility of IT governance. Grembergen (2009) defined IT governance as an organizational capacity used by board of directors, executive management and technology management for formulating and implementation of IT strategy, and business and technology are coordinated. Weill and Ross (2004) believe that IT governance is to specify the decision rights and accountability framework for encourage desirable behavior in the use of IT [3].

B. Why is IT Governance important?

The use of IT has the potential to be the major driver of economic wealth in the 21st century. While IT is already critical to enterprise success, provides opportunities to obtain a competitive advantage and offers a means for increasing productivity, it will do all this even more so in the future.

Leveraging IT successfully to transform the enterprise and create value added products and services has become a universal business competency. IT is fundamental for managing enterprise resources, dealing with suppliers and customers, and enabling increasingly global and dematerialized transactions. IT also is key for recording and disseminating business knowledge [1].

C. What does IT governance cover?

IT governance considers two things: IT's delivery of value to the business and Mitigation of IT risks. The can be driven by strategic alignment of IT with the business and second is driven by embedding accountability into the organization. Both mentioned factors should be supported by adequate resources, and be measured for assurance of results.

Value represented by IT is actually a function of strategic alignment of IT with the business.
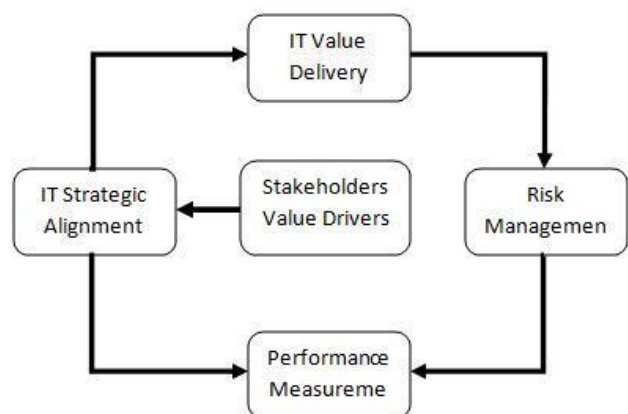

Figure 1- Focus Area of It Governance [1]

Accountability in organization is driver of second aspect. This will cause to importance of five main focus areas which

have driven by stakeholder value. "Value delivery" and "Risk management" are outcomes. Three other areas of Strategic alignment", "resource management" and "performance measurement" are drivers. This has shown in Figure 1 [1].

This concept also is a continuous life cycle, which can be entered in any point. Generally entry point is beginning of cycle and with strategy and alignment throughout the organization. Then implementation occurs, value delivery, and addressing the risk that needs mitigation. In regular intervals, strategic monitoring needs, results would be measured, be reported, and acted upon. Generally on an annual basis strategy would be reevaluated and be realigned if necessary. IT governance is a process that IT strategy is driver of IT, and collects necessary resources. IT processes are responsible for these responsibilities about process results, managed or accepted risks, and used resources. These reports must show right strategy implementation or need for rechecking strategies.
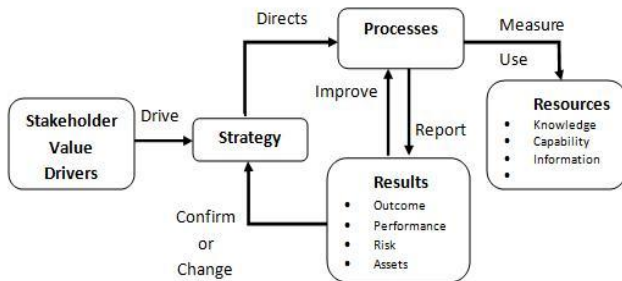

Figure 2- It Governance Process [1]

IT governance cycle doesn't take place in vacuum space. Each organization works in an environment that is influenced by [1]:
1) Stakeholder values
2) The mission, vision, and values of organization
3) Culture and ethics of community and organization
4) Level of IT development
5) Applicable laws, regulations and policies
6) Industry practices

Looking at the predictions of well-known market analysts like Gartner, Compass, Giga, and CSC shows that general issues of IT management shift from technology to the management-related arenas. This is totally matched to areas covered by IT governance, which listed below:
1) Strategic alignment
2) Value delivery
3) Risk management
4) Resource management
5) Performance measurement

D. IT governance performance evaluation

Performance evaluation is actually recognition of current position that compares with predetermined goals or used for planning and choosing goals. Thus first step in implementation of IT governance in organization is recognition, which can be base of right planning. Recognition of current position can help to find strengths and weaknesses. It also helps to offer plans for IT governance development. One of IT governance evaluation methods is to use balanced scorecard which this article focused on it.

