

## ARTICLE

# BUILDING HOSPITAL BALANCED SCORECARD BY USING DECISION SUPPORT APPROACH

Ufuk Cebeci\*

Department of Industrial Engineering, Istanbul Technical University, TURKEY

## ABSTRACT

**Background:** The Balanced Scorecard (BSC) is one of the most common applications of performance management in every type of organization all over the world. The literature studies reveal that there is an obvious lack of studies which focus on integrated approach for balanced scorecard stages. The aim of this study is to develop a new decision support framework for balanced scorecard in hospitals.

**Methods:** An integrated hospital BSC approach is developed from vision to action as a whole. The approach including 10 stages is developed for hospitals, originally. The new decision support system framework helps to the managers of hospitals to design balanced scorecard effectively. Some hospitals in Turkey are visited to obtain necessary information. The hospitals with top management's commitment are selected. **Results and Conclusions:** The paper finds that an integrated approach should be applied for the implementation of balanced scorecard and expert knowledge is required for every stage of balanced scorecard to support hospital managers. The model gives recommendation for every stage of balanced scorecard and it is applied in a private hospital.

## INTRODUCTION

The Balanced Scorecard (BSC) is one of the most common applications of performance management in every type of organization (private sector, non-profit organizations, and government) all over the world. It is used to increase the performance of a company and the employees by starting from vision, strategies and other long term concepts. BSC enables management to execute their strategies. ERP systems focus on integrating different business functions and departments in an efficient manner. While BSC uses the information derived from Enterprise Resource Planning (ERP) systems to focus the strategies, goals, objectives, and performance. The balanced scorecard is a tool that can help translate visions and strategies into an integrated set of performance and action. Kaplan and Norton [1] introduced the balanced scorecard concept as a strategic performance management system. A strategic planning study such as balanced scorecard is very useful from vision to action. Kaplan and Norton [2] state that "the balanced scorecard translates an organization's mission, vision and strategy into a comprehensive set of performance measures and provides the framework for strategic measurement and management". The balanced scorecard concept measures organizational performance across four balanced perspectives: financial perspective, customer perspective, internal business perspective, and learning and growth perspective. They state that balanced scorecard tells you the knowledge, skills and systems that your employees will need (learning and growth perspective) to innovate and build the right strategic capabilities and efficiencies (internal processes perspective) that deliver specific value to the market (customer perspective) which will eventually lead to higher shareholder value (financial perspective) [Fig.1].

Bisbe and Barrubés [3] studied some of the contributions, dilemmas, and limitations of Balanced Scorecards in health care organizations. They prepared a case study, formed strategy maps, but they don't emphasize the relation between strategy maps and Key Performans Indicators (KPI). Chang et al. [4] assessed both direct and indirect outcomes of the implementation of Balanced Scorecard in a hospital in Taiwan since its inception in 2001. MMH is the first hospital in Taiwan to implement the Balanced Scorecard fully for the entire organization, not just for a specific department. Cowan et al [5] reviewed the literature about competence in nursing practice. Cebeci [6] proposed a fuzzy AHP-based decision support system for selecting ERP systems by using balanced scorecard and its case study was applied in a textile company. A BSC study needs ERP infrastructure. Huang [7] suggests a knowledge-based system for strategic planning including balanced scorecard. It is important to select, manage and balance the right Key Performance Indicators (KPI) among thousands that can be produced by ERP systems for every management level and units. Companies define their vision, strategies and goals at top management level, but they cannot apply deployment at medium or lower level management and units. Almost none of the papers applied SWOT (Strength, Weakness, Opportunities, Threats) analysis. Some existing papers focus only few stages of balanced scorecard. This study helps to managers an integrated implementation of balanced scorecard by defining 10 stages originally.

Managers need expert knowledge to build an effective performance management system and BSC in every stage and they ask a lot of questions such as:

- How to define a shared vision?
- How to apply SWOT analysis?
- Which strategies are important for my sector and my organization?
- How to apply Balanced Scorecard in hospital sector?
- How many strategies are necessary for my organization?
- How to form strategy maps?

### KEY WORDS

Balanced Scorecard;  
Decision Support;  
Hospital; Healthcare  
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Email: cebeciu@itu.edu.tr  
Tel.: +90 532 432 1300  
Fax: +90 212 24072 60

Which Key Performance Indicators (KPI) are more important for my organization?  
 What is the formula of every Key Performance Indicator?  
 How many objectives are necessary at hospital level?  
 How many objectives are necessary at unit level?  
 How many objectives are necessary at unit manager level?

