Developing Dynamic Balanced Scorecards

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INTRODUCTION

With the advent of scientific management in the late 19th century came attempts to increase worker efficiency by setting standards for various factors in an industrial system. While measuring financial factors of a business was prevalent even during late 19th century, the scientific management ideology heralded the start of an era of formally measuring non-financial factors. This ignited several performance measurement frameworks that were used by businesses.

The most widely used among them included Tableau de Bord, developed in early 20th century in France, which focused on improving production processes. Management by Objectives (MBO) was markedly different and radical as compared to early "command & control" structures advocated by Frederick Taylor. Performance Matrix, first developed in 1986, is a list of performance metrics that are priority weighted. Balanced Scorecard (BSC), first published in the *Harvard Business Review* in 1992 by Kaplan and Norton, is a comprehensive framework that imbibed the good ideas of all the earlier frameworks plus presented some new attributes in a concise and understandable manner that managers found easy to comprehend (Epstein & Manzoni, 1998).

BSC focuses on the need to derive performance measures from strategic goals and objectives (Epstein & Manzoni, 1998; Kaplan & Norton, 1992, 1996a, 1996b; Niven, 2002). The impetus for proposing the BSC was the increasing disillusionment of solely using financial metrics to plan, monitor, control and manage organizational performance (Niven, 2002). The BSC categorizes performance measures into four perspectives, namely: financial, customer, internal business process and learning and growth, with the assumption that these capture an organizational performance in a holistic manner. BSC also recognizes the fact that having isolated and unlinked measures constituting the scorecard does not provide a mechanism for managers to "see" the impact of changes and test business hypotheses (Kaplan & Norton, 2004). A well-architected BSC therefore must describe organizational strategy through a system objectives and measures that are linked (Niven, 2002). These measures are linked together in a chain of cause-effect relationships from the performance drivers in the learning and growth perspective all the way through to financial perspective (Kaplan & Norton, 2004; Niven, 2002). However intuitive cause-effect chains may seem, creating them is perhaps the most challenging aspect in scorecard development (Niven, 2002). The concept of balance central to the BSC performance measurement system specifically relates to (Niven, 2002):

- Balance between financial and non-financial measures
- Balance between internal and external constituents of the organizations
- Balance between lag and lead indicators

BACKGROUND

The balanced scorecard framework was selected by the *Harvard Business Review* as one of the most influential management theories of the last 75 years. Driven by its simplicity and power, the BSC framework has been adopted by nearly 50% of Fortune 1000 companies in a Bain & Company Survey in 1999. Notwithstanding its prevalence and industry acceptance, the BSC framework in its classical form as proposed by its founders has certain key deficiencies that often come as obstacles to its effective implementation (Fowler, 2003). These are:

- *Deficiency 1:* A cause-effect diagram used to depict the strategy map expresses the causality in a unidirectional manner.
- *Deficiency 2:* A cause-effect diagram, while showing the cause-effect linkages, does not take into consideration the time varying impact of these influences.
- *Deficiency 3:* A BSC provides no mechanism for validating the performance measures specified.

These key deficiencies have far-reaching implications on the effectiveness of BSC as a strategy implementation framework (Takikonda, 1998; Veen-Dirks & Martin, 2002).

- Cause-effect linkages are viewed as one-way in nature, thus emphasizing one-way thinking.

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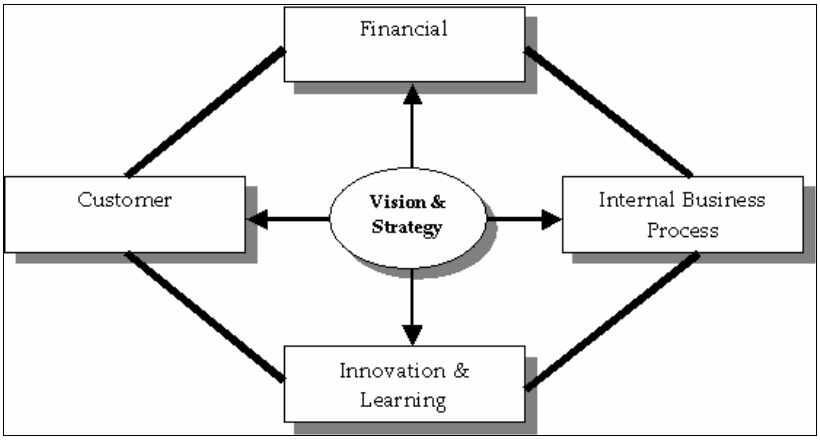
Figure 1. Basic structure of a BSC performance measurement system



- Unidirectional approach leads to difficulty in reliable simulations.
- While linkages from non-financial to financial measures are shown, feedback loops depicting the impact of financial on non-financial measures is absent.
- It is also assumed that both cause and effect occur in the same place and time, thus not provisioning for delays in causality, thereby missing the temporal/dynamic complexity.
- A static cause-effect diagram makes it difficult to identify "good" predictor metrics.

These five implications necessitate enhancement of the BSC with systems thinking/system dynamics approach to develop the dynamic balanced scorecard (DBSC).

DYNAMIC BALANCED SCORECARD

A broad methodology that combines systems thinking/system dynamics with balanced scorecard theory is shown next. Listed as follows are suggested steps or activities involved that culminate into development of a DBSC.

1. Assessing strategic and organizational landscape.
2. Identifying critical success factors (CSF).
3. Analyzing performance over time for identified CSFs.
4. Developing critical success loops (CSL) for each CSF.
5. Synthesizing individual CSLs into one single global CSL (GCSL).
6. Identifying and defining strategic resources.
7. Specifying strategies and strategic objectives.
8. Building strategy map(s).
9. Identifying performance measures for strategic resources.
10. Specifying targets for performance measures.
11. Identifying initiatives to address strategic objectives and CSFs.
12. Developing Dynamic BSC.
13. Validating DBSC through dynamic simulation.
14. Deploying DBSC as the performance management framework.

While these specific steps can vary from organization to organization, the approach remains largely similar. As the objective of this article is to highlight the use of systems thinking/system dynamics in order to overcome (most) of the deficiencies of the traditional BSC, steps that are specifically different are highlighted and described as follows.

Step 3: Analyzing Performance Over Time for CSFs

Following identification of CSFs that the organization "thinks" is key to its success, analyzing their behavior over time is a good starting point to uncover the underlying systemic structures among interrelated variables. The key here is to select a time horizon that is appropriate for the specific success factor. The "performance over time" graph is a simple graph showing CSFs on one axis and time on the other. Strategic assessment performed earlier identifies the number of other significant variables that might impact specific CSFs. Analysis of CSF performance over

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