E. Balanced scorecard

BSC concepts have used for processes and IT responsibilities. These concepts can be used to evaluate IT governance in a macro level. This framework can help top IT managers, executive managers, and board of directors to have supervision on governance processes, performance, and expandability. Balanced scorecard benefits are as follow:

-Organization and IT department use a single tool to measure performance therefore have a common language, and planning and IT evaluation integration will facilitate. Balanced scorecard will provide goals and standards for all business aspects, including IT.

- Business and IT governance integration will eliminate or minimize the interval between them.

F. IT governance BSC model

Figure 6 represents IT governance BSC in four dimensions: Corporate contribution, stakeholders, operational excellence, and future orientation.
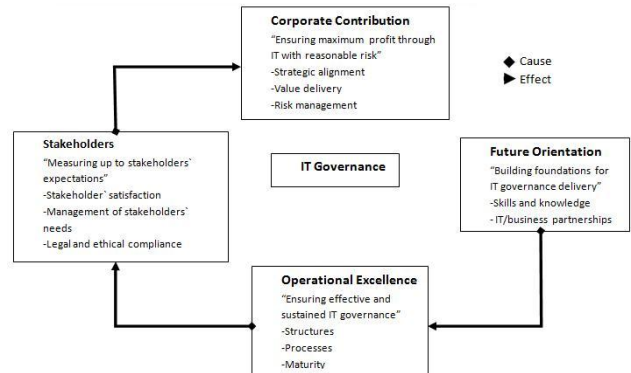

Figure 3- It Governance Scorecard Perspectives and Their Cause-And-Effect Relationships [6]

The ultimate goal is to develop and implementation of IT governance, and reach to a fusion of business and IT, and achieving better financial results. Thus IT governance BSC process that starts with a corporate contribution perspective is a logic process. As shown in Figure 3 the other three perspectives have a causal relationship with corporate contribution and have cause-and-effect relationships among each other. Overall, completed IT governance education (future orientation) may enhance the level of IT/business planning (operational excellence), which in turn may improve stakeholders' satisfaction (stakeholders orientation) and have a positive effect on the strategic match of major IT projects (corporate contribution).

Mission, objectives, and perspective of each measure has shown in tables 1 to 4

IT governance BSC model is used by researchers to evaluate IT governance condition in a health organization in petroleum industry. In following mode of implementing the model, data collection, and data analysis in the company explained in detail.

II. DATA ANALYSIS AND RESEARCH PROCEDURE

A. Research procedure

This article, according to data collection, can be categorized under conceptual - case study category. For

collecting information about literature library method is used. And for evaluating company's IT governance performance field method applied using questionnaire. And, according to goal dimension this article is an applied research.

TABLE 1- CORPORATE CONTRIBUTION MEASURES [6]

	Corporate Contribution
	Ensuring maximum profit while mitigating IT-related risks
Perspective Mission Objectives	*Strategic Alignment* Measures • Weighted governance performance • Strategic match of major IT projects engaged in strategic projects • Percentage of business goals supported by It goals
	Value Delivery Measures • Business unit performance management • Business value of major IT projects based on ROI, NPV, IRR, BP • Ratio IT costs/total turnover • IT costs charged back to the business
	Risk Management Measures • Number of new implemented IT security initiatives and security breaches • Attainment of disaster recovery plans • Number of IT audits performed and reported shortcomings

TABLE 2- STAKEHOLDER'S ORIENTATION MEASURES [6]

	Stakeholders Orientation
	Measuring up to stakeholders` expectation
Perspective Mission Objectives	*Stakeholder satisfaction* Measures • Stakeholders` satisfaction surveys on fixed times • Number of complaints of stakeholders • Index of availability of systems and application
	Management of Stakeholders Needs Measures • Number of meetings with stakeholders • Clear communication in place with CEO and board members • Index of CEO/board involvement in new and major IT initiatives • Number of major IT projects within SLA
	Legal and Ethical Compliance Measures • IT adherence to Sarbanes-Oxley Act • IT adherence to privacy regulations • Adherence to IT code of ethics/IT code of conduct