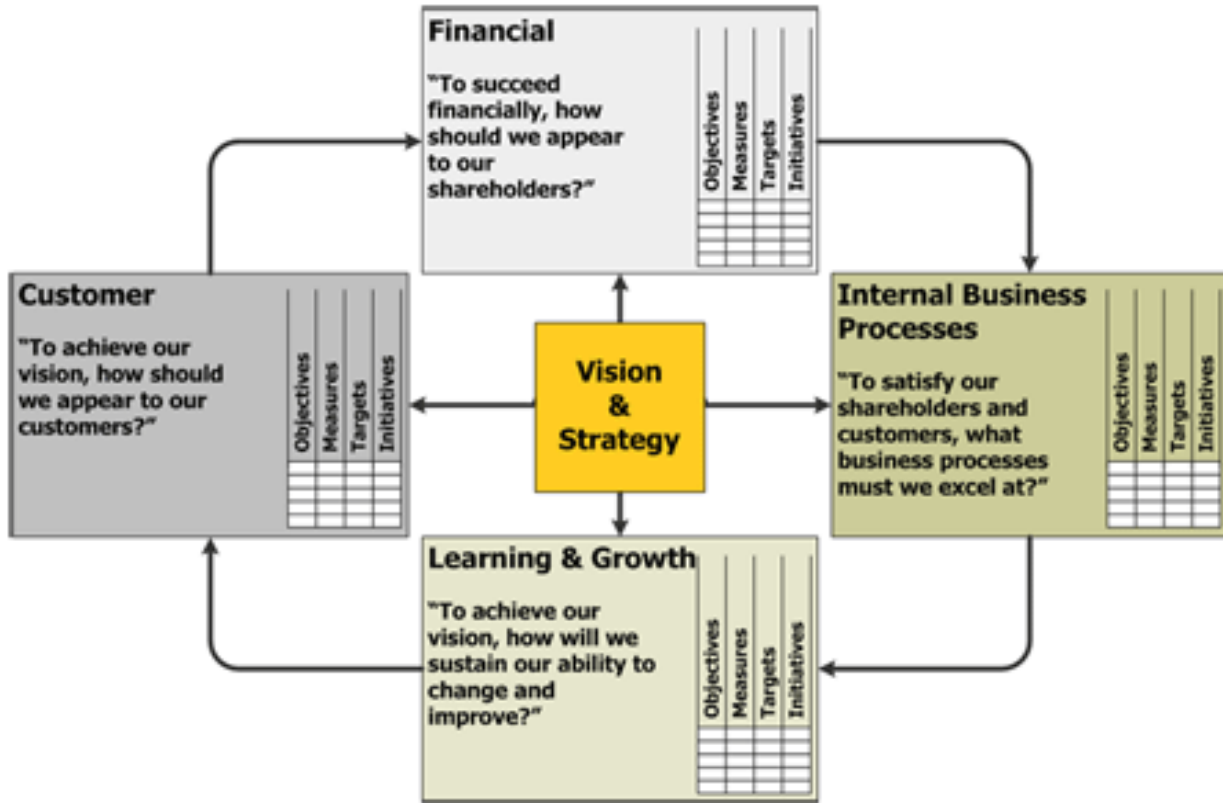


Fig. 1: The structure of Balanced Scorecard developed by Kaplan and Norton.

All these questions and more need expert knowledge. One of the objectives of this study is to answer these important questions by developing a framework of balanced scorecard decision support system for the hospitals. Another objective is to help a user who wants to build a balanced scorecard by giving some suggestions and recommendations when analyzing the necessary data derived generally from ERP system of the organization.

Scientific studies related balanced scorecard focus some parts of balanced scorecard, in general. However, balanced scorecard concept needs to be implemented from vision to action and operational level.

The rest of the paper is organized as follows:

The developed BSC decision support framework for hospitals are explained. A Case Study from a Turkish Hospital is added to understand more clearly the BSC, A discussion section and finally conclusion section including lessons learned and future study.

## MATERIALS AND METHODS

In this study, an integrated approach is developed from vision to action as a whole.

### The developed balanced scorecard decision support framework for hospitals

The developed system aims to manage the stages of building a balanced scorecard for hospitals. The conceptual framework of the developed methodology by the author is presented as stages.

Stage 1: Define shared vision statement by involving all employees

Most of the Hospitals in Turkey have no shared and clear vision statement and long-range planning, global crisis and the changes affect them too much.

BS-DSS suggests: Interdisciplinary workshops are needed to define shared vision clearly. If possible, invite consultants and external sector experts to the workshops and meetings. The vision should have a future picture of 8 years later, at least.

Stage 2: Prepare a SWOT Analysis document related vision statement and Hospital industry.

BS-DSS suggests: SWOT (Strength, Weaknesses, Opportunities and Threats) Analysis should focus the shared vision statement so that the strategies of hospital can be determined. You may prepare a SWOT Matrix both for your hospital and your competitor(s) in the same table to benchmark and for other reasons.

