DEVELOPING A STRATEGIC COST MANAGEMENT MODEL: COMBINING THE BALANCED SCORECARD AND ACTIVITY-BASED COSTING IN THE CONTEXT OF DIABETES EDUCATION

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Abstract

The study presents the development of a strategic cost management model that combines activity-based costing (ABC) with principles of the balanced scorecard (BSC). The purpose of the combined ABC/BSC model is to provide cost information that could be used to evaluate strategy implementation, monitor premises underlying strategy that may need to be revised, and provide a strategic perspective to operational decisions. While ABC provides activity-specific cost information, the BSC framework of different performance perspectives (or activity dimensions) provides structure to data collection and organization, and facilitates strategic analysis. The model is applied in the healthcare context of a diabetes client education program, and the study includes a list of activities, activity drivers, and cost drivers for Type-2 diabetes education. It also provides a summary of costs per client category and proportion of resources consumed by different activity dimensions for a specific program.

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1. Introduction

1.1 The need for a strategic cost management model

Strategic decisions are aimed at maintaining an organization's alignment with its environment, while also managing internal interdependencies. Therefore, they involve organizational goals as well as the allocation of resources needed to achieve these goals (Snow & Hambrick, 1980). However, straightforward as this statement makes the strategic process appear, there is no "right" way to arrive at optimum strategic decisions. Even in organizations where strategy is well-formulated, translating strategic plans into reality sometimes becomes a stumbling block (Spanyi, 2003).

Strategic cost management tools could help with this issue by providing important information for strategy formulation, evaluation of strategy implementation, and highlighting the practical limitations or problems with the adopted strategy (Shank & Govindarajan, 1993). Dent (1990) conducted a literature review and also identifies three possible avenues of research into the interface between accounting systems and strategy – how accounting system structure is adapted to strategy, the role of accounting systems in influencing the strategic decision-making process, and the proactive role of accounting systems in strategic change. Extant literature focuses on the role of cost management in creating strategic competitive advantage (e.g., Kaplan & Cooper, 1998), but examples of cost information being used to monitor strategy implementation and evaluate an existing strategy are not found. The purpose of this study is to address this gap by combining the activity-based costing and balanced scorecard frameworks into a combined strategic cost management model. By doing so, positive attributes of both these powerful tools can be harnessed, and used for strategic monitoring and strategy evaluation. The study differs from some existing strategic cost management literature (e.g., Blocher, Chen, Cokins, & Lin, 2005; Cooper,

1996; and Shank & Govindarajan, 1993) by discussing strategy without limiting it to generic competitive strategy such as cost leadership or product differentiation.

Activity-based costing (ABC) is a costing method that focuses on activities as consumers of resources, and costs individual activities rather than allocating costs directly to cost objects[1]. ABC uses different cost drivers to link costs to cost objects, thereby linking costs to variety and complexity of products or services, and not just product volumes (Kaplan & Cooper, 1998). For example, drivers of costs could be the number of machine hours used, the number of square feet occupied in a building, or the number of machine set-ups in a production process, and not just the volume of output. Such a multi-driver approach has been shown to provide information that is more accurate and useful in decision making about resource use and allocation, at various organizational levels (Kaplan & Cooper, 1998; Plowman, 1998). Detailed activity and cost information could also have strategic value if used to evaluate the contribution of a specific activity to strategy achievement, and the cost of this contribution.

However, one of the limitations of ABC is that large amounts of complex activity and cost driver data are collected during the process (Kaplan & Anderson, 2004), with no framework to arrange them, no means of verifying that all important cost areas have been included, and no clear indication of how groups of activities link to strategic objectives. A strategic cost management model that uses ABC would therefore have to incorporate a method or tool, such as the BSC, to create the link to strategy.

The Balanced scorecard (BSC) is a performance management tool that identifies quantifiable performance measures and targets and links them to a unified strategy (Kaplan

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[1] Cost objects are defined as any unit of production, service, client, department, business unit etc. for which costs are incurred, and for which cost measurement is desired (Gunasekaran, 1999)

& Norton, 1996). In order to do this, the BSC defines performance dimensions that are critical to strategy achievement. These dimensions are termed "perspectives" in the original literature, and usually include satisfying customers and shareholders, excelling at internal processes, and ensuring growth opportunities for employees (Kaplan & Norton, 1992).

A model that combines ABC and BSC could adapt the strategic BSC dimensions, and use them as a means of collecting, organizing, and analyzing activity and cost information. This would overcome the above mentioned limitation of ABC by organizing complex activity and cost data, and by providing a clear strategic link between dimensions of activity, costs, and strategic goals. The nature and costs of activities performed in an organization could be analyzed for strategic purposes, in order to identify which activities contribute positively to achievement of strategic goals, and which do not. Activities that are not essential to strategy achievement, but still consume valuable resources, can then be reassessed from a strategic point of view. Similarly, activities that contribute indirectly to strategic objectives could be identified and given due importance.

1.2 The context of the study

This idea of creating a link between activities, costs, and strategic objectives can be applied to any situation in different industries and contexts that requires a strategic perspective of costs. It is, however, developed in the current study using the healthcare context of diabetes patient education. There are three reasons for selecting this milieu.

First, there appears to be the need for a practical strategic management tool that can connect the medical, business, and public service dimensions of strategic objectives in healthcare. While the achievement of strategic objectives is important in any organization, in the healthcare sector these objectives usually have broader implications beyond the impact on an individual organization. Despite this, the healthcare sector has been especially slow in

adopting of the strategic management paradigm (Buller & Timpson, 1986). One possible reason for this slower adoption could be the absence of a tool that provides the multi-dimensional focus that the sector needs. Another reason could be the absence of an illustration of how a business system could be useful in the non-profit domain.

Second, the healthcare service of patient education plays an important role in the management and control of diabetes (Mensing et al., 2003). There is widespread acceptance in academic and practitioner literature about the importance of patient education (e.g., Norris et al., 2001; Ryan, Todd, Estey, Cook, & Pick, 2002), and large amounts of resources are invested in education programs (Williams et al., 2004). However patient education (especially in chronic diseases) is absent from discussions in the literature about the costing of healthcare services. By discussing strategic cost management in a diabetes program, this study provides a starting point for further discussion of the costs of diabetes education. The objectives of diabetes education programs, such as creating awareness of the disease and ensuring patients lead productive lives, cannot be subordinated to cost control for its own sake. Therefore, using a strategic cost management model that manages costs, without adversely affecting the goals of patient education, would be appropriate.

Third, a local health authority was interested in obtaining detailed cost information for its diabetes program. Therefore, it was willing to allow an examination of its diabetes program, and participants and information were made readily available. The selection of patient education to discuss strategic cost management was thus expedient.

1.3 Research question, objectives and significance

Two research questions are addressed in this study, and are as follows –

1. How can the BSC be combined with ABC to provide a tool for strategic cost management that can be used in decision making?

2. What are the possible uses of such a combined model in strategic decision making?

The first question relates to the steps involved in developing a strategic cost management model, while the second question addresses the use of such a strategic cost management model. The study seeks to answer these two questions, and therefore its objectives are –

~ to develop a strategic cost management model that provides a strategic perspective to ABC by combining it with some features of the BSC, and

~ to examine possible strategic uses of the combined model by discussing it in the context of a Type-2 diabetes education program.

A model that combines ABC and the BSC could be implemented in different industries and settings, and used to understand relationships between the different dimensions of activity and strategic objectives. The significant outcomes of the study, specifically in the context of diabetes client education, are discussed below.

A model, overlaying the BSC over ABC, would link activities and their costs to the strategic objectives of an education program (for example, prevention of complications and optimization of quality of life [Norris et al., 2001]). Based on this information about the strategic impact of activities, operational cost management decisions, resource allocation, and process improvements could be implemented so as to maximize congruence with strategic goals. The model could therefore be used to evaluate whether operational realities reflect strategic plans, by showing where resources are being expended. Such a combined model that contributes to the achievement of strategic goals would be a valuable strategic cost management tool (Govindarajan & Shank, 1992).

The combined model could also be used to obtain information to reassess strategic objectives. The model could indicate variations in resource consumption thereby directing

attention to changes in the strategic environment, or highlight whether assumptions underlying the strategic choice are valid in reality. These issues could manifest themselves in the combined model through variations between expectations and actualities.

The next chapter presents the motivation and support from the literature for the development of a combined strategic cost management model, and its application to patient education.

2. Theoretical Foundation & Literature Review

The theoretical basis for the combined strategic model can be discussed from five different points of view – (1) the benefits and limitations of using traditional ABC in strategy management, (2) the strategic focus that BSC can provide to ABC, (3) the use of the combined model for strategic control, (4) the role of strategic management in healthcare, and (5) the importance of managing diabetes education costs strategically.

2.1 The benefits and limitations of using traditional ABC for strategy management

In this section the following points are discussed – (i) the operational advantages of ABC, (ii) the strategic benefits of ABC, and (iii) the strategic limitations of ABC. The literature in these areas supports the development of a strategic cost management model, and the use of ABC as a critical element within the model.

2.1.1 Operational advantages of ABC

ABC has significant advantages over its predecessor, standard costing. Standard costing is driven by volume measures such as number of production units or number of machine hours, and uses a predetermined ("standard") cost rate per unit to assign overhead costs (such as product design, and administrative costs) and evaluate performance (Kaplan & Cooper, 1998). Standard costing thus assumes a direct relationship between overhead resource consumption by each unit of output, which has been shown to be unrealistic (Plowman, 1998). Standard costing techniques are also based on work standards and standard costs that follow a top-down flow from management to line employees. Valuable problem-solving skills and process improvement insights from frontline employees may thus be lost, making these approaches inappropriate for strategic performance management (Kaplan & Cooper, 1998).

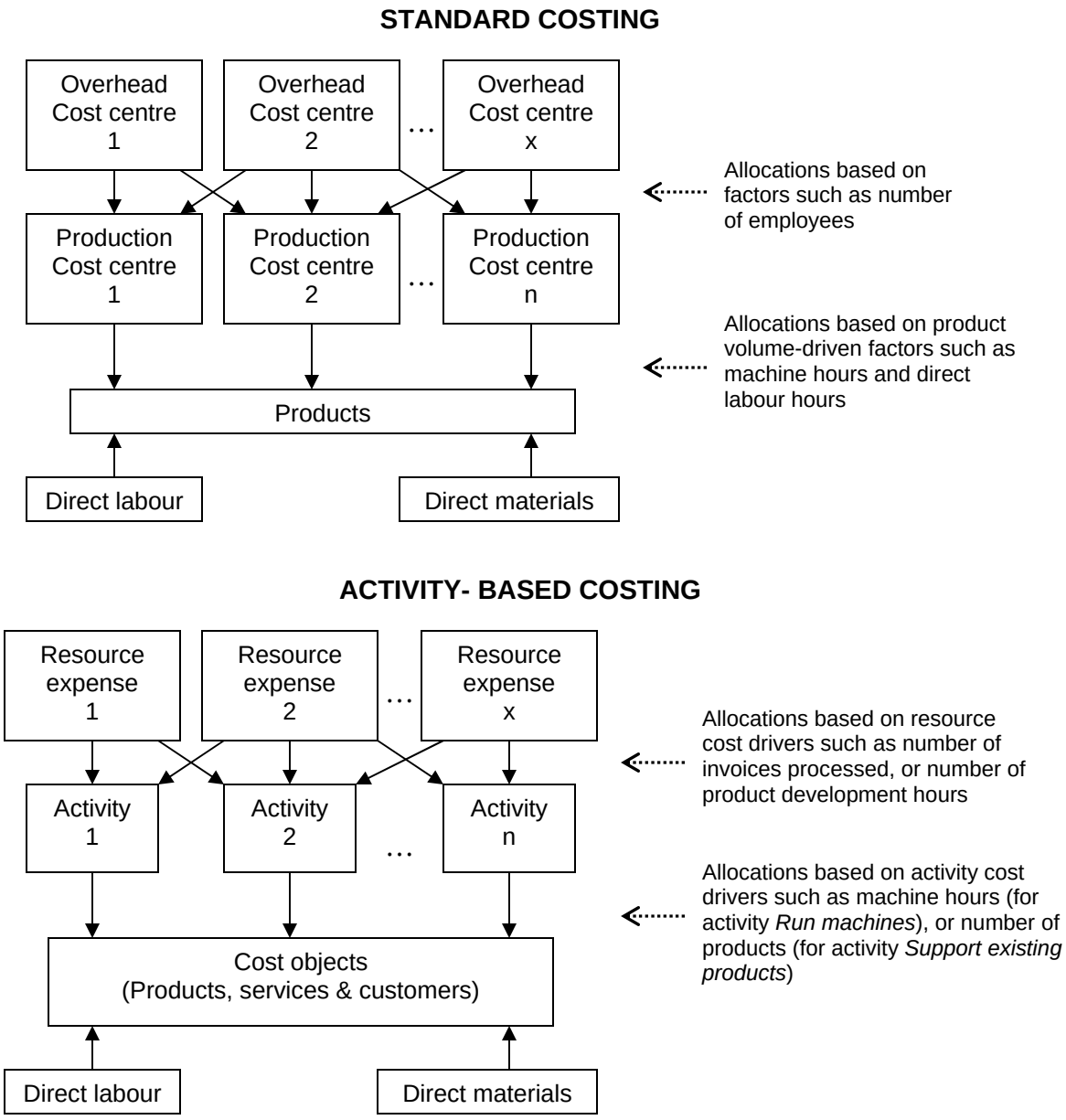

Figure 2.1
Difference between traditional and activity-based costing
(Adapted from Kaplan & Cooper, 1998, pp. 83-84)

ABC, on the other hand, focuses on activities that result from events or decisions, and consume resources in order to produce output. Cost allocation is therefore moved from cost centres (such as departments) to discrete units of activity. These activities are then "consumed" by different cost objects such as a unit of production, a customer, or a business

department. This distinction between standard costing and ABC systems is represented in Figure 2.1. An ABC system can thus provide resource consumption information for activities, business processes, products, and customers (Kaplan & Cooper, 1998).