TABLE 3- OPERATION EXCELLENCE MEASURES [6]

	Operation Excellence
	Ensuring effective and sustained governance
Perspective Mission Objectives	*Structures* Measures • Number of meetings of IT strategy committee and IT steering committees • Composition of IT committees • CIO on board or member of executive management
	Processes Measures • Level of IT strategy planning and business planning • Number of hours spent on IT/business strategic issues • Existence of an IT balanced scorecard and a business balanced scorecard • Number of IT processes measured through a scorecard • Number of IT processes covered by COBIT • Number of IT processes covered by ITIL • Maturity levels of IT processes • Percentage of IT goals supported by IT processes
	Maturity Measures • Overall level of the IT governance process maturity

TABLE 4- FUTURE ORIENTATION MEASURES [6]

	Future Orientation
	Ensuring effective and sustained governance
Perspective Mission Objectives	*Skills and Knowledge* Measures • Number and level of cross-function business/IT training sessions • Number of overall IT governance training sessions • Percentage completed IT governance education per skill type • Number of IT governance presentations for CEO and board members • Level and use of IT governance knowledge management system
	IT/Business Partnership Measures • Percentage of senior managers IT-literate • Percentage of IT managers business-literate • Level of business perception of IT value

Importance and success level of each studied measure in organization is shown in Table 5. Bar chart has shown the difference levels.

TABLE 5- DESCRIPTIVE STATISTICS

	N	Mean (Importance)	Mean (Successful)
Value delivery Measures	55	91.34	40.54
Risk Management Measures	55	96.24	27.67
Stakeholders Satisfaction Measures	55	94.75	71.90
Management of stakeholder Needs Measures	55	89.26	34.88
Legal and Ethical Compliance Measures	55	88.75	83.93
Structures Measures	55	92.49	80.79
Processes Measures	55	90.48	31.23
Skills and Knowledge Measures	55	95.47	43.83
IT/Business Partnership Measures	55	72.39	32.54

For evaluating IT governance performance in four dimensions of IT balanced scorecard a questionnaire developed that IT management experts verified its validity. Stability of questionnaire calculated by Cronbach's alpha 0.9280 with SPSS as shown in Table 6.

TABLE 6- RELIABILITY STATISTICS

Cronbach's Alpha	N of Items
0.928	11

The questionnaire specialized for the organization based on IT experts and company executives' comments. Then company's experts were questioned about several measures. And Likert 5-point scale is used.

B. Measuring IT governance using BSC model

For analyzing data and determining each goal's score (except strategic alignment and maturity) 20,40,60,80 and 100 allocated to 5 items. According to known questions for each dimension's goal the result was average scores of the goal. For calculating dimension's scores the goal scores averaged.

Strategic alignment and maturity have their own questionnaire, which have been used for the article's questionnaire and the score calculated.

1) Strategic Alignment score calculation method

Peter Weill (2004) introduced a short questionnaire in his book for quick evaluation of IT governance which scores out of 100. Grembergen (2005) also used this indicator for evaluating strategic alignment [3], [6].

This questionnaire formed by 8 questions. In first four questions response asked to give opinion about importance of 4 IT governance output (Q1), and in next 4 questions asked to determine his/her organization's position in any of the outputs from 1 to 5 (Q2). The outputs are as follow: gaining effective result from IT expenses, enhancement of organization growth using IT effectively, increasing performance in applying organization assets using IT
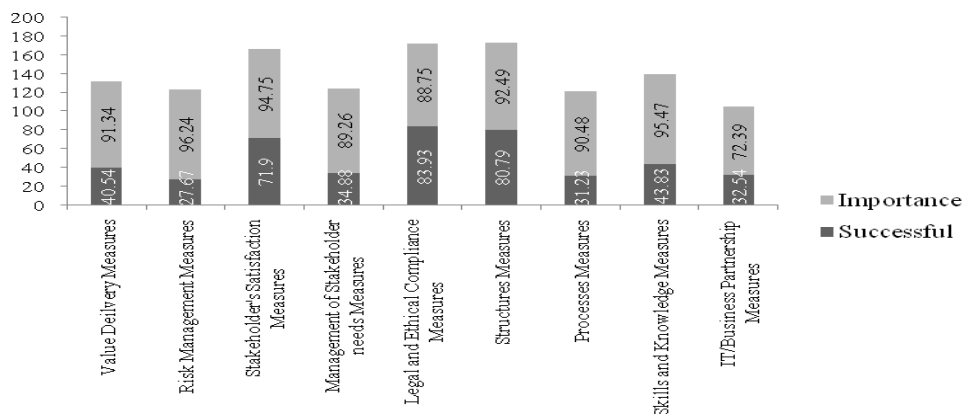

