

# PACS Contribution to Hospital Strategy via Improved Workflow

**Reeva Lederman**

*University of Melbourne, Australia*

**Rogier van de Wetering**

*University of Melbourne, Australia*

**Lucy Firth**

*University of Melbourne, Australia*

## INTRODUCTION

Since Strassman's (1990) exposition of the "productivity paradox," there has been increased attention paid to justification and evaluation of investments in information technologies (IT) and information systems (IS). Observed outcomes from practice have called for theoretical explanations in order to construct a generalized view of IS. In the hospital environment, we see that there is a pressing need for frameworks adequate to the tasks of evaluating increasingly expensive implementations. Because hospitals have multiple stakeholders and multiple strategic goals, in order to be adequate, a framework needs to address these multiplicities. One promising framework is Kaplan and Norton's (1992), the Balanced Score Card (BSC).

BSC has been used to evaluate hospital performance and the implementations of IT/IS in hospital and medical contexts by several authors (Curtright, Stolp-Smith & Edell, 2000; Gordon & Geiger, 2001). However, Picture Archiving and Communication Systems (PACS), which is one of the most important system implementations in the past few years in the area of e-health and the transmission of health data, have not been evaluated using BSC. Rather, most evaluations of PACS have tended to focus on single issues like clinical communication, quality improvement, image availability, speed of service, and workflow simplification and automation, and the associated gains that are important to the patient's overall journey (Peer, Peer, Walcher, Pohl & Jaschke, 1999). The focus on single issues within PACS implementations has made it difficult to gain a clear understanding of the overall workflow impacts of a PACS implementation. Moreover, the literature does not relate well to the intangible value created for the patient by the patient care benefits of PACS, which

is an important component of the hospital's strategy overall and as it relates to IS strategy.

Therefore, this chapter investigates the adequacy of BSC for a holistic evaluation of the workflow impacts of a PACS implementation. It asks whether a theoretical model such as BSC adequately captures the reality of how such technology is used. The approach taken is radical in that it is built on a consideration of the fundamentals of hospital strategy. The BSC is then modified to incorporate qualitative themes rather than performance measures to reflect the fundamentally qualitative nature of the clinical values of hospital strategy. In so doing, this chapter develops a framework that is relevant to a hospital's not-for-profit and clinical strategies.

## BACKGROUND

The BSC is a set of measures that provides managers with a comprehensive framework that translates a company's strategic objectives into a coherent set of performance measures. As originally developed by Kaplan and Norton (1992), the BSC includes performance measures from the following four perspectives, supplementing the financial perspective with those of the internal business process, the customer, and learning and growth within the organization:

- **Financial perspective.** "How should we appear to our shareholder?" Performance measures include operating income and return-on-investment.
- **Internal business process perspective.** "At which business processes must we excel?" Performance measures include rework rates, cycle times, and process costs.

- **Customer perspective.** “How should we appear to our customers?” Performance measures include customer satisfaction and retention.
- **Learning and growth perspective.** “How will we sustain our ability to change and improve?” Performance measures include employee skills, retention, and satisfaction.

The comprehensive view drawn from these four performance measures can then be presented as a single management report that reflects many of the elements of a company’s competitive agenda: becoming customer oriented, shortening response time, improving quality, emphasizing teamwork, reducing new product launch times, and managing for the long term (Kaplan & Norton, 1992). Not only does the BSC provide a measurement framework that improves alignment of actions to the strategic goals of an organization, but it also provides a platform for identifying priorities (Mooraj, Oyon & Hostettler 1999). These priorities can then be used to guide management in the achievement of objectives.

However, the BSC is not a template that can be applied to business in general or even industrywide. Rather, it is intended that different market situations, product strategies, and competitive environments employ different scorecards, differing in terms of performance measures. Each organization’s unique reason for an IT/IS implementation and therefore different perspectives on measuring success is reflected in the use of a BSC that includes appropriate performance measures. BSCs are particularly appropriate for organizations in industries such as health care, where there is a more diverse set of performance measures than in the business and academic sectors (Voelker, Rakish & French, 2001). Therefore, the BSC’s design flexibility makes it applicable to the evaluation of a broad range of organizations and implementations, and suitable to evaluation within the health sector. A range of perspectives has been used to generate performance measures used in BSC applications within the health sector, such as patient satisfaction, clinical outcomes, functional health status, and cost to evaluate outsourcing (Schriefer, Urden & Rogers, 1997) . We argue that these adaptations of the BSC to health care are successful because the modifications are in line with the organizational strategies of the health sector; consequently, there is a value in a BSC that is specifically targeted toward PACS.

## PERFORMANCE MEASURES THAT FIT HOSPITAL STRATEGY

“Strategy” in the corporate sense, popularized by Porter (1996), is “the creation of a unique and valuable position, involving a different set of activities ... different from rivals.” Following from Porter’s earlier work, three fundamental strategies for competitive advantage are identified: low cost, product differentiation, and niche market (McFarlan, McKenney & Pyburn 1983). Willcocks, Petherbridge, and Olson (2001) expand these to six strategic uses of IT: breakthrough unit costs for customers, service-based differentiation, micromarketing management, shorter time to market, transfer of experience, and new level of partnership. The idea of strategy as a way of positioning the organization so as to attract customers and compete with rivals is central to these approaches.

However, the relevance of corporate strategy to hospitals that have a commitment to clinical excellence and a commitment to public responsibility has been questioned (Liedtka, 1992). Where clinical and not-for-profit considerations are fundamental to organizational strategy, Liedtka (1992) suggests that Andrews’ concept of strategy is more relevant: “A pattern of decision in a company that determines and reveals its objectives, purposes, or goals, produces the principal policies and plans for achieving those goals ... and the nature of the economic and non-economic contribution it intends to make to its shareholders, employees, customers, and communities” (Andrews, 1987, p. 56).

Given this richer concept of strategy, Andrews (1987) argues that there are four elements to be considered together to determine strategy:

1. What the market wants in terms of industry opportunities and threats—what might we do?
2. The organization’s competence—what can we do?
3. The aspirations and values of executives in charge of the organization—what do we want to do?
4. The organization’s obligation to society—what should we do?

Liedtka (1992) argues that in the health context, it is clinical as well as executive preferences that must be considered. Liedtka (1992) summarizes these elements emphasizing the fact that the elements of strategy may be classified as either market-driven or

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