Stage 3: Define strategies by means of SWOT Analysis

BS-DSS suggests: Consider related topics for your hospital as follows (if related): Big Data, Quality Management Systems such as JCI, ISO 9001, Traceability. Define 4-6 strategies (the ways to achieve the shared vision) as default. If you select more than 6 strategies, it is difficult to focus them. If you select less than 4 strategies, it is difficult to realize the shared vision.

Stage 4: Draw strategy maps to link cause and effects

Most people have little information about strategy maps. Kaplan and Norton [8] explain strategy maps as follows: Strategy maps show the cause-and-effect links by which specific improvements create desired outcomes—for example, how faster process-cycle times and enhanced employee capabilities will increase retention of customers and thus increase a company's revenues. From a larger perspective, strategy maps show how an organization will convert its initiatives and resources—including intangible assets such as corporate culture and employee knowledge—into tangible outcomes.

BS-DSS suggests: Select KPIs from strategy maps so that you can deploy your objectives easily. Derive KPIs and dashboards as much as from your ERP system to get results faster. Stage 5: Develop Performance Measures for Strategic Objectives, Key Performance Indicators and Targets

BS-DSS suggests: Determine balanced KPIs. It means not only financial KPIs, but also customer perspective, internal business processes perspective and learning & growth perspective.

Let KPIs be S.M.A.R.T.;

(Specific – target a specific area for improvement.

Measurable – quantify or at least suggest an indicator of progress.

Assignable – specify who will do it. Or Achievable.

Realistic – state what results can realistically be achieved, given available resources.

Time-related – specify when the result(s) can be achieved.

Define approximately 15 KPIs at hospital level.

Use necessary simulation techniques to understand the nature of important processes and their KPIs.

Stage 6: Start Strategic Projects

BS-DSS suggests: Use Project Management tools and software to get satisfied results.

Stage 7: Prepare the formula of every KPI and Determine How to measure KPIs

BS-DSS suggests: Get KPIs from ERP system as much as possible, then you will have results automatically. Form important and value-added KPIs.

For example, a conventional “in-time delivery” KPI such as medicine, is formulated as follows:

Percentage of in time delivery =  $100 * \text{in-time-deliveries} / \text{total deliveries}$ .

If the quantities of delivered products are different

Instead, we may use the formula of KPI as follows:

Rate of in time delivery =  $100 * (\text{quantities of in-time-deliveries} / \text{quantities of total deliveries})$ .

Stage 8: Determine alarm and goal value of targets

BS-DSS suggests: Assign last period's value as standard alarm value.

Assign 75 percent of goal value for project type targets. Because deviation is big for project type targets.

Stage 9: Form action plans to achieve targets

BS-DSS suggests: Use P-D-C-A Kaizen (Continuous Improvement) methodology of Total Quality Management philosophy for Stage 9 and 10.

Stage 10: Compare actual results to targets, Revise target values and actions according to results.

BS-DSS suggests: Go to the necessary stages and manage your system.

A hospital case study in Turkey

Turkey has a population of 76 million people and is growing with rising income levels.

Organizations are continuously looking for the new ways to improve their performance and stay competitive in their markets.

Some private sector hospitals are visited and studied their processes carefully. A hospital (we call "Hospital X") was chosen to apply this study because of top management's commitment.

Stage 1: Define shared vision statement by involving all employees

Hospital X organized a meeting and all employees including doctors are participated. They prepared a clear vision statement together. The vision was determined by using a Balanced Scorecard project. A management consultant managed the Balanced Scorecard project and the top management supported this strategic management application. The vision, mission, strategies, perspectives and Key Performance Indicators are determined at the meetings participating managers from all departments including top management.

Hospital X's shared vision statement is "to become one of the best hospitals in south east Europe, and Middle East region."

Stage 2: Prepare a SWOT Analysis document related vision statement and Health industry. Hospital X prepared a SWOT Analysis document related vision statement about the Strengths, Weaknesses, Opportunities and Threats of the hospital to clarify important strategy fields.

Stage 3: Define strategies by means of SWOT Analysis:

After a SWOT Analysis (Strengths, Weaknesses, Opportunities, and Threats), strategies are determined:  
Decreasing costs by using six sigma projects for TQM and excellence.  
Increasing the image by using and developing innovative service applications.  
Using new technologies efficiently.  
Sustaining the loyalty of the patients, their families and the personnel.

The management of Hospital X decided to define just 4 strategies to focus.

Stage 4: Draw strategy maps to link cause and effects

Hospital X prepared a strategy map for the strategy "Decreasing costs by using six sigma projects".

Stage 5: Develop Performance Measures for Strategic Objectives, Key Performance Indicators and Targets

Hospital X will decide to define the numbers of SMART KPIs at hospital level.  
Some considered KPIs are

- Number of notified adverse events
- Mean time [in days] on waiting list for surgery
- Average skills matrix point and etc.