Figure 4 – difference between importance and successful means

effectively, and increasing flexibility of organization and being ready to change using IT effectively. Final index would be calculated through the following formula and it would be a number out of 100 which represents strategic alignment of organization [3]:

$$\frac{(\sum_{n=1\ to\ 4}(Q1 * Q2)) * 100}{\sum_{n=1\ to\ 4}(5(Q1))}$$

According to the formula results given in Table 7 obtained. Results demonstrates that organization's strategic alignment is 60.38%

TABLE 7- DESCRIPTIVE STATISTICS

	Strategic Alignment	Sum
Strategic Alignment (Importance)		654.12
Strategic Alignment (Successful)		1083
	60.38 %	

2) Maturity calculation method

For calculating IT governance maturity in organization

suggested methods by IT governance institute (ITGI) in each level has used. Calculation method of final maturity index which is a number amongst 0 to 5 will explain as follow.

Aim of maturity questions is to see to what extent the organization's IT is aligned to scenarios given for each maturity level. To obtain a number representing compliance value in each level, responses asked to say to what extent they agree or disagree with each statement. Answers would allocate to 0, 0.33, 0.66, and 1 respectively [7], [8].

After completing questionnaires each level will have a set of statements including a number representing alignment level with the organization. The number is calculating from each level statement's average and in the next stage this numbers will normalize. (Each level's number divide on total) in the final stage each level's number will multiply to the level's weight which is the level's number, and sum of numbers will be the maturity number. Results has shown in Table 8, and maturity level for the organization is70.04%

TABLE 8- DESCRIPTIVE STATISTICS

	Sum	Mean
Maturity Measures	192.60	3.5018
Adjusted Maturity Measures	**70.04%**	

Since maturity number is out of 5 it will multiply to 20 to match other numbers.

TABLE 9- SUGGESTIONS FOR IMPROVING IT GOVERNANCE PERFORMANCE

Dimension	Description	Suggestions
Future orientation	This dimension shows that to what extent company provided basis for future development. Therefore its very important	1) Holding training courses in IT area for IT employees and managers 2) Holding trading courses in presence of IT managers and Business managers 3) Improving IT and business knowledge among IT and business managers and employees 4) Providing an IT governance management system in the company for sharing knowledge
Operation excellence	Operation excellence has a special emphasis on IT operation and related processes. In fact, success in this dimension is basis of success in stakeholder's dimension for the company.	1- A seat for top IT manager in board of directors 2- Forming IT governance committee to determine main orientation 3- Supporting IT governance committee in several areas 4- Using a IT process framework as a basis to define IT governance processes (such as COBIT or ITIL) 5- IT processes evaluation using BSC 6- Defining IT processes using BSC 7- Determining clear interactions between business and IT goals.
Stakeholders	Stakeholder's dimension is evaluating interaction between IT and different stakeholders and their satisfaction degree. This dimension is important because Misapprehension of stakeholder's needs and not providing it preventing IT from reaching to it's goals	1- Creating mechanisms like oral, by phone, or through website surveys for recognition of stakeholder's requests from IT 2- Holding regular meetings with members to know their satisfaction degree and their needs 3- Making service level agreements for IT services that IT provide for other departments.
Corporate contribution	In this dimension IT results determined and we can see to what extent IT can help corporate to reach it's goals	1- Defining IT projects based on corporate strategic plan and consultation with stakeholders before final decision making 2- Allocating funds and facilities to strategic projects 3- Using at least one of financial evaluation methods for deciding about doing or not doing the project (ROI, NPV, IRR, PBP) 4- Creating programs for confronting IT crisis 5- Increasing number of inspections and security controls.