A link is established between resources and activities, and between activities and cost objects, by identifying appropriate cost and activity drivers. These are factors that cause an increase in cost or activity consumption. By using volume of output, employee time, complexity, and other factors as possible drivers of costs, ABC estimates costs more accurately. Also, by providing realistic information about activities, their costs, their drivers, and how they link to form processes, ABC can provide information for activity-based management (ABM), i.e. decision making based on an understanding of costs and cost drivers, which can be managed and improved upon (Kaplan & Cooper, 1998; Plowman, 1998; Siegel et al., 1999). For example, cost information obtained from an ABC system for a patient education program can also be used to evaluate the effect of changes in the system, such as providing certain modules of instruction via digital media.

The insights provided by a multi-driver ABC system can be very valuable to service organizations since almost all operating expenses in the service sector vary due to factors other than volume (Buckingham & Loomba, 2001; Kaplan & Cooper, 1998). For example, Hwang and Kirby (1994) find that if hospital inpatient costs are driven by multiple cost drivers, but are allocated based on a single driver, the reported cost and, consequently, the reimbursement to hospitals by insurers is hugely distorted. Scholars have further noted that ABC is most useful in situations where there are large, increasing expenses especially for indirect and support resources, or where there is high diversity – with a variety of products, services and customers, or a combination of these variables (Kaplan & Cooper, 1998).

The ABC approach is therefore well-suited to a cost object such as a patient education program, where the relationship between number of patients (i.e. volume) and costs is not always linear[2]. Patient education is also a suitable candidate for ABC due to the rapidly increasing number and changing demographics of persons diagnosed with Type-2 diabetes, and the wide variety of personalized services that are provided in these programs.

Studies have discussed the applicability and issues in implementation of ABC in various settings, such as manufacturing (Swenson, 1995), financial services (Sapp, Crawford, & Rebischke, 2005), and healthcare (Udpa, 1996). Though the goals of for-profit and non-profit organizations are different by definition, the literature does not show that ABC is any less applicable in the non-profit sector, though the decisions the ABC information is used for may differ (Kaplan & Cooper, 1998). Some real-world examples of ABC being used in the non-profit sector are seen in various departments in the Texas state government (Office of the Texas Comptroller, 2001) and a Peruvian non-government organization (Water, Abdallah, Santillán, & Richardson, 2003). The use of ABC for operational cost analysis is therefore well-established. However, scholars such as Shank and Govindarajan (1993) contend that such cost analysis must be supplemented by strategic analysis in order to understand the true nature of a business problem or situation.

2.1.2 Strategic benefits of ABC

Strategic uses of control systems, including accounting systems, have been discussed in the academic literature. For example, both Khandwalla (1972) and Simons (1987)

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[2] For examples of patient education costs that are not driven by volume, consider the cost of maintenance of the building in which patient education is provided, or of maintaining computer systems. These are examples of overhead costs that are incurred to run a patient education program effectively, but are not directly proportional to the number of clients. So allocating these costs based on client volume alone would provide inaccurate cost estimates.

conclude that there is a positive association between strategic factors such as the competitive behaviour a firm engages in, and the use and types of sophisticated management controls. Such studies, however, tend to focus on tailoring control systems to a specific strategy, rather than present the use of accounting information to inform and influence strategy.

ABC can be used to influence how strategy is formulated. Porter (1996) emphasizes the importance of activities to strategy, specifically the sustainable competitive advantage (low cost or differentiation) that consistent, reinforcing and effort-optimizing activities can bestow. Some suggested uses of ABC during strategy formulation include pricing decisions, supplier selection, customer profitability analysis, product design and development, and cost reduction (Blocher et al., 2005; Cooper & Kaplan, 1988; Kaplan & Cooper, 1998; Nair, 2000; Plowman, 1998).

Information from ABC could also impact the strategy process during the implementation and monitoring stages. ABC explicitly lists activities carried out in an organizational unit, and then allocates resource costs to the activities. This information could be analyzed to determine the relative importance of specific activities to the achievement of strategic objectives, and the associated costs. Resources could then be managed to better reflect organizational strategy. ABC would thus help strategy implementation by relating activities to goals, indicating contradictions between goals and resource consumption, and highlighting where improvements can be made. An ABC system could also be used to monitor an organization's strategic environment. Variations between plans and actual performance could draw attention to changes in circumstances that call for a change in strategic objectives, and the way they are implemented.

A search of literature does not reveal any discussion about the use of ABC for strategy monitoring or reassessment. The proposed use of ABC for this purpose in addition

to the more traditionally discussed uses is, therefore, a variation in the existing themes of strategic cost management literature, especially when it is applied in a healthcare context.

The strategic value of ABC in healthcare, which is the context of the current study, is now discussed further. Some researchers feel that increasing the visibility of activities may not automatically lead to better strategic control – especially in healthcare (Coombs, 1987; Nyland & Pettersen, 2004). In this sector administrative control (i.e. bureaucratic powers) and collegial control (i.e. domination of the medical profession) must co-exist with ambiguous boundaries, and yet at odds (Coombs, 1987). Knowledge-sharing between different clinical functions may occur ad hoc, without an established administrative protocol for such interaction being in place (Nyland & Pettersen, 2004), which makes such activities hard to identify and control.

However, given the increasing pressure of resource scarcity in the healthcare sector (Ontario Case Costing Initiative [OCCI], Version 2.0), some means of directing activity from the cost control perspective becomes necessary. Coombs (1987) suggests that "closer integration of bureaucratic and collegial control mechanisms" (p.392) is a good way to fulfill this necessity, and that greater visibility of activities will result, at a minimum, in attempts to modify behaviour that affects strategic goal achievement. ABC models facilitate such integration, as they link costs, which in this case are the form of administrative control, to the activities needed to provide healthcare services to clients, which are largely the domain of medical practitioners.

2.1.3 Strategic limitations of ABC

ABC, though not used to monitor and reassess strategy, is considered to be an important component of strategic cost management and a useful strategic analysis tool. However, it is not powerful enough to be used as the primary tool for this purpose. Shank

and Govindarajan (1993) point out that ABC systems assign "all... costs to products without any concern as to whether or not the cost is legitimate in a strategic sense" (p. 181). Therefore, some means or criteria for evaluating the short-term and long-term strategic implications of control based on activity analysis is needed (Mitchell, 1994). This leads directly into the reasons for incorporating the BSC into a combined strategic model that can explicitly link costs to strategic objectives.

2.2 The strategic focus that BSC can provide to ABC

This section begins with a brief discussion about the development and uses of a BSC, followed by the how the BSC can be useful in a strategic cost management model, and finally, the modifications that are necessary for using the BSC dimensions for strategic cost management in a specific context.

2.2.1 About the Balanced scorecard

The BSC is a performance management tool that addresses the agency theory concern of implementation of legitimate stakeholders' concerns, and acts as a governance mechanism by aligning agency performance measures with the principal's values (Eisenhardt, 1989; Johnsen, 2001). These values are represented in the BSC by the organization's strategic objectives. The BSC links performance at various levels to overall strategic objectives by –

~ Identifying different important areas or perspectives of performance that an organization must excel at for strategic success. These usually relate to financial goals, customer needs, internal processes, and employee abilities, but can be modified to reflect a specific organizational reality.

~ Identifying specific, quantifiable measures or performance indicators within each dimension of performance. These can be financial or non-financial in nature, and are identified based on strategic objectives (Lawrie & Cobbold, 2004).

~ Setting targets for each of the identified measures. Individual and business unit performance can then be evaluated by comparing achievement of these targets. Areas for improvement can be identified based on variance between targets and actual measures.

The BSC thus provides a unified, strategic focus to individual and organizational performance, and communicates strategy at all organizational levels by providing performance targets that are consistent with strategy (Kaplan & Norton, 1992, 1996, 2001). Appendix A summarizes how the BSC operationalizes an abstract strategy, and presents examples of goals and measures within the different performance perspectives for a hospital.

Cascading scorecards can be constructed at different levels, flowing from the organization, to a business unit, to a department, to a work team, to each individual. By measuring selected, strategically consistent outcomes at all levels, strategy can be communicated effectively. The BSC thus acts as a coherent strategy management system, by translating strategy into performance measures and targets, and communicating and enforcing a consistent strategy through the organization.

The next step is to discuss the adaptation of BSC's strengths to ABC and strategic cost management.

2.2.2 Using the BSC with ABC for strategic cost management

Scholars have discussed how ABC complements the BSC by providing information for performance measurement (Buckingham & Loomba, 2001; Plowman, 1998), and the synergistic effect of the two systems on company performance (Maiga & Jacobs, 2003).

However, combining the two systems into a single model does not appear to have been attempted. The two reasons presented in this research to support the use of the BSC framework with ABC, in a combined strategic cost management model are – (i) to ensure the completeness of activity information by providing structure and, (ii) to promote a strategic view of costs. These are discussed below in more detail.

As the complexity of operations increases, ABC tends to become time-consuming and expensive to implement and maintain (Hicks, 2005; Kaplan & Anderson, 2004; Kiani & Sangeladji, 2003). To overcome this problem, activity dimensions can be used as a framework to collect, classify, and organize activity information. The BSC has previously been adapted to areas other than performance measurement. For example, Voordt (2004) used the performance perspectives to analyze the costs and benefits of flexible workplace design. A more pertinent example is the method adopted by Edwards, Downey, Griffin, Lang, and Eldred (2005) of using the BSC to organize cost information while estimating the costs of implementing nursing best practice guidelines. This study extends their use of the BSC framework, firstly by using it specifically with ABC for activity and cost information collection and classification, and secondly, by emphasizing the strategic value of such a combination to cost management.

One of the problems faced in strategic cost management is that no tool or method exists to connect strategic costing principles with their implementation at the operational level (Buckingham & Loomba, 2001). A strategic cost management tool could create this link by taking advantage of the BSC principle that allows it to relate day-to-day performance to achievement of strategic goals (Kaplan & Norton, 2001). By clearly defining the goals of an organization (or organizational unit), and then identifying the different dimensions of activity and activity costs that are directed towards that purpose, an explicit link can be created

between activities, resource utilization, and objectives. This can provide a more strategic orientation to cost management at the operational level.

In order for a combined ABC/BSC model to have true strategic value, the activity dimensions chosen for the model must reflect the specific context in which the model will be used. This issue is addressed in the following section.

2.2.3 Modifying performance dimensions to match strategic objectives

While the original BSC authors present four performance dimensions – customer, internal business, innovation and learning, and financial (Kaplan & Norton, 1992, 1996), researchers state that the use of these dimensions was mainly to promote the use of non-financial performance measures (Lawrie & Cobbold, 2004). Some researchers and practitioners, therefore, select and name perspectives based on the strategic objectives of a particular organization. For example, Elefalk (2001) uses operational, staff, resources, and citizen perspectives in an analysis of BSC use in a police force; Kalagnanam (2004) uses customer and stakeholder, public purpose, leadership, innovation and learning, and financial perspectives in his study of government-owned for-profit companies; and Pink et al. (2001) use financial performance, patient satisfaction, system integration and change, and clinical utilization and outcomes as performance perspectives in a public health service setting.

The literature indicates that, in a combined model for strategic cost management, activity dimensions should reflect the goals of a specific program, as the use of standard categorizations may not be relevant. Figure 2.2 is a generic representation of a combined ABC/BSC model using the activity dimensions presented by Kaplan and Norton (1996).

The model can link each activity dimension and individual activity to a specific strategic objective. Here, the activity information is the contribution of ABC, while the activity dimensions and link to strategy are provided by the BSC. In the example provided in

the figure, activities in the customer dimension, such as making sales contact, and filling an order, would contribute to the achievement of Objective 1 (Satisfy customers). Similarly, activities in the learning and growth dimension, such as attending training sessions, could be linked to Objective 3 (Be market leaders in innovation). The activities to be included in each dimension would depend on the way the dimensions are defined.

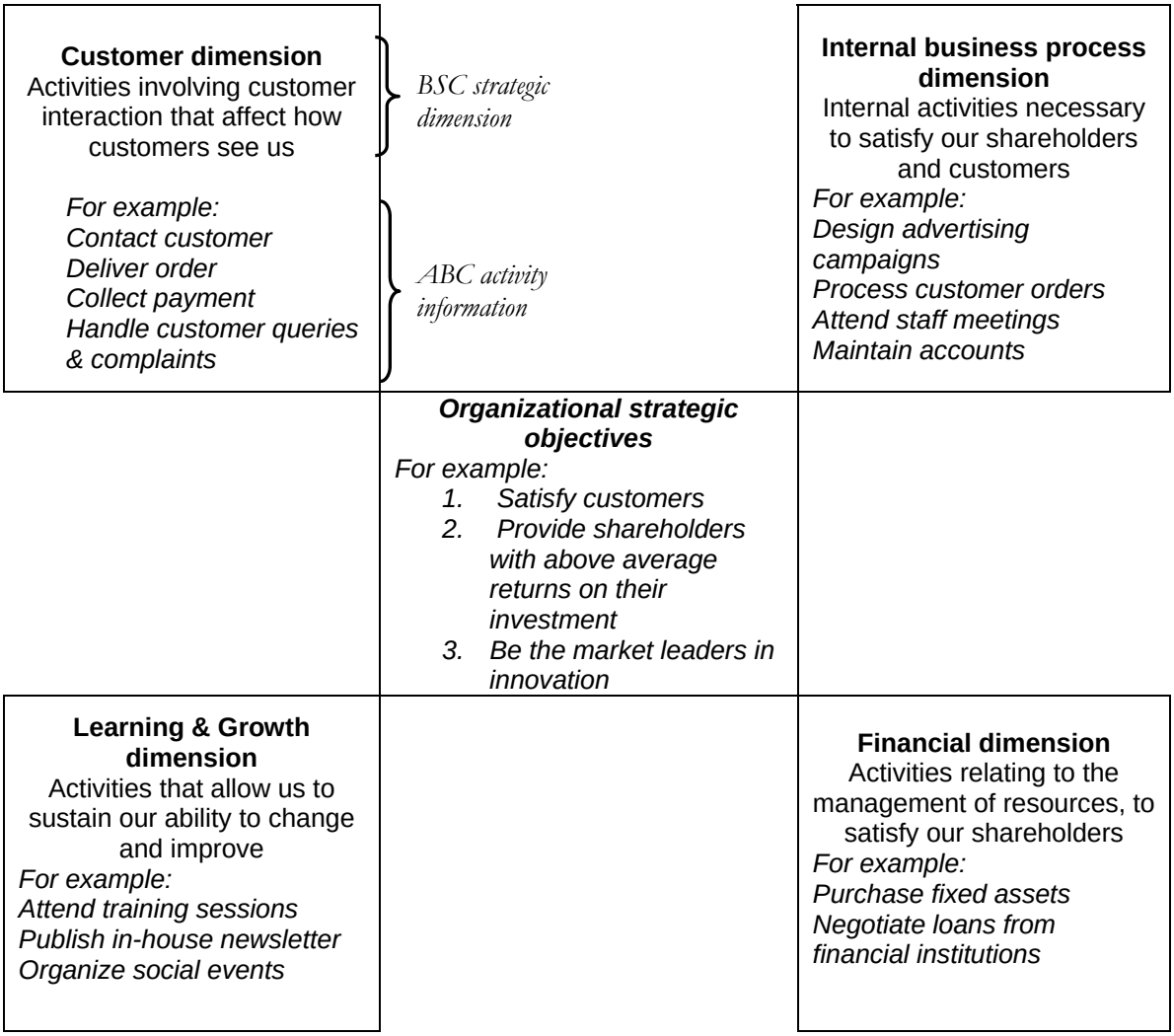

Figure 2.2
Generic representation of the ABC/BSC model

The relevance of an individual activity within a particular dimension can also be linked to specific strategic objectives in the same way. The ABC process can provide the cost

associated with each activity. We can then evaluate the resource consumption associated with the strategic contribution of activities and activity dimensions. For instance, some activities in the internal business process dimension, such as attending staff meetings and maintaining accounts, do not appear to link directly to any particular strategic objective. They are still necessary components of the business but, due to their non-strategic nature, it might be possible to control the amount of resources such activities consume, without affecting the achievement of strategic objectives.

