Chapter 2.19

The Integration of Systems Dynamics and Balanced Scorecards in Strategic Healthcare Policy Simulation Analysis

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ABSTRACT

This paper uses simulation modelling techniques and presents summarized model outputs using the balanced scorecard approach. The simulation models have been formulated with the use of empirical health, clinical and financial data extracted from clinical data warehouses of a healthcare group. By emphasising the impact of strategic financial and clinical performance measures on healthcare institutions, it is argued that hospitals, in particular, need to re-focus cost-cutting efforts in areas that do not impact clinicians, patient satisfaction or quality of care. The authors have added a real time component to business activity monitoring with the executive dashboards shown as graphs in this paper. This study demonstrates that it is possible to understand health policy interactions and improve hospital performance metrics through evaluation using balanced scorecards and normalized output data. Evidence from this research shows that the hospital executives involved were enthusiastic about the visual interactive interface that pro-

vides the transparency needed to isolate policy experimentation from complex model structures that map strategic behaviour.

INTRODUCTION

The provision of health care is a complicated activity requiring a multitude of skills, experiences and technologies. No one person or discipline can be responsible for poor or excellent performance. Similarly, hospitals are complex organizations that cannot be measured on a single dimension of performance.

A balanced scorecard includes financial measures that capture the organisation's ability to survive and grow. However, it complements financial measures with operational measures on customer satisfaction, internal processes, and the organization's innovation and improvement activities (Caldwell, 1995). If well chosen, these operational measures capture the organisation's operating performance, which is the ultimate driver of both current and future financial performance. The power of the balanced scorecard derives from its ability to present a succinct yet multifaceted picture of an organization to top management and a board of directors.

A "balanced scorecard" for measuring the multiple dimensions of hospital performance is shown as four quadrants in Table 1.

The objectives of this research paper was to develop, test and evaluate a sustainable hospital performance model for Senior Executives that would use both qualitative and quantitative indicators such as patient satisfaction, clinical utilization and outcomes, financial performance as shown in Table 1:

- Cash flow in the private hospital;
- Net cash balance;
- Patient satisfaction with hospital and clinician services;
- Clinician satisfaction with hospital management;
- Hospital bed occupancy;
- Deviations between the national average length of stay (NLOS) and the hospital's LOS by Diagnostic Related Group (DRG) for patient admissions;
- Gap in available bed days comparing NLOS and hospital's LOS for the patient admissions; and
- Average marginal costs per patient.

These cardinal dimensions are visually represented in radar chart format so that the simulated outcomes across the dimensions under different combination of hospital policies and scenarios can be visually compared against a reference baseline for these metrics. The Balanced Scorecard approach to represent the results was then integrated the simulation outputs so that each time a policy variation or scenario was tested, users could see the differences across all dimensions simultaneously the impact of the policy variations.

Table 1. The four quadrants' of hospital performance

Patient Satisfaction	Clinical Utilization and Outcomes
Examines patient perceptions of their hospital experience including the overall quality of care, outcome of care and unit-based care	Describes the clinical performance of PCH and refers to access to hospital services, clinical efficiency and quality of care
Financial Performance and Condition	**System Integration and Change**
Describes how PCH manages the financial and human resources. Refers to the hospital's financial health, efficiency, management practices and HR allocations	Describes PCH's ability to adapt, including how clinical information technologies, work processes and hospital-community relationships function within the hospital system.

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