Stage 6: Start Strategic Projects

Hospital X decided to start a Six Sigma Project supported by a six sigma consultant and the author of this paper. They decided to use Minitab statistics software by for analyzing operations. The six sigma project increases the level of operational excellence.

Stages 7, 8, 9, and 10 will be analyzed according to the earlier stages' outputs.

Hospital X signed a contract to add balanced scorecard module with their ERP software company to customize the software.

## DISCUSSION

The information how to apply a balanced scorecard methodology is vague and distributed in the literature and industry. Besides, the implementation of balanced scorecard in hospitals is not well defined from vision into the action. Some existing papers focus only few stages of balanced scorecard. This study helps to managers an integrated implementation of balanced scorecard by defining 10 stages originally. It has also expert knowledge for every stage to support managers. A lot of companies define approximately 100

KPIs or more, while the approach recommends 15 KPIs at hospital level according to expert knowledge by Norton and Kaplan. Therefore, this approach prevents the management from the problem of too much KPI defining, applying, measuring, controlling, and etc. Similarly, the approach suggests alarm value as default value (for example: "Select last period's value as default one"), target values to the managers. Another example is the number of strategies: Too much strategies yield the problem of focusing, whereas few strategies makes difficult to achieve the firm's shared vision. How to form strategy maps and obtain KPIs are explained.

## CONCLUSION

In this study, the problem of the effective implementation of balanced scorecard in hospitals has been analyzed by using decision support system approach and used in health sector. A new decision support framework including 10 stages of balanced scorecard are developed originally:

- Stage 1: Define shared vision statement by involving all employees
- Stage 2: Prepare a SWOT Analysis document related vision statement and Health industry.
- Stage 3: Define strategies by means of SWOT Analysis
- Stage 4: Draw strategy maps to link cause and effects
- Stage 5: Develop Performance Measures for Strategic Objectives, Key Performance Indicators and Targets
- Stage 6: Start Strategic Projects
- Stage 7: Prepare the formula of every KPI and Determine How to measure KPIs
- Stage 8: Determine alarm and goal value of targets
- Stage 9: Form action plans to achieve targets
- Stage 10: Compare actual results to targets, Revise target values and actions according to results.

The benefits of this study for the hospital:

- Clear and shared vision with employees
- Well defined strategy
- Better image
- Increased patient satisfaction

The developed decision support system framework has recommendations for every stage of balanced scorecard. The necessary expert knowledge is derived from related literature, hospital experts and the writer's own experience.

Balanced scorecard systems have a vital role in organizations to realize from their vision and strategies into the action.

This study shows that the developed new decision support system framework helps managers to apply balanced scorecard in hospitals, effectively. In this study, the focused strategy in case study is "decreasing costs by using six sigma projects". The six sigma project increases the level of operational excellence, also.

Strategic planners can use the methodology when attempting to identify strategic issues. The presented methodology is flexible and can be used for other sectors with some sector specific characteristics changes. The lessons from this hospital case in Turkey or other applications can be added into the knowledgebase of the decision support system. An example of lessons learned is: Defining a very good vision is not enough, it must be applied in every management level and shared by employees. Some other hospital departments can also be studied as a further study.

### CONFLICT OF INTEREST

None

### ACKNOWLEDGEMENTS

None

### FINANCIAL DISCLOSURE

None

## REFERENCES

- [1] Kaplan RS, Norton DP. [1992] The balanced scorecard-measures that drive performance. Harvard Business Review. 70(1): 71-79.
- [2] Kaplan RS, Norton DP. [1996] The balanced scorecard: Translating strategy into action. Boston, MA: Harvard Business School Press.
- [3] Bisbe J, Barrubés J. [2012] The balanced scorecard as a management tool for assessing and monitoring strategy implementation in health care organizations. Revista Española de Cardiología (English Edition), 65(10):919-927.
- [4] Chang WC, Tung YC, Huang CH, Yang MC. [2008] Performance improvement after implementing the Balanced Scorecard: A large hospital's experience in Taiwan. Total Quality Management. 19(11):1143-1154.
- [5] Cowan DT, Norman I, Coopamah VP. [2005] Competence in nursing practice: a controversial concept—a focused review of literature. Nurse education today. 25(5): 355-362.

- [6] Cebeci U. [2009] Fuzzy AHP-based decision support system for selecting ERP systems in textile industry by using balanced scorecard, Expert Systems with Applications. 36: 8900–8909
- [7] Huang HC. [2009] Designing a knowledge-based system for strategic planning: a balanced scorecard perspective, Expert Systems with Applications. 36 (1): 209–218.
- [8] Kaplan RS, Norton DP. [2000] Having Trouble with Your Strategy? Then Map It, Harvard Business Review, Sept–Oct, 167–176.