The next section of the study discusses in more detail how a combined ABC/BSC cost management model can be used for strategic control.

2.3 Potential uses of a combined model for strategic control

Ensuring cost control without affecting non-cost strategic goals could be crucial, especially in sectors such as public service and healthcare where strategic outcomes have socio-economic implications. By overlaying ABC and BSC principles, a combined model provides cost information, identifies the amount of resources particular activities consume, and links activities and resource consumption to the achievement of strategic objectives. Cost management decisions using the model could therefore be driven by more long-term considerations, rather than cost minimization for its own sake.

Based on the literature, two strategic uses of a combined strategic cost management model are identified. These are (i) to evaluate strategy implementation, by providing information about the impact of decisions already taken, and (ii) to monitor the premises on which strategy is based, and provide information that could affect future strategic decisions. Schreyögg and Steinmann (1987) refer to these two aspects of strategic control as feedback control and feedforward control respectively.

2.3.1 Evaluation of strategy implementation (Feedback role)

The model could be used to evaluate strategy implementation by using activity and cost information to show how activities relate to strategy, and what resources they consume. By showing where resources are being expended, in relation to strategy, a combined model can provide feedback about whether a strategy is being implemented as planned. This use is consistent with strategic control as defined by Schendel and Hofer (1979).

2.3.2 Monitoring the strategic environment (Feedforward role)

A combined model could draw attention to critical events that require a change in the way strategy has been created or implemented; assumptions that are not valid in the current environment; or factors that may not have been originally considered in the strategic planning process. These events or factors may make themselves known through distortions or variations in activity time and cost estimates obtained from the cost model. This information can then be used to make adjustments to implementation or to the strategy itself. The use of a strategic cost management tool for reassessment of the strategy itself is consistent with the premise control, strategic surveillance, and implementation control stages of Schreyögg and Steinmann's (1987) strategic control framework, which has also been discussed by other scholars such as Ittner and Larcker (1997).

While cost information has traditionally been used to evaluate the internal efficiency of organizations, the use of such accounting information and controls to influence strategic purposes such as customer satisfaction, employee learning and improvement in activities has been criticized as misleading due to its rigidity and narrow scope (Dent, 1990; Johnson, 1990; Langfield-Smith, 1997). However, a cost measure of processes is essential to show managers the financial impact of their decisions (Kaplan & Cooper, 1998). For such an attention-directing role accounting information can be an objective indicator of resource use.

The study does not discuss the use of a combined model for strategy formulation. This separates it from most literature discussing the strategic role of management control systems (MCS)[3], which focus heavily on the tailoring of MCS to strategy, the role of MCS in strategy formulation and, to a lesser extent, on MCS' role in strategy implementation (Cooper, 1996; Dent, 1990; Henri, in press; Langfield-Smith, 1997; Simons, 1987).

The discussion now moves to the context in which the combined ABC/BSC model is presented – healthcare and diabetes patient education.

2.4 Strategic management in healthcare

Strategic management is very important for healthcare organizations because of the constantly changing environment they operate in (Buller & Timpson, 1986). The literature recognising this need and discussing the role of strategy in healthcare organizations can be broadly categorized as (i) studies about internally focused, long-range operational and planning issues (e.g., Dansky, Weech-Maldonado, De Souza, & Dreachslin, 2003), (ii) studies discussing the importance of an externally focused, long-range strategic perspective (e.g., Yasin, Zimmerer, Miller, & Zimmerer, 2002), and (iii) studies presenting strategic tools and sources of strategic information in healthcare organizations (e.g., Wells, Lee, McClure, Baronner, & Davis, 2004).

2.4.1 Internally focused long-range planning

There is a body of empirical and a priori research focusing on strategic ways to realize effective internal operations in healthcare. Some examples include strategic brokerage (i.e. the integration of diverse non-clinical support services to ensure effective operation of clinical activities) (Heng, McGeorge, & Loosemore, 2005), retention of nursing staff through

[3] MCS are defined as measurement systems that use information to influence organizational and individual behaviour patterns (Simons, 1987; Govindarajan & Shank, 1992).

improved work life conditions (Gifford, Zammuto, Goodman, & Hill, 2002), use of operations research techniques for strategic resource allocation in hospitals (Blake & Carter, 2002), cost control through outsourcing (Roberts, 2001), and the relationship between strategic orientation and level of diversity management (Dansky et al., 2003).

These internally oriented studies tend to focus on the aspects of healthcare organizations that do not deal directly with the provision of clinical services but are important facilitators of the core services, and achievement of strategic goals. A strategic management tool that ensures that the strategic role of operational factors (both clinical and non-clinical) is not overlooked would therefore be useful, especially if it can also identify activities that consume resources without contributing to achievement of strategic objectives.

2.4.2 Externally-oriented strategic planning.

Researchers have also discussed the role and importance of strategic planning and management in healthcare. For example, Buller and Timpson (1986) acknowledge the importance of the various stages in the strategic process (including implementation and continuous monitoring) in health services; Douglas and Ryman (2003), in their study of US hospitals, show that a hospital's strategic competencies (i.e. the ability to deliver superior services resulting in competitive advantage) are positively related to financial performance; Yasin et al. (2002) who also studied a sample of US hospitals, find that hospital executives are attempting to overcome traditional barriers to new ideas, and implement new strategic philosophies such as total quality management and business process re-engineering in healthcare; Cuellar and Gertler (2006) try to understand strategic relationships between hospitals and physicians using a transaction economics perspective.

These studies indicate that there is an increasing interest in strategic management in healthcare. However, though most hospitals tend to have internally-focused planning

systems in place, not many have strategic planning systems that are externally-oriented, proactively attempting to understand the changing environment, and moulding themselves to achieve their objectives in that environment (Bruton, Oviatt, & Kallas-Bruton, 1995; Buller & Timpson, 1986). Even in academic research, there seems to have been no attempt to present a practical tool that can be used as a source of strategic information. A combined strategic cost management model could address this gap by providing information for strategic decisions.

2.4.3 Sources of strategic information in healthcare organizations

Some studies have looked at the sources of strategic information and strategy formulation in healthcare. Daake, Dawley, and Anthony (2004) studied the strategic use of data from formal sources (such as circulated reports, information from experts, journal and magazine articles) and informal sources (based on experience, knowledge of operations, informal discussions etc.) in a health organization. They conclude that "formal data should be limited, concise, and structured" (p.244). A combined strategic cost model that uses the BSC framework could provide such specific, structured information for strategic decisions.

Killingsworth, Newkirk, and Seeman (2006) present an example of a tool for strategic planning using a strategic information systems approach, and discuss the importance of incorporating internal and external analyses, and stakeholder influences into the development of a strategic information system. Here again, a combined model that utilizes the different activity dimensions from the BSC approach could address the need for strategic information from different perspectives.

The literature does not supplement the discussion about the multi-dimensional nature of healthcare strategic management with studies about the use of cost information in a strategic way, or the need for systems and tools for strategic cost management in

healthcare. A discussion about strategic cost management model in the context of healthcare would therefore be helpful. This study addresses this issue by providing information specifically about patient education, a relatively ignored healthcare service.

2.5 The importance of managing diabetes education costs strategically

This section begins by discussing the role of costing in healthcare, followed by the importance of patient education, and the extant literature about the costs of patient education. As the combined model is developed using ABC and BSC, and is then applied to patient education, the applicability of each of these methods to healthcare and patient education forms the final part of the discussion.

2.5.1 The role of costing in the healthcare sector

The concept of costing healthcare services is not new, and the literature discusses its importance through issues such as the information requirements for decision making in healthcare (Kaskiw, Hanlon, & Wulf, 1987), the use and implications of DRGs[4] (Beaty, 2005; US Congress OTA, 1986), the need for standard benchmarks to control costs (Meeting, Saunders, & Curcio, 1988), and problems in developing benchmarks due to differences in operations and costing practices (Negrini, Kettle, Shepherd, Mills, & Edbrooke, 2004; Northcott & Llewellyn, 2002), and the positive relation between cost system functionality, level of detail and perceived usefulness of cost data in hospitals (Pizzini, 2006).

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[4] Diagnosis Related Groups or DRGs are the components of "a classification system that groups patients according to principal diagnosis, presence of a surgical procedure, age, presence or absence of significant comorbidities or complications, and other relevant criteria" (US Congress OTA, 1986, p. ix). A cost is associated with each DRG, and is commonly used in the US for Medicare reimbursements.

An argument can be made that the strategic objectives of healthcare organizations, specifically patient education programs, are related to changing attitudes and lifestyles of clients, rather than to cost containment. Though this may be true, resource optimization is still a valid goal given the increasing pressure of resource scarcity in most healthcare systems (OCCI, Version 2.0). Detailed information about the components and drivers of relevant costs could guide decisions that improve operational efficiency, through improved cost management, efficiency in resource utilization (Jagolinzer, 1984) and better resource allocation that is in line with non-cost related strategic objectives of a health program or service (Dent, 1990; Kaskiw et al., 1987; Suthummanon, Omachonu, & Akcin, 2005). In other words, while cost reduction may not be a primary goal, cost management can make resources available to meet strategic needs of healthcare organizations.

Some scholars have called for more research into the use of cost information for decision making in healthcare. For example, Finkler and Ward (2003) comment on the absence of evidence-based cost containment research that hospital managers can use in their decisions. Their three-stage cost containment framework identifies possible avenues of healthcare costing research. These include (i) the *cost measurement* aspect (such as the cost of services, types of information currently available, differences in systems across organizations), (ii) the *cost control* aspect (such as effective cost control strategies, conditions leading to selection of one cost control strategy over another, non-financial impact of cost control efforts), and (iii) the *assessment of value* aspect (such as the impact of cost control on quality of services, value addition to healthcare organizations and society).

Within the context of Finkler and Ward's framework (2003, p.350), a combined ABC/BSC model could address issues from all three stages of strategic cost containment in healthcare (see Figure 2.3). A combined model could use the ABC approach to identify the

costs of processes. Strategic activity dimensions would be provided by the BSC aspect of the model, and costs could therefore be measured for these dimensions as well. While ABC on its own could address the cost measurement aspect, the added strategic focus of the BSC is needed to address questions in the other two areas (cost management and assessment of value), which link costs to strategy achievement. As discussed earlier, ABC does not create this explicit link to strategy and so, as a strategic tool, a combined ABC/BSC model would be more useful than a traditional ABC model.

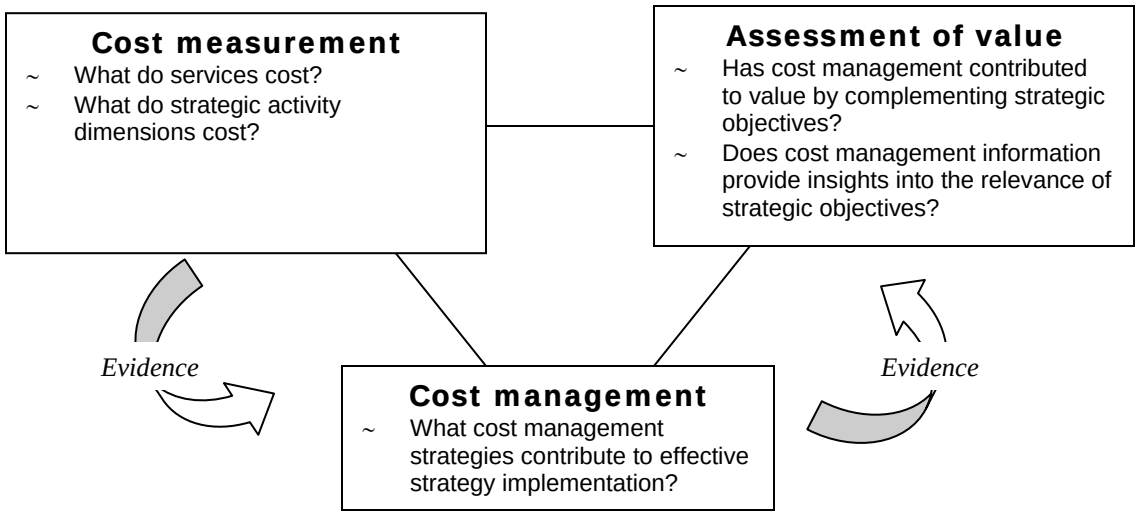

Figure 2.3
Possible healthcare cost management issues addressed by an ABC/BSC model
(Framework adapted from Finkler & Ward, 2003, p.350)

We now move on to discuss the importance of diabetes patient education, and the relevance of strategic cost management in this setting.

2.5.2 The importance of diabetes patient education

Diabetes is a chronic disease that is reaching epidemic levels in Canada, where nearly two million people currently live with the condition – a number expected to increase 50% by 2010 (Canadian Diabetes Association [CDA] & Diabète Québec, 2005). Ohinmaa, Jacobs,

Simpson, and Johnson (2004) estimate that the Canadian costs of diabetes and related complications will increase from $4.6 billion in 2000 to $8.1 billion in 2016. Appendix B discusses diabetes, its prevalence and costs further. These statistics highlight the extent and severity of the diabetes crisis, and the importance of managing it as effectively as possible.

Type-2 diabetes, caused by insufficient production or absorption of insulin in the body, accounts for almost 90% of all diagnosed cases. It can be controlled, or even prevented in some cases, through healthy lifestyle choices (CDA, 2005). Therefore, an important role of healthcare organizations is to improve diabetes knowledge, self-care methods and habits through patient education. The goal is to improve, or at least maintain, a patient's level of well-being, preferably within acceptable cost levels (Karam, Sundre, & Smith, 1986; Norris, Engelgau, & Venkat Narayan, 2001).

Diabetes education aims at promoting self-management which empowers clients. This is a more efficient way of managing a chronic disease, as continuous monitoring of all diagnosed cases is not practical for either the organizations or their clients. The self-management approach benefits the patients, who can function with more independence, as well as the healthcare organizations, from which some of the pressure of responsibility is lifted (Coates, 1999). At the Regional Health Authority (RHA) studied in this project, client management of diabetes is considered a key concept, and the organization aims at providing disease-specific information to understand, manage, and live productively with the disease.

Managing diabetes is desirable, clinically, as well as from an economic perspective, as better control of the disease translates into lower healthcare costs (Wagner et al., 2001). Patient education can play an important role in diabetes management, as it appears to have a positive impact on the well-being of patients, by improving knowledge levels, blood glucose self-monitoring skills, and dietary habits, especially with short term follow-up (Loveman et

al., 2003; Norris et al., 2001; Ryan et al., 2002). Patient education can reduce risk factors and increase compliance, leading to decreased morbidity and mortality (Bourie, 1993). In fact, the 1998 Canadian Clinical Practice Guidelines for management of diabetes recommend that, "(i)nitial and ongoing education of the person with diabetes should be an integral part of diabetes management and not merely an adjunct to treatment." (Meltzer et al., 1998, p.S4)

In order to achieve therapeutic goals, education programs must meet certain standards (see Appendix B) and, in addition to knowledge improvement, must also address psychological and social aspects which influence the behaviour of clients with chronic diseases (Coates, 1999, chap.6). Diabetes programs generally consist of individual and classroom sessions, where clients are taught about the physiology of diabetes; diabetes medication, blood glucose monitoring procedures and insulin adjustments; the role of diet in diabetes control and menu planning; and the importance of exercise (Ryan et al., 2002). Education is usually provided via face-to-face interaction between clients and an interdisciplinary team of trained educators and clinicians such as nurses, dieticians, exercise physiologists, and physicians (Meltzer et al., 1998; Mensing et al., 2003). These teams use innovative education tools, and are required to maintain up-to-date skills and undergo ongoing training (Maldonato, Bloise, Ceci, Fraticelli, & Fallucca, 1995; Mensing et al., 2003).

Consequently, diabetes education programs must carry out a range of activities, and consume a variety of resources in order to be effective. These costs associated with the provision of effective diabetes education are met from within a finite pool of resources and therefore, must be optimized. This resource optimization, however, must be accomplished without any negative impact on the quality of the programs, or their strategic objectives. The use of strategic cost management therefore seems essential in this situation. Of course, in order to manage costs, strategically or otherwise, they must first be known.

2.5.3 Costs of patient education – A gap in the literature

While studies have tried to estimate the direct and indirect costs of chronic diseases in general (including diabetes) (Jacobs et al., 2004; Ohinmaa et al., 2004), and of specific types of diabetes treatment such as combination therapy using different drugs (Caro et al., 2003), there is little information specifically about the cost of patient education programs (Williams et al., 2004). For example, Jacobs et al. (2000) present an inventory of healthcare services and standard provincial costs, but do not list patient education separately. Most research into patient education costs is limited to estimating the direct costs of nursing time spent on pre- and post-operative patient education (Bourie, 1993; Williams et al., 2004). The study by Karam et al. (1986) is an exception and estimates education costs for a surgical procedure by adding indirect costs to direct educator and material costs.

However, as the focus of these studies is not chronic disease self-management, their findings are not directly applicable to diabetes education. While pre- and post-operative instruction is provided to help patients gain knowledge and skills that influence their behaviour for a specific (usually short-term) period, chronic disease education serves a fundamentally different purpose. For chronic diseases, changes in behaviour and habits must be sustained for long periods of time (usually life), and so motivation and psychological factors also play an important part in chronic disease instruction (Coates, 1999).

These unique characteristics of diabetes education require its costs to be analyzed using a customized model. Also, processes and costs for different healthcare organizations tend to differ and a single study cannot provide cost amounts that are relevant to all such organizations (Siegel et al., 1999). Therefore, a study developing such a model should present

details of the model development process, activities, time, cost items, and possible cost drivers for a diabetes program and for specific patient categories.

2.5.4 Using ABC and BSC in healthcare

The combination of ABC and BSC into a single strategic cost management tool has not been attempted, and so it is not possible to conclusively assert the usefulness of such a combined model to diabetes education or even healthcare in general. However, ABC and BSC have been studied extensively in healthcare settings, as individual systems. For example, studies have presented the benefits of using ABC in hospitals (Chan, 1993; Eden, Lay, Maingot, & Doyle, 2006; Ramsey, 1994; Udpa, 1996), private practices (Siegel et al., 1999), and specific hospital departments and wards (Maher & Marais, 1998; Suthummanon et al., 2005). Similarly, applicability and successful use of BSC in healthcare, as long as appropriate modifications are made to reflect strategy, has been discussed by many researchers including Chow, Ganulin, Haddad, and Williamson (1998), Inamdar and Kaplan (2002), Pink et al. (2001), Radnor and Lovell (2003), and Zelman, Pink, and Matthias (2003). The literature thus confirms that the benefits of ABC can be experienced in healthcare, and that the BSC link between performance and strategy applies in the healthcare setting. This strengthens the argument that a combined strategic cost management model will be relevant in healthcare.

Having presented the theoretical evidence in support of developing a combined ABC/BSC model, and the relevance of such a model to diabetes education, the study now moves on to the steps involved in creating such a model.

3. Methodology

This chapter discusses the general steps that were followed to create a combined ABC/BSC model for a large health unit of a Canadian Regional Health Authority (RHA)[5]. The diabetes education program that was studied is part of an initiative to promote healthy lifestyle choices amongst residents in the region. Appendix C describes the education program for Type-2 diabetes, and the different client categories.

Various sources of information were used in the study. Table 3.1 summarizes these different sources of primary and secondary data in the study.

Table 3.1
Sources of information for ABC/BSC model development for diabetes education

	Primary	Secondary
Stage 1 Pre-interview	~ Meetings with RHA diabetes program managers ~ Email and telephone correspondence with RHA diabetes program managers	~ Academic journals & books ~ Diabetes information websites ~ RHA educational material ~ RHA internal documents such as planning documents, process manuals, checklists, and activity logs
Stage 2 Interview	~ Interviews with RHA staff for activity and cost information	~ RHA documents such as annual reports, budgets, and internal accounting statements
Stage 3 Post-interview	All data from previous stages for costs of processes, activity dimensions, & cost objects	

Figure 3.1 is a representation of the model development process.

[5] Regional health authorities are responsible for promoting the health of the population in their respective health regions, and the prevention of disease and injury. They look after hospitals, continuing care facilities, community health services and public health programs. Provincial health ministries allocate operational funding to the RHAs. (Alberta Health & Wellness, 2005)

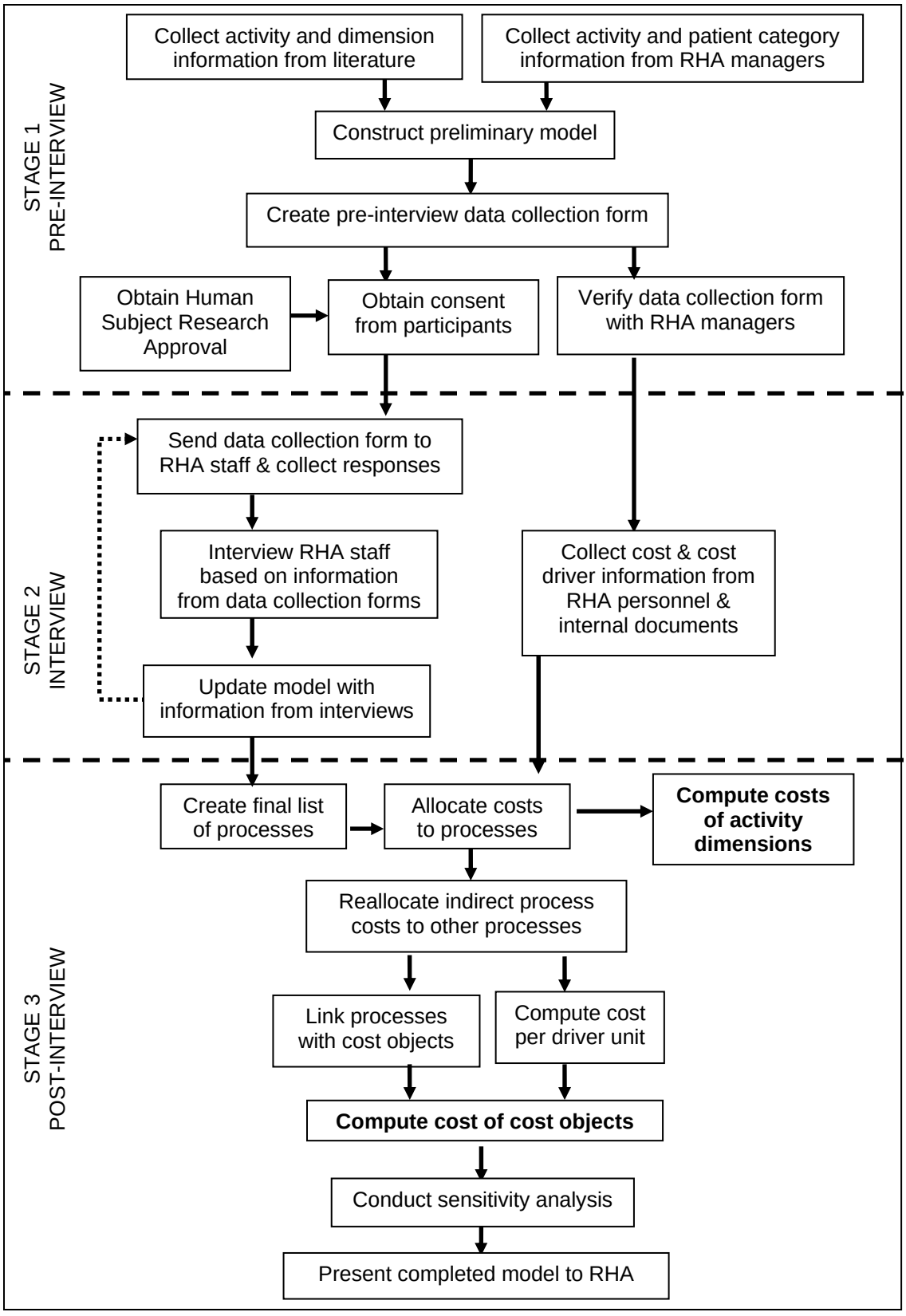

Figure 3.1
The process of customizing the ABC/BSC model to the RHA's diabetes program

3.1 Stage 1: Pre-interview

3.1.1 Collecting preliminary information and creating an outline of the model

The first step in the development of the ABC/BSC model was to understand diabetes education and the process at the RHA. A review of literature in the areas of diabetes patient education and self-management was conducted. This was supplemented by RHA documents and interviews with the program director and team leader. This information was used to (a) identify important activity dimensions, (b) develop a preliminary list of activities, and (c) identify client categories that would be the cost objects for the study.

Once the RHA Research Committee and the University of Lethbridge Ethics Committee formally approved the study, the diabetes program staff attended a meeting where the study and its purpose were outlined. Formal consent from individuals was received at the end of this meeting.

3.1.2 Developing a pre-interview form

A pre-interview data collection form was created by categorizing the identified activities into the activity dimensions. The form asked participants to indicate their role in the diabetes program, and estimate the amount of time spent on different activities for different categories of clients. They were also asked to add significant activities that had been overlooked and provide time estimates for these newly added activities as well.

The purpose of collecting this data before commencing the interview process was to provide specific direction to interview questions. Given the busy work schedules of respondents, this was a more efficient way of collecting information as (a) it eliminated repetitive questions during the interviews, (b) it allowed participants to think about the activities they performed over a longer period time (usually 3-4 days) rather than in the relatively short duration of an interview, resulting in a more accurate and complete list of

activities, and (c) it provided an opportunity to collect input from all staff involved in the program, and not just from selected interviewees.

3.1.3 Validation of the data collection form by RHA managers

Once the pre-interview form was completed, it was pre-tested by the diabetes program director and the team lead at the participating centre, to obtain their comments, and suggestions for improvement. These suggestions were then incorporated into the form. By involving senior staff at each stage of model development, the output at each stage of the process was more accurate and streamlined. Appendix D shows the final draft of the form.

3.2 Stage 2: Interview

3.2.1 Collecting activity information and time estimates

The completed data collection form was sent out electronically to eight staff members (roughly 50% of the program staff at the selected location) including nurses, dieticians, administrative staff, and managers. Six of the forms were completed and returned. The responses in the forms directed the specific questions to be asked in interviews. Three of the six respondents were interviewed over the telephone at this stage, with each interview lasting from 15 to 30 minutes. (See Appendix E for sample interview protocol). Information collected from the forms and interviews was then used to refine the original diabetes education activity list.