C. Data analysis

In fact, doing this research current situation reviewed and reported and the company has scored in each dimension. As no development can occur without recognition of current situation the company can use this report to recognize its position and improvement in various dimensions.

For analysis first of all a comparison made amongst various dimensions and was determined that 3 aspects of corporate contribution, operation excellence, and future orientation are very close together. Stakeholder's dimension has greater score comparing to other dimensions.

In corporate contribution dimension risk management goal and value representation has more favorable position than strategic alignment goal. IT department Interaction with other departments was not sufficient and as a result strategic alignment position is not suitable. If projects approve with feasibility study and financial planning value delivery measure will obtain higher score.

Stakeholder's dimension has 3 goals. Legal and ethical compliance measure has higher score than stakeholder's

satisfaction. As the company has concentration on data protection it has a high level of legal and ethical compliance. The company also has an acceptable interaction with stakeholders and matched their IT needs. Stakeholder's satisfaction is acceptable and can be developed.

In operation excellence dimension all 3 goals have almost equal scores. Structure goal is in a proper position due to strategic committees. Currently IT executive doesn't have a seat in board of directors. If organization provide a seat for him in board of directors Structure goal will have greater score. As organization has strategic planning and some time spent on discussing about strategic issues, despite the lack of business balanced scorecard and IT balanced scorecard some processes created proportional to IT goals. Therefore process goal obtained a mediocre score. Overall IT governance maturity in the organization is moderate that shows some awareness and actions performed but still needed more effort. Future orientation dimension has two goals: skill and knowledge, and IT/ business partnership.

However according to acceptable knowledge about IT in management and their interaction with this area IT/business partnership condition is not inappropriate but in skills and IT knowledge issues still need more attention.

D. Suggestions for improving IT governance performance

According to results obtained from IT governance performance evaluation in the company some suggestions presented for improving IT governance performance summarized in Table 9.

III. CONCLUSION

IT balanced scorecard governance used for evaluating IT condition and improving it, because measuring is not sufficient and should use this instrument as a management system. For example when measurement shows fundamental problems in risk management (corporate contribution) should create an acceptable strategy for confronting crisis (operation excellence) which needs training courses (future orientation). As data collected from this research shows some measures don't have acceptable situation in the organization when importance evaluated in high level. For example Risk management measures, Process measures, IT/Business partnership measures, and Management of stakeholder's needs measures do not cover the importance evaluated for them.

Implementing IT balanced scorecard organizations can increase capacitance of board of directors, CEO, IT executive, and executives providing needed data. They can do more effective actions based on this data. As a result of this actions there would be more contribution between IT and corporate. IT balanced scorecard governance model is a general model that all organizations can use it regardless of size, public or private, profitable or non-profitable, and the industry. According to measures mentioned in each dimension a questionnaire can be created to evaluate IT governance operation in each dimension using balanced scorecard. If this model used in different companies in an industry, each company can compare its situation with it's competitors, and use results to improving their goals. In addition customers also can have more conscious choice in a competitive market.

REFERENCES

[1] IT Governance Institute (ITGI). (2003). "Board Briefing on IT Governance" available online at: www.itgi.org
[2] Van Grembergen Wim. (2009). "Introduction to the minitrack IT governance and its mechanisms". Proceedings of the 35th Hawaii International Conference on System Sciences. IEEE
[3] Weill P., Ross, J. (2004). "IT Governance- How top performers manage IT decision rights for superior results". Harvard Business School Press.
[4] Van Grembergen Wim. (2004). "Strategies for information technology governance", Idea Group Publishing
[5] Van Der Zee J. T. , De Jong Berend. (1999). "Alignment is not enough: Integerating Business and Information Technology Management with the Balanced Scorecard" Journal of Management Information Systems; 16,2 P.137
[6] Van Grembergen W, de Haes Steven. (2005) "Measuring and improving information technology governance through the balanced scorecard" Information systems control journal Volume 2 P. 46-49
[7] IT Governance Institute (ITGI). (2005). "COBIT 4.0"
[8] Pederiva Andrea. (2003). "The COBIT maturity model in a vendor evaluation case, Information systems audit and control association.