The updated list was then sent to the remaining participants, and the above process of collecting information and interviews was repeated. Three more completed forms were received in the second round, and all three respondents were interviewed telephonically, again for 15-20 minutes each. At this point, no additional information was obtained from the interviews or forms. The process was therefore concluded after two iterations.

Throughout the data collection process, the activity dimensions adapted from the BSC approach were used to ensure that no important area of activity had been overlooked. The use of this framework, combined with the iterative data collection process, ensures that the activities and time estimates used in the model are reasonably complete and accurate.

3.2.2 Collecting cost and cost driver information

Cost information for the study was obtained from internal documents such as diabetes program budgets. Some overhead information, for example, the program's share of occupancy costs, was not included in these documents. This information was collected from a finance manager at the RHA's centralized finance department, via email correspondence. Internal planning documents and records were used to estimate cost driver information including the number of clients, number of staff, and staff pay scales. For example, staffing schedules provided the number of full-time equivalent employees for each of the RHA's diabetes centres, while a manager provided estimates of client numbers from client records.

3.3 Stage 3: Post-interview

This stage primarily involved working with information collected in the earlier stages to estimate the costs of activity dimensions and cost objects. The steps involved were:

~ Creating a list of processes from the activity information;

~ Allocating resource costs to processes;

~ Linking processes to each cost object and reallocating indirect costs to other processes;

~ Computing cost per unit of cost drivers and total cost driver units for each cost object;

~ Estimating the costs of the cost objects; and finally,

~ Conducting sensitivity analyses based on assumptions made in the study.

Each of the steps is discussed in more detail in the following chapter.

4. Building the ABC/BSC model for diabetes education

This chapter is laid out as follows – the first section deals with diabetes education information collected for the ABC/BSC model, and its construction; the second section discusses the information obtained from the model that can be used for feedback control; the third section presents examples to illustrate the ABC/BSC model's feedforward use to identify uncertainties and changes in the environment; the final section briefly discusses the results of the study's sensitivity analyses based on the study assumptions. A complete list of assumptions is shown in Appendix F.

4.1 Developing the model

4.1.1 Identifying activity dimensions

The RHA participating in the study is part of the public health system. Using the performance perspectives identified by Kaplan and Norton (1992, 1996), a review of different BSC perspectives used in the literature (e.g., Elefalk, 2001; Kalagnanam, 2004; Pink et al., 2001), the modifications made by Edwards et al. (2005) for cost classification, and an analysis of the strategy and process at the RHA, four activity dimensions are identified to collect and classify activity information (see Figure 4.1). The activity dimensions identified for the ABC/BSC model focus on clients, internal processes, employee learning and growth, and interaction with external stakeholders (including regulatory and government agencies, donors, and the general public).

The *client dimension* includes all activities that require direct interaction (face-to-face, telephone, email etc) with persons with diabetes. This corresponds with the customer dimension presented by Kaplan and Norton (1996). In the figure, the arrows show that this dimension affects the achievement of strategic objectives 2

(Offer patients the right level of care at the right time), and 3 (Make patients accountable for their health).

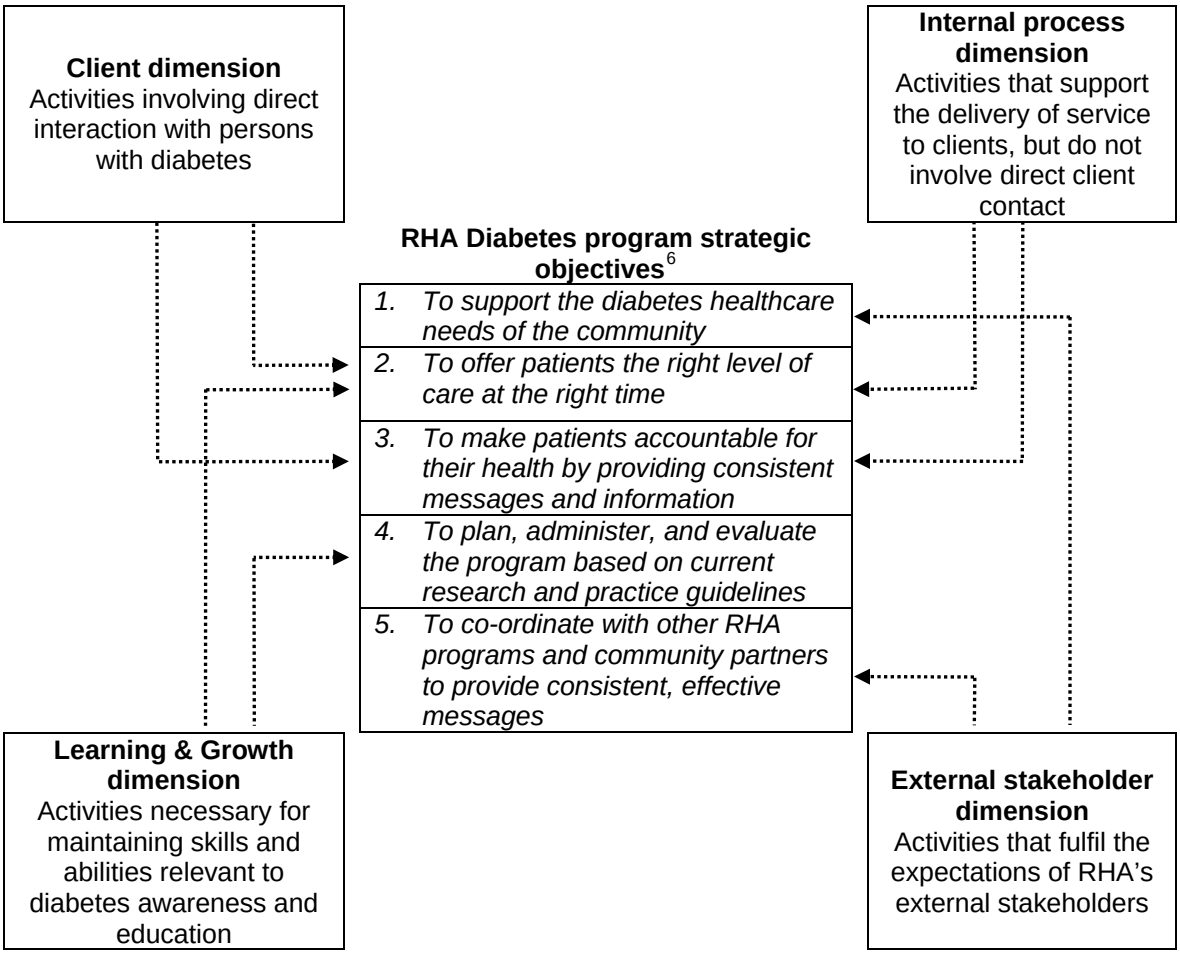

Figure 4.1
Linking activity dimensions to strategic objectives of the RHA's diabetes program

The *internal process dimension* includes all activities that support the running of the facility and delivery of service to clients, but do not involve direct contact with them. This includes activities such as maintaining logs and records, purchasing materials, and staffing. These activities therefore indirectly support the achievement of

[6] Adapted from RHA documents

objectives 2 (Offer patients the right level of care at the right time), and 3 (Make patients accountable for their health), which are the links shown in the figure.

The *learning and growth dimension* includes all activities undertaken by RHA staff to maintain skills and abilities relevant to Type-2 diabetes awareness and education, such as attending conferences. Figure 4.1 indicates that the activities in this dimension affect the strategic objective of providing clients the right care when they need it (Objective 2), and of managing the program based on current research information and guidelines (Objective 4).

The *external stakeholder dimension* includes all activities undertaken to fulfill the expectations of stakeholders external to the RHA such as donors, government and regulatory organizations, and the general public. Examples of these activities include managing funding, interacting with general public, and collaborating with community partners for various diabetes-related initiatives. These activities are thus important to the achievement of objective 1 (Support diabetes needs of the community) and objective 5 (Co-ordinate with other programs and community partners).

The original BSC authors use the financial dimension as the fourth aspect of the BSC (Kaplan & Norton, 1992, 1996), and this convention is followed in studies by other authors as well. Where the financial dimension is used in performance measurement, its purpose is to identify financial targets that an organization must achieve, in order to meet its strategic objectives. However, due to the difference in purpose of the original BSC (performance measurement via financial targets) and that of the new ABC/BSC model (linking activities and their costs to strategic objectives of diabetes education), the fourth dimension has been modified in the ABC/BSC model to include the activities required to accommodate the

numerous external stakeholders a public health organization typically must satisfy. As discussed in Section 2.2.3, similar modifications have been made in other studies with non-profit organizations (e.g., in the BSC for a police force [Elefalk, 2001]) so that the selected dimensions reflect the goals of the organization being studied.

The specific selection of an External Stakeholder strategic dimension is supported by other studies in healthcare. For example, Bart and Hupfer (2004) looked at responses from executives of Canadian hospitals to identify general themes in mission statements, such as concern for stakeholders (including employees, shareholders, and the general public), and how these themes impact the way operations are managed. Wells et al. (2004) studied small hospitals, and also highlights the importance of continual negotiations with external stakeholders as the main source of strategic information.

It is important to note that the financial dimension has not been ignored in this example, but has simply been included in the External Stakeholder dimension along with other aspects of activity. Therefore, there is still a financial element in the external stakeholder dimension. Donors and government agencies are external stakeholders providing the RHA with funding, and they would be interested in the financial management of the program. Therefore, finance-driven activities, such as managing the funds available to the diabetes program, must be included here.

4.1.2 Activity information collection

As discussed in Section 3.1, activity information was collected in two iterations, and resulted in a list of 48 activities. These activities were then combined in major education-related and operational processes, based on their tendency to "cluster into larger units of work" (Siegel et al., 1999, p. 7). Each process was thus a collection of activities that were related, and for which individual analysis and cost allocation could not be easily carried out

(See Appendix G). For example, the activities *Print off lab results*; *Review referral for priority*; *Triage referral*; *Book referral*; *Sort referral and organize*; and *Mail package to client*, are grouped into a single process – Process 1 (Book client). This grouping reduces the number of activities to a more practical and manageable number. The final list of 19 processes is shown in Figure 4.2.

Patient dimension	**Internal process dimension**
1. Book client 2. Conduct initial assessment 3. Schedule visits & follow-up with clients 4. Deliver face-to-face follow-up 5. Deliver telephone follow-up / consults 6. Deliver group sessions	7. Handle and maintain records 8. Attend to correspondence & communication 9. Develop & handle educational materials 10. Travel to deliver education 11. Consult with clinicians & physicians 12. Sustain operations 13. Create and implement strategic plans
Learning & Growth dimension	**External stakeholder dimension**
14. Maintain certification 15. Update knowledge and skills – Conferences 16. Update knowledge and skills – Reading & Discussion 17. Maintain supporting system skills	18. Manage funding 19. Interact with public & drop-in clients

Figure 4.2
ABC-based processes arranged into BSC-based activity dimensions for the RHA's diabetes program

4.1.3 Defining cost objects and the processes they consume

Based on the different client categories and the study's focus on Type-2 diabetes, the following cost objects were identified for services delivered by the RHA's diabetes education program to clients newly-diagnosed with Type-2 diabetes.

1. *Clients requiring lifestyle intervention only (LS)*

   Clients in this category can maintain blood glucose levels just by making changes in lifestyle – mainly diet and exercise habits.

2. *Clients requiring oral medication (OM)*

   Clients in this category require oral medication in addition to lifestyle changes to maintain blood glucose levels.

3. *Clients requiring oral medication and insulin or client with comorbidities (M&I)*

   This category includes patients with higher blood glucose levels over a longer period of time, which requires oral medication as well as regular use of insulin. Persons with co-morbidities, i.e. pre-existing health conditions such as heart disease in addition to diabetes, are also included here. These two groups of clients do not overlap completely, but are combined as a single unit because of the similarities in resource use.

4. *Clients with gestational diabetes (PREG)*

   Clients who become diabetic due to hormonal changes during pregnancy are included in this category.

5. *Group sessions (GRP)*

   The group sessions provide general information about diabetes and related issues, and are used to supplement the information provided in individual sessions. The clients in a group typically come from across different client categories, and so the group sessions are included as separate cost objects.

Table 4.1 shows the link between the processes and each of the cost objects. A brief description of how this relationship is identified follows.

Consider as an example Process 1 (Book Client) which is shown to be consumed by all cost objects except the group sessions. The reason for excluding group sessions is that

patients attending the group sessions will have already been booked as individual clients, and so will not have to be booked again for group sessions. The same goes for processes 2, 4, 5, and 7, which are unit-level activities, related to individual clients. Process 6 (Deliver group sessions), on the other hand, is directly consumed by the cost object *GRP* only.

Table 4.1
Linking processes to cost objects

Activity dimension	#	Process	Cost objects
CLIENT	1.	Book client	LS, OM, M&I, PREG
	2.	Conduct initial assessment	LS, OM, M&I, PREG
	3.	Schedule visits & follow-up with clients	All
	4.	Deliver face-to-face follow-up	LS, OM, M&I, PREG
	5.	Deliver telephone follow-up / consults	LS, OM, M&I, PREG
	6.	Deliver group sessions	GRP
INTERNAL PROCESS	7.	Handle and maintain records	LS, OM, M&I, PREG
	8.	Attend to correspondence & communication	Reallocate to processes 1-7, 11
	9.	Develop & handle educational materials	Reallocate to processes 2, 4, 6
	10.	Travel to deliver education	All
	11.	Consult with clinicians & physicians	OM, M&I, PREG
	12.	Sustain operations	Reallocate to all other processes
	13.	Create and implement strategic plans	*No cost driver link to selected cost objects or other processes*
LEARNING & GROWTH	14.	Maintain certification	Reallocate to processes 2, 4, 5, 6
	15.	Update knowledge and skills - Conferences	Reallocate to processes 1-6, 9,11
	16.	Update knowledge and skills – Reading & Discussion	Reallocate to processes 1-6, 9,11
	17.	Maintain supporting system skills	Reallocate to processes 1-9
EXTERNAL STAKEHOLDER	18.	Manage funding	*No cost driver link to selected cost objects or other processes*
	19.	Interact with public & drop-in clients	*No cost driver link to selected cost objects or other processes*

Certain processes, such as Process 12 (Sustain operations), include activities that are essential for smooth operations and effective delivery of the organizational output (in this case, education). However, instead of being consumed directly by the cost objects, these service-sustaining processes facilitate other processes. Therefore, following the example of Siegel et al. (1999), such processes are reallocated to the processes consuming them.

Finally, certain groups of activities, for example Process 13 (Create and implement strategic plans), are facility-sustaining, and while essential to the success of the operational unit as a whole, cannot be linked meaningfully either to any of the cost objects, or to other processes. Process 19 (Interact with public) is another example of a process that is not driven by the volume of clients or time spent on client groups. The costs associated with such processes can be traced to the facility, but should not be arbitrarily assigned further down to the client category-based cost objects (Kaplan & Cooper, 1998, p. 91). Such an allocation that is made without a meaningful driver would distort cost information for the cost objects. In Table 4.1, these processes are indicated with the comment *"No cost driver link to selected cost objects or other processes."* This does not mean that the costs of these processes are excluded while estimating the cost of the program, but only that they are not passed on to the individual cost objects.

4.1.4 Identifying drivers linking resources with processes

The purpose of this step is to identify the link between resource consumption and processes. Table 4.2 shows the basis for allocating expenses of the diabetes program to each of the 19 identified processes.

Resource costs were allocated to processes based on an understanding of the types of resources or expenses included under each cost category, and the purpose of the expense. For example, the cost item *Staff compensation* includes salaries, benefits and other employee

remuneration (excluding compensation paid to the program director). As every process requires the resource that this expense pays for, it is allocated to all processes in the proportion of the time spent on each activity. *Program Director's compensation* on the other hand, is paid to enable Process 13 (Create and Implement strategic plans), and Process 18 (Manage funding) as these are activities performed by the director.

Some expenses can be attributed directly to specific processes. For example, the cost of promotion can be traced directly to Process 19 (Interact with public).

Appendix H provides a list and brief description of all cost items and drivers.

Table 4.2
Drivers linking resource costs to processes

Expense / Resource	Driver	Assigned to Process #
Staff compensation	Time spent on each process	All processes except 13 & 18
Program Director's compensation	Time spent on each process	13 – Create & implement strategic plans 18 – Manage funding
Educational material	Direct	9 – Develop & handle educational material
Travel between sites	Direct	10 – Travel to deliver education
Office supplies & small equipment	Direct	12 – Sustain operations
Licence fees & other memberships	Direct	12 – Sustain operations
Education & reference books	Time spent on each process	14 – Maintain certification 15 – Update knowledge (Conferences) 16 – Update knowledge (Reading & discussion)
Laboratory costs	# of individual sessions	2 – Conduct initial assessment 4 – Deliver face-to-face follow-up
Equipment lease	Direct	12 – Sustain operations
Medical supplies	# of individual sessions	2 – Conduct initial assessment 4 – Deliver face-to-face follow-up
Occupancy costs	Direct	12 – Sustain operations
Promotion & advertising	Direct	19 – Interact with public
Telecom	Time spent on each process	3 – Schedule visits & follow-up with clients 5 – Deliver telephone follow-up & consults 8 – Attend to correspondence & communication
Allocated overheads	Direct	12 – Sustain operations

4.1.5 Identifying activity drivers that link processes to cost objects

Table 4.3
Activity drivers linking process costs to cost objects

Dimension	Process	Activity driver	Cost objects
CLIENT	1. Book client	# of clients	LS, OM, M&I, PREG
	2. Conduct initial assessment	# of initial assessment minutes	LS, OM, M&I, PREG
	3. Schedule visits & follow-up with clients	# of sessions (individual + group)	All
	4. Deliver face-to-face follow-up	# of face-to-face follow-up minutes	LS, OM, M&I, PREG
	5. Deliver telephone follow-up / consults	# of telephone follow-up minutes	LS, OM, M&I, PREG
	6. Deliver group sessions	# of group sessions	GRP
INTERNAL PROCESS	7. Handle and maintain records	# of individual sessions	LS, OM, M&I, PREG
	8. Attend to correspondence & communication	Staff time spent on process	Reallocate to processes 1-7, 11
	9. Develop & handle educational materials	Staff time spent on process	Reallocate to processes 2, 4, 6
	10. Travel to deliver education	# of sessions (individual + group)	All
	11. Consult with clinicians & physicians	# of minutes of consultation	OM, M&I, PREG
	12. Sustain operations	Staff time spent on process	Reallocate to all other processes
	13. Create and implement strategic plans		*No cost driver link to selected cost objects or other processes*
LEARNING & GROWTH	14. Maintain certification	Staff time spent on process	Reallocate to processes 2, 4, 5, 6
	15. Update knowledge and skills - Conferences	Staff time spent on process	Reallocate to processes 2, 4, 5, 6
	16. Update knowledge and skills – Reading & discussion	Staff time spent on process	Reallocate to processes 2, 4, 5, 6
	17. Maintain supporting system skills	Staff time spent on process	Reallocate to processes 1-9
EXTERNAL STAKE-HOLDER	18. Manage funding		*No cost driver link to selected cost objects or other processes*
	19. Interact with public & drop-in clients		*No cost driver link to selected cost objects or other processes*

The next step is to link processes and their costs to specific cost objects using appropriate activity drivers. Table 4.3 shows the drivers for each process. To facilitate comparison across cost objects, Table 4.4 groups all processes for each cost object.

Table 4.4
Processes consumed by individual cost objects

Cost object	Processes consumed
LS Client requiring lifestyle intervention only	1 – Book client 2 – Conduct initial assessment 3 – Schedule visits & follow-up with clients 4 – Deliver face-to-face follow-up 5 – Deliver telephone follow-up/consults 7 – Handle and maintain records 10 – Travel to deliver education
OM Client requiring oral medication	1 – Book client 2 – Conduct initial assessment 3 – Schedule visits & follow-up with clients 4 – Deliver face-to-face follow-up 5 – Deliver telephone follow-up/consults 7 – Handle and maintain records 10 – Travel to deliver education 11 – Consult with clinicians & physicians
M&I Client requiring oral medication & insulin or Client with comorbidities	1 – Book client 2 – Conduct initial assessment 3 – Schedule visits & follow-up with clients 4 – Deliver face-to-face follow-up 5 – Deliver telephone follow-up/consults 7 – Handle and maintain records 10 – Travel to deliver education 11 – Consult with clinicians & physicians
PREG Client with gestational diabetes	1 – Book client 2 – Conduct initial assessment 3 – Schedule visits & follow-up with clients 4 – Deliver face-to-face follow-up 5 – Deliver telephone follow-up/consults 7 – Handle and maintain records 10 – Travel to deliver education 11 – Consult with clinicians & physicians
GRP Group sessions	3 – Schedule visits & follow-up with clients 6 – Deliver group sessions 7 – Handle and maintain records 10 – Travel to deliver education

Consider Process 1 (Book client) and the associated driver (number of clients), which imply that there is a direct relationship between the number of clients, and the cost of the process i.e. if the number of clients increases, then the cost of the process will increase as it

has to be performed more often. Similarly, the costs of preparing and delivering group sessions (Process 6) are directly proportional to the number of sessions delivered.

Reallocations of certain costs to other processes, such as the reallocation of Process 8 (Attend to correspondence) and Process 12 (Sustain operations), are based on time spent on the processes to which allocation is made. No drivers are identified for unallocated costs.

4.1.6 An example for how process costs are computed

To clarify how the costs of processes are determined, a complete example is presented for Process 1 (Book client). The first step was to identify the activities that form this process. Due to their close relation, and the difficulty in estimating separate times for each one, the activities *Print off lab results*; *Review referral for priority*; *Triage referral*; *Book referral*; *Sort referral and organize*; *Mail package* were grouped into the single process – Book client.

The next step is to estimate the time spent on the process. Estimates from RHA staff showed that administrative staff spent an average of 10 minutes booking each client, while educators spent an additional 5 minutes per client. The total time spent on the process for the year was then calculated based on the total number of clients in all categories. Using an average compensation cost per minute for administrative and educator staff, the total cost of the process was then calculated. As Table 4.2 (in Section 4.1.4) shows, the only cost item allocated to this process was staff salary.

As this process can be traced to the selected client-based cost objects in the study, there is no need for it to be reallocated to other processes. The next step, therefore, is to link the process to various objects. The process cost driver is the number of clients, i.e. as the number of clients increases, the time spent on the process and its total cost will increase. By dividing the total cost of the process (approximately $30,120) by the total number of clients (around 3295), the average cost of the process is calculated to be around $9.14 per client.

The total cost of Process 1 (Book client) is then allocated to each cost object, based on the number of clients in the category. So, in the case of the category *Clients requiring lifestyle intervention only*, the number of clients in the category is estimated to be around 2800, and so the total cost of booking clients in this category is estimated at around $25,590.

In the next section, possible strategic uses of this type of information are discussed.

4.2 Using the ABC/BSC model for feedback control in diabetes education

The information obtained from the ABC/BSC model creates awareness about the differences in resource consumption for different activities or client types. Some examples of how the model does this are discussed in this section. Complete cost and driver information is not included in the study for reasons of confidentiality. However, examples are provided to discuss the relationships between activities and strategy, and how the model can be used to influence cost management from a strategic point of view. The value of this strategic cost management system can therefore be assessed based on its ability to complement strategic plans (Finkler & Ward, 2003).

4.2.1 The costs of processes

The costs of the diabetes program are allocated to processes using the appropriate drivers described in Table 4.2, and the total cost of each process. Information about the cost of a specific process may allow decision makers to evaluate ways of controlling the cost, especially if those activities are not directly related to meeting strategic goals. For example, consider the information for the processes below.

Process	*Average cost*	*Dimension*
1 – Book client	$0.61 /minute	Client
10 – Travel to deliver education	$0.90 /face-to-face session	Internal process
11 – Consult with clinicians & physicians	$0.66 /minute	Internal process

The cost of Process 1 (Book client) is $9.15 per client and, as an average of 15 minutes is consumed by this process (including administrative and clinical staff time), the cost per minute is approximately $0.61. This activity does not directly contribute to the achievement of any of the five strategic objectives of the program. Managers may therefore feel this is a high cost to pay for a set of activities that do not add significantly to achievement of strategy, and may try to find ways of reducing the time spent on the process. Process 10 (Travel to deliver education) is a similar example of such a non-strategic process.

Process 11 (Consult with clinicians and physicians) on the other hand, has a unit driver cost of approximately $0.66 per minute of consultation, and is a crucial part of the education service. Sharing information and opinions about more complex cases is an integral part of providing service to clients that helps educators understand a client's condition. It therefore contributes to the program objective of providing clients with the level of care they need. So managers may not want to pressure educators to reduce time spent on such a strategically relevant process. They may even try to increase the time spent on case discussions if it leads to employee learning, especially given the relatively low cost per minute, when compared to other processes.

While instinctively one may feel that activities in the Client dimension deserve greater importance due to the personal interaction with clients, the above examples of Processes 1 and 11 show that controlling activities based simply on the dimension may be misleading. The purpose of an activity in relation to strategy must also be considered.

Information about costs of processes can also be useful to evaluate the processes in relation to each other, and to identify better alternatives, that may cost less without compromising strategic outcomes. This use of the cost information is consistent with the suggested use of ABC cost data for optimizing resource allocation and use (Jagolinzer, 1984;

Kaskiw et al., 1987; Suthummanon et al., 2005). The ABC/BSC model provides the additional link to strategy. For example, consider the following.

Process	*Average cost per minute*	*Dimension*
4 – Deliver individual (face-to-face) follow-up	$0.75	Client
5 – Deliver telephone follow-up & consults	$0.71	Client

Based on this information, RHA management could encourage clients to use telephone or email for queries arising outside scheduled sessions. However, managers would also have to consider the strategic impact of reducing the amount of face-to-face interaction. This may not be a suitable course of action if it impacts quality of patient care, i.e. it contradicts strategic objective 2 (To offer patients the right level of care at the right time).

These examples show the benefit of the combined cost management model over a traditional ABC system, which would not link activities to strategic objectives. The examples also highlight that the ABC/BSC model does not provide a direct cost solution. It must be used with other strategically relevant information such as quality of service and client needs.

4.2.2 The costs of activity dimensions

Figure 4.2 (in section 4.1.2) shows the different processes within each of the activity dimensions. Once the cost of each process has been computed as described in Tables 4.2 and 4.3, the total costs for each of the four activity dimensions can also be calculated. Table 4.5 summarizes this information for the RHA by showing the proportion of resources consumed by each dimension.

Table 4.5
Proportional costs of RHA activity dimensions for Type-2 diabetes education

Dimension	% of Total cost
Client	36
Internal Process	59
Learning & Growth	2.5
External Stakeholder	2.5

This information can be used to evaluate the fit between resource use and strategic objectives, and is part of monitoring strategy. For example, the RHA may find that the best way to achieve strategic objective 2 (To offer patients the right level of care at the right time) is through intensive personal interaction (either face-to-face or via telephone and email). The distribution of costs shows that currently the resources used for internal processes (59%) is more than 1.6 times that being spent on direct client interaction (36%). While some activities within the Internal Process dimension are critical to meet strategic goals, a closer analysis of the dimension may reveal possible avenues for cost control that will not impact strategy achievement.

It is worth reiterating that the model does not provide strategic solutions, and only informs decision making. Additional sources of information and more in-depth analyses of qualitative factors are therefore essential when using the model.

4.2.3 The costs of client categories

Using information about the costs of processes and the different processes consumed by each cost object, the total cost of each client category, and the average cost per client in each category can be computed.

Table 4.6
Costs of client category cost objects at the RHA's diabetes program

Cost object	Total annual cost*	Avg. cost per client*
Clients requiring lifestyle intervention only	$405,300	$ 144.75
Clients requiring oral medication	$45,600	$ 276.50
Clients requiring oral medication & insulin	$34,900	$ 423.50
Clients with gestational diabetes	$99,400	$ 402.25
Group sessions	$7,400	$ 154.00**

* Costs are rounded off
** Cost per session

Table 4.6 summarizes the cost per client information obtained for each cost object from the RHA's ABC/BSC model. The comparison of average cost per client (or session) for the above cost objects makes it clear that there is a difference in the resources consumed by the different patient categories. It would be absurd to suggest that the services to certain groups of clients (such as cases requiring oral medication and insulin, or clients with gestational diabetes) be curtailed because of higher average costs. However the model can create the awareness that resources are consumed differently. Such a difference would be intuitively expected, but the ABC/BSC model can also show where differences arise, and their extent.

Decision makers can use this information when formulating strategic and operational plans. For example, compare an anticipated increase in the number of gestational diabetes clients with an anticipated increase in the number of clients that need lifestyle intervention only. Management would have to provide more resources for an increase in the former category, than if the increase were in the latter category. Budgeting for resources such as educator time would be affected by this.

The above discussion uses the cost per client measure, though other measures such as cost per hour of service could also be used. In fact, in case of large variations in time spent on individual clients within the same category, other measures that are not client specific may be more meaningful.

4.3 Using the model for feedforward control

The above examples of ABC/BSC model uses are based on feedback, i.e. information about decisions already taken and implemented. However, Schreyögg and Steinmann (1987) find that feedback control may not be received in time to make necessary corrections to strategy implementation. They also state that for feedback control to be the

sole means of strategic management, the unrealistic assumption is made that there will be no environmental changes that could necessitate changes to the strategic plan. A strategic tool would therefore have to provide information that proactively influences future decisions.

The ABC/BSC model could address this issue by not only analyzing past data, but also indicating the best direction for future actions (i.e. feedforward). By monitoring changes in the environment, it could indicate where strategic adjustments may be needed. The primary indicator of this nature from the ABC/BSC model would be variations in resource consumption patterns. Variations in the cost of a process could be affected by two factors – time spent on the process, and changes in other drivers such as client numbers.

4.3.1 Analyzing variations in time spent on processes

Changes in the average amount of time spent on a particular process could indicate a change in the nature of service demanded by clients. For example, consider the client category *Oral medication & Insulin*. Currently, the average time taken for Process 4 in the model (Deliver individual follow-up) by this category is 270 minutes per client in the initial year after referral to the RHA. If this average time decreases, it could indicate that clients have fewer concerns or queries once the initial assessment has been completed. On the other hand, if the average time increases, it might mean that clients are spending more time interacting with their diabetes coach. Reasons for this could then be identified for either of these situations, which may impact the way education is provided. Changes in client needs and the instruction that is provided directly affect the achievement of the diabetes program's strategic objective number 2 (To offer patients the right level of care at the right time) and number 3 (To make patients accountable for their health through consistent messages).

Traditional ABC could also indicate changes in the cost of individual processes. However, because such a system would not link each activity to a specific strategic objective,

this valuable information may be lost among the large quantities of unstructured activity information. The ABC/BSC model's structure could thus be valuable for monitoring assumptions and evaluating strategic objectives.

4.3.2 Analyzing variations in client numbers

Changes in the numbers of clients in different categories could also be an indicator of changing environmental conditions. For instance, the current distribution of newly-diagnosed *Lifestyle only* and *Oral medication* clients is in the ratio 17:1. A shift in numbers towards clients requiring medication in order to control the disease may signify that lifestyle habits are becoming less healthy and more awareness needs to be created. This could mean changing the type of public awareness campaigns currently in place. This relates directly to achievement of the RHA diabetes program's strategic objectives 1 (Meeting the diabetes needs of the community) and 5 (Providing effective messages to the community).

The above examples also highlight that the ABC/BSC model will not provide reasons for changes in trends or costs. However it can direct decision makers' attention to strategic areas where there are changes, so that appropriate research and analysis can be carried out to provide information for decision making.

4.4 Results of sensitivity analysis

All the examples used in this chapter are obtained from the model by making assumptions about factors such as client numbers, time spent on processes, and staff compensation. Appendix I presents the results of a sensitivity analysis showing how the model changes with variations in some of these assumptions.

Consider the example of proportion of Type-2 cases. Based on the number of Type-1 and Type-2 cases at the RHA, the baseline proportion of Type-2 cases is taken to be 85%. The sensitivity analysis shows that when this is increased to 95%, the average cost per client

in each of the client categories (i.e. the cost objects) changes. For example, the cost per client in the *Lifestyle only* category increases from $144.77 to $145.59, while the cost per client for the same category falls to $143.84 when the proportion of Type-2 cases is considered to be at a minimum level of 75% of all diagnosed cases.

The examples show that for the factors included in the sensitivity analysis, change in costs for clients and activity dimensions is, for the most part, not significant. This could indicate the model's stability with respect to changes in the selected factors. As the model is refined with use, the results of these analyses are likely to change as well.

5. Contributions, Limitations, and Conclusion

5.1 Contributions of the study

The study contributes to literature in three different areas by – (i) providing a model for strategic cost management, (ii) using the model to provide strategic emphasis to operational decisions, and (iii) providing activity and cost information for diabetes education.

5.1.1 Providing a tool for strategic cost management

A strategic cost management tool is developed in the study by leveraging the benefits of two well-established management accounting systems. The ABC/BSC model provides a tangible link between activities, activity costs, and their contribution to the strategic objectives of an organization. This information can be used to evaluate strategic implementation, and also to monitor the strategic environment and show where possible changes in assumptions and strategies are needed. The study presents an example of a strategic management tool that can use accounting information to provide strategic orientation to cost control.

A review of strategy management literature shows that there is a specific need to monitor the ever-changing environment of healthcare. The ABC/BSC model is therefore relevant in the context it is applied to in the study. The model considers important external factors causing environmental change through the *Client* and *External Stakeholder* dimensions. By adding these to the *Internal Process* and *Learning & Growth* dimensions, the model incorporates a wider range of factors, providing better input for strategic cost management.

5.1.2 Providing strategic emphasis to operational decisions

The second contribution of the study is to operational decision making. The combined model retains all the operational advantages of the ABC, and can provide accurate

information about the resources consumed by different processes and cost objects. The model can therefore be used to identify possible areas for cost control, how processes can be modified to increase efficiency, and benchmark performance against reported best practices (Siegel et al., 1999). The added advantage of the model is that these day-to-day, frontline, operational decisions that affect consumption of resources (such as staffing, for example) can be made while also considering whether the activities and outcomes of the decision are consistent with the broader, strategic objectives of the organization.

5.1.3 Providing information about client education

While discussing the ABC/BSC model's practical applications, the study provides a list of activities necessary to providing diabetes client education. The ABC/BSC model also shows how the different processes relate to the strategic goals for client education, and the relative proportion of resources consumed by different dimensions of activity in a specific diabetes program. The average costs per client for different client categories (cost objects) are also calculated and reported. By including activity and cost driver information, the study helps healthcare organizations understand the reasons for variation in costs of patient education. All this information can be used to examine possible areas for cost control.

The actual processes and costs will vary between organizations, and the results from the model may not be representative of the entire population of diabetes programs. So the study does not merely summarize the results for client education, but also describes the process of developing the combined model. Other programs can use this to create their own models, making the study valuable to a broader audience.

5.2 Limitations of the study

The primary limitation of the study is that, owing to time constraints, the model's use in strategic decision making has not been evaluated by the RHA. Though the model

development has sound theoretical basis, a longitudinal study involving surveys and in-depth interviews with decision makers would be necessary to show that input from the model has practical value for organizations. This information is also needed to evaluate generalizability of the model. However, there is no reason to believe that the model, if useful to one RHA, would not be useful to other diabetes education situations, or to other organizations that require a strategic perspective of cost management.

The quality of information obtained from a model is affected by the quality of the input going into its development. The second limitation of the ABC/BSC model is that, in its current form, it relies on historical cost data from year-end financial statements. Therefore, the information from it may not be received in time to avoid the negative effects of ineffective implementation or of changes in the strategic environment (Schreyögg & Steinmann, 1987). However, ABC systems can be modified to use estimates and predict the financial effects (such as resource requirements) of decisions before they are implemented (Kaplan & Cooper, 1998), which would alleviate the negative effects of this limitation.

The third limitation pertains to the model as applied specifically to diabetes education. The study uses limited data sources to develop the strategic model, focusing only on Type-2 diabetes, and using activity and cost data collected from a single location of a healthcare organization. The reliability of the model could be enhanced if more geographically dispersed sources of information are used. Additional sources of information, such as researcher observation and in-depth interviews could also be used to refine the model. As far as the cost structure of diabetes patient education programs goes, the generalizability of the findings from the study to other healthcare centres or regions is not evaluated. However, given the extremely limited availability of cost information for chronic disease education, the study's contribution is not diminished by this factor.

The final limitation of the study arises from the set of assumptions it makes in relation to diabetes patient education. The most important of these assumptions are that all clients use all the recommended services the program offers, and that all clients within the same category consume similar amounts of resources. In reality however, some clients do not to return after initial assessment sessions, while others have more questions or concerns and require additional consults. Anecdotal evidence shows that such differences are hard to predict as they depend on individual client personalities. The proportion of such cases could be noted from client records, and incorporated into the model to make it more realistic. Also, once the model has been used and streamlined, clients using more or less than the average amount of services could be added to the model as additional cost objects.

5.3 Future research directions

The value of the ABC/BSC model is based on the inherent premise that strategic information and control have a positive impact on achievement of strategic objectives and organizational performance. However, there is little empirical evidence in support of this (Ittner & Larcker, 1997). Thus, more research is needed to positively claim that, as a strategic management tool, the ABC/BSC model can contribute to organizational performance.

Another important area of study is the empirical evaluation of the ABC/BSC model's impact on strategic control. Such an evaluation could include its impact on implementation control i.e. ensuring that strategy is implemented as planned, as well as content control, i.e. shaping strategy content during implementation (Muralidharan, 2004). Within the healthcare realm, once the model's impact on strategic control and decision making is better understood, further study could be made of the model's eventual impact on the service provided by healthcare organizations and patient outcomes.

More comprehensive longitudinal studies to assess the accuracy and usefulness of the model in operational decision making are also a logical step from this study. From the point of view of patient education information, studies could involve the inclusion of Type-1 and Type-2 diabetes, as well as data collection from multiple locations or organizations. Applicability of model to patient education in other chronic diseases, to other healthcare services or even outside the health sector are also needed to show the true reliability of the model in decision making. A more detailed sensitivity analysis of factors, such as differences in resources consumed by individual clients, could also be included, testing the various assumptions that are necessarily part of the costing of uncertain, complex services (Coombs, 1987) such as patient education.

Coombs (1987) raises a point that is relevant in the context of this study, and indicates an interesting avenue of future research. An activity-cost system requires the active co-operation of the people carrying out activities. However, managers and medical personnel often do not perceive accounting information as being equally important to operational decision making, and may have different objectives as well – the former more often tending to use a cost-based definition of efficiency and the latter usually emphasizing the importance of using the most effective medical techniques and optimizing patient outcomes (Coombs, 1987; Nyland & Pettersen, 2004). The combined model does highlight the importance of the convergence of financial and strategic goals, and elaborately describes "the relationships between clinical activities and resource consumption" (Coombs, 1987, p. 402), trying to narrow the gap between the professional and administrative areas of activity. It would be interesting to obtain the perceptions, from these different perspectives, of how influential and useful such a strategic costing model is, and how authority and control are viewed to shift when such a model is used to modify activity behaviour.

5.4 Final comments

The ABC/BSC model uses accounting information to show how much of an organization's resources are being utilized by specific activities, and whether or not this use of resources contributes to achievement of strategic objectives. This information can show where adjustments need to be made not only in operational decisions and implementation of strategy, but even in the way a strategy has been formulated. Furthermore, strategic direction and progress toward organizational goals need to be communicated regularly with variety in delivery (Spanyi, 2003), at all levels of an organization. The ABC/BSC model could be a very useful tool in this regard as it utilizes activity information, something individuals carrying out the activities can closely identify with, to create a link with strategy.

In conclusion, it is important to point out that, while the model presented here is useful in strategy evaluation and decision making, organizations must have other sources of information as well. Strategic decision making is, as Dent (1990) succinctly states, "… a complex, dynamic, multi-level activity, shaped by the interests of diverse individuals and groups and the structural context through which decisions move" (p.14).

The greater the degree of environmental uncertainty, the greater should be the quantity of data collected for strategic decision making (Makadok & Barney, 2001). Strategy management based on a single source of information will be unidimensional and can provide, at best, only a limited view of an organization's internal and external environment. This caveat is especially relevant in the current environment of increasing competition, rapidly changing technology, and growing client knowledge and expectations, where organizational success is often simply a war to survive. The ABC/BSC strategic cost management model can thus be viewed as one possible weapon in an organization's strategy management arsenal.

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Appendix A
About the Balanced scorecard

The following figure A1 summarizes the BSC process.

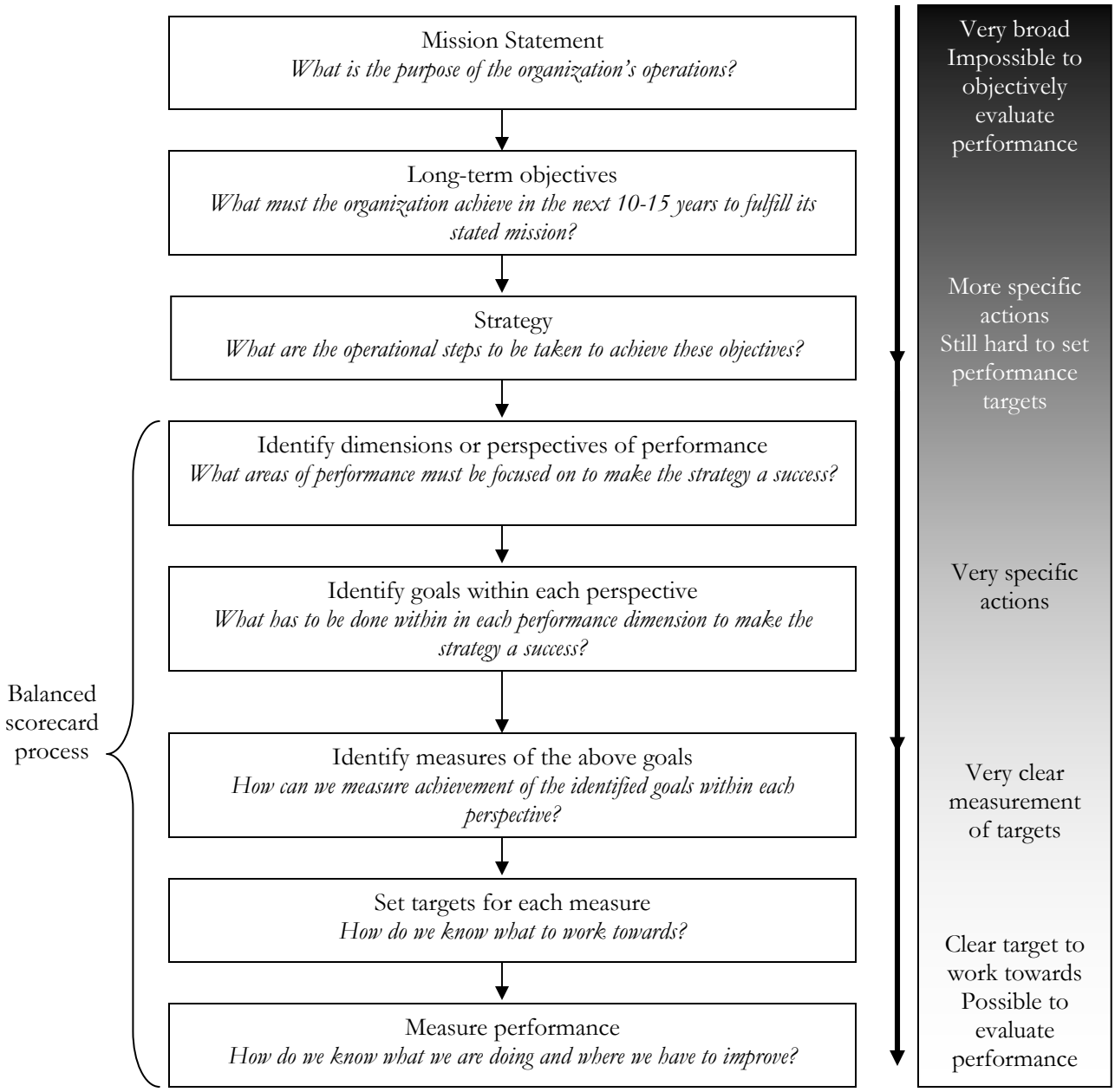
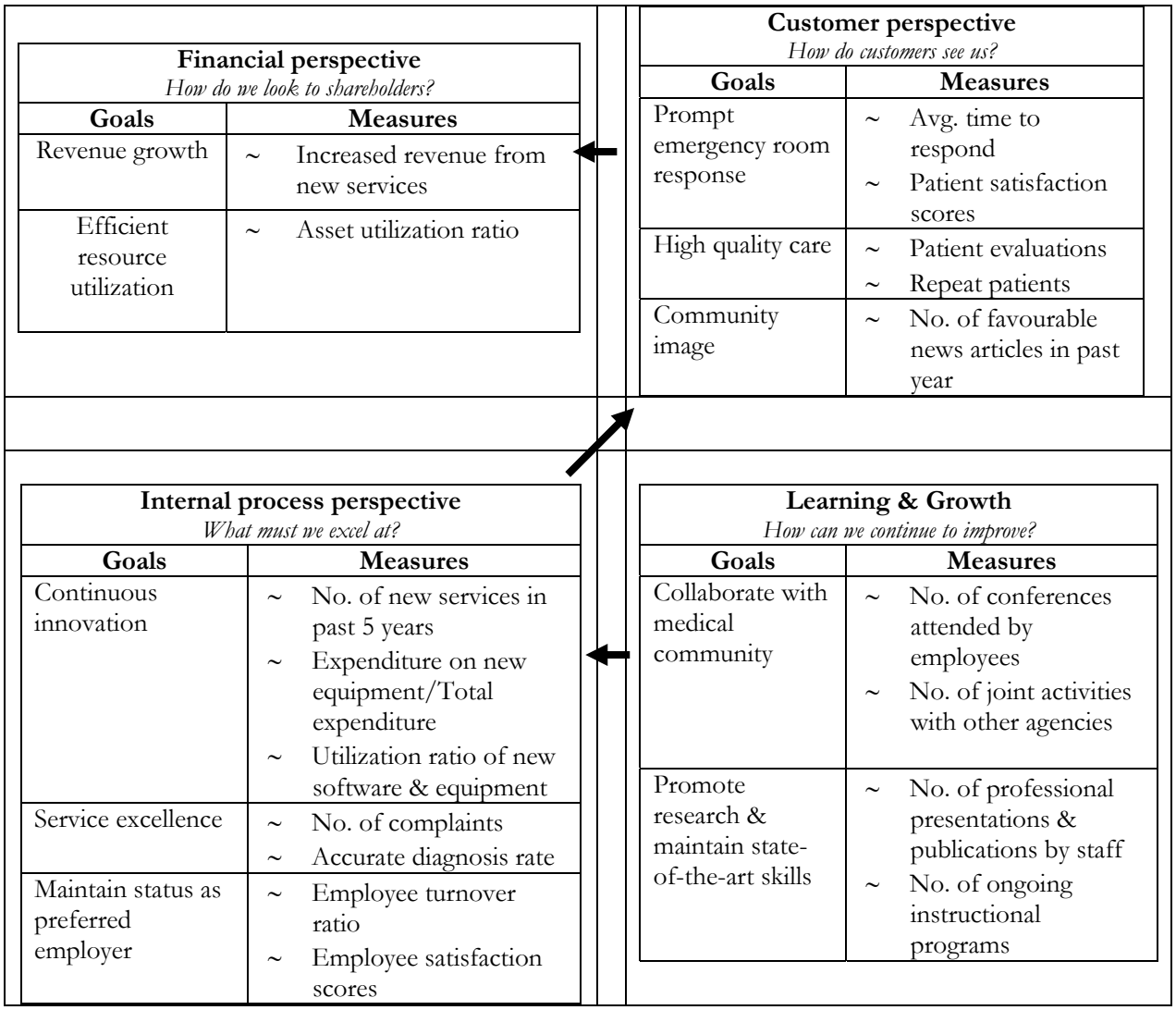


Figure A1
How the balanced scorecard translates strategy at the operational level
Adapted from Kaplan & Norton (2001)

Figure A2 is an example of BSC perspectives, goals and measures for a general hospital. The arrows in the figure indicate that the perspectives are linked to each other by congruent goals with the same strategic focus.



Financial perspective
How do we look to shareholders?

Goals	Measures
Revenue growth	~ Increased revenue from new services
Efficient resource utilization	~ Asset utilization ratio

Customer perspective
How do customers see us?

Goals	Measures
Prompt emergency room response	~ Avg. time to respond ~ Patient satisfaction scores
High quality care	~ Patient evaluations ~ Repeat patients
Community image	~ No. of favourable news articles in past year

Internal process perspective
What must we excel at?

Goals	Measures
Continuous innovation	~ No. of new services in past 5 years ~ Expenditure on new equipment/Total expenditure ~ Utilization ratio of new software & equipment
Service excellence	~ No. of complaints ~ Accurate diagnosis rate
Maintain status as preferred employer	~ Employee turnover ratio ~ Employee satisfaction scores

Learning & Growth
How can we continue to improve?

Goals	Measures
Collaborate with medical community	~ No. of conferences attended by employees ~ No. of joint activities with other agencies
Promote research & maintain state-of-the-art skills	~ No. of professional presentations & publications by staff ~ No. of ongoing instructional programs

Figure A2
An example of a balanced scorecard for a hospital
Adapted from Kaplan & Norton, 1992; Chow et al., 1998

Appendix B
About diabetes

The following information about diabetes mellitus is taken from Rubin and Blumer's *Diabetes for Canadians* (2004) and the Canadian Diabetes Association (CDA) website (2005).

What is diabetes?

Glucose (or blood sugar) is the fuel used by the body to move muscles and also helps certain chemical reactions to take place in the body. The glucose level in the human body is maintained by the pancreatic hormone insulin, without which cells are unable to absorb glucose and tissues start to break down. Diabetes is a chronic condition caused by insufficient amounts of insulin. The two main types of diabetes are Type-1, where the pancreas ceases to produce insulin, and Type-2, where the pancreas does not produce enough insulin or the body cannot effectively use insulin that is produced. Type-2 accounts for about 90% of diagnosed cases. A third type of diabetes is gestational diabetes with onset of the disease during pregnancy.

Causes, symptoms, & effects of diabetes

The causes of diabetes are still not fully understood. Table A1 lists factors commonly believed to cause diabetes, and common symptoms associated with its different types.

Certain populations are considered to be at higher risk of being diabetic, including people of Aboriginal, Hispanic, South Asian, Asian, and African descent. Other causes of diabetes include surgical removal of the pancreas, pancreatitis, steroidal medicines, and certain alternative medicine treatments.

Diabetes, if not properly cared for, often leads to complications including peripheral vascular disease, heart disease, strokes, kidney disease, and blindness.

Controlling diabetes

Depending on the type and severity, the three key therapies in diabetes management are (i) diet management, (ii) exercise, and (iii) medication including oral agents and insulin. In addition to these treatments, people with diabetes must test their glucose levels regularly using a blood glucose meter, including before and post-meal tests. Again, the frequency of these tests varies with the type of diabetes and therapy being used. For example, if treatment consists only of lifestyle measures, testing once daily is sufficient, whereas someone taking insulin 3 or 4 times a day would have to test 4 to 7 times daily.

Another form of testing is A1C testing. Haemoglobin in the blood attaches itself to glucose and forms glycohaemoglobin, of which the A1C form is the largest fraction and the easiest to test for. The amount of glycohaemoglobin in the blood is directly proportional to the amount of the glucose in the body, and remains in the blood for as long as the red blood cell that contains it exists (about 120 days). A1C levels therefore indicate glucose control over a longer period time, and these tests are used to complement blood glucose monitoring.

Table A1
Partial list of causes and common symptoms of diabetes
Adapted from Rubin & Blumer (2004) and CDA (2005)

Type	Possible Causes	Common Symptoms
1	~ Antibodies attacking islet cells of pancreas because of viruses that shared appearance with pancreatic cells, or protein in cow's milk causing same response as to a virus in non-breastfed babies ~ Direct damage to pancreas by virus ~ Accumulation of oxygen-free radicals in pancreas ~ Ingestion of certain poisons or chemicals	~ Frequent urination ~ Increased thirst ~ Weight loss & increased hunger ~ Fatigue ~ Fruity breath ~ Blurred vision
2	~ Genetic predisposition ~ Overweight and sedentary lifestyle ~ Being a member of a population considered to be at high risk for diabetes	~ Frequent urination ~ Increased thirst ~ Weight loss & increased hunger ~ Fatigue ~ Blurred vision ~ Slow wound healing ~ Yeast infections ~ Numbness in extremities
Gestational	~ Obesity ~ Age over 35 years ~ History of polycystic ovary syndrome ~ Being a member of a population considered to be at high risk for diabetes	~ Similar to Type-2

Costs of diabetes

Since diabetes often leads to severe health complications, its costs include not only hospitalisation and rehabilitation, but also loss of economic productivity (CDA & Diabète Québec, 2005).

Table A2 shows the expected change in healthcare costs and prevalence of diabetes in each province of Canada.

Table A2
Predicted diabetes healthcare costs and prevalence in Canada: 2000 – 2016
From Ohinmaa et al. (2004, p.3)

	Healthcare costs (CAD millions)				% change (2000- 2016)		
	2000	2005	2010	2016	Healthcare cost	Total population	Diabetes prevalence
Nunavut	1.4	2.0	2.8	3.7	170.1	27.1	146.3
Northwest Territories	3.1	4.0	5.3	7.1	128.3	11.5	107.8
Yukon	3.0	3.7	4.6	6.0	103.9	2.9	87.1
Alberta	386.1	477.6	584.2	733.3	89.9	14.0	85.8
British Columbia	635.1	775.9	941.2	1177.9	85.5	22.6	84.3
Ontario	1763.0	2131.0	2551.4	3143.6	78.3	18.2	76.5
Newfoundland	79.4	94.0	111.3	135.4	70.5	-4.3	64.8
Nova Scotia	149.8	175.5	206.0	249.3	66.4	2.9	63.5
New Brunswick	119.0	139.8	164.1	198.0	66.4	-0.6	62.7
Prince Edward Island	21.9	25.3	29.4	35.7	63.0	5.9	62.3
Quebec	1295.4	1508.8	1747.0	2069.0	59.7	2.0	53.2
Manitoba	189.6	214.9	247.9	295.3	55.8	2.8	52.1
Saskatchewan	165.8	188.7	214.5	250.3	51.0	0.1	50.1
Canada (Total)	**4657.8**	**5592.5**	**6658.1**	**8142.7**	**74.8**	**11.9**	**71.9**

More about patient education

The UK Department of Health and Diabetes UK (2005) present the standards and structure of diabetes patient education as put forward by the *Diabetes National Service Framework (NSF) Standards*. This list summarizes very well the expectations from an effective patient education program.

> "The Diabetes NSF Additional Material… highlights a number of key features of effective educational interventions, which can be used by local teams to support one-to-one education.
> ~ Extensive use of techniques that aim to promote and sustain changes in health-related behaviour, such as goal setting, problem solving, procedures for modifying environmental cues and reinforcers that control behaviour
> ~ Communication styles that encourage and support people with diabetes to participate in setting their own treatment goals
> ~ Regular follow-up, either in person or by telephone, which includes the monitoring of the achievement of treatment goals and the provision of continuing education
> ~ Hands-on demonstrations and the opportunity to practice the skills required for self-care
> ~ Provision of practical aids to support behaviour change, such as charts and reminders to take medication
> ~ Simplification of self-care and medication regimes
> ~ Use of computer packages to augment the diabetes education provided by health professionals
> ~ Involvement of family and significant others
> ~ Peer support for goal achievement" (p. 38)

Appendix C
About the RHA diabetes program

The following are the usual steps involved in diabetes education at the RHA.

Process:

A client is usually referred to the RHA for diabetes education by their personal physician, though walk-in cases are also common. Based on clinical reports, an initial session is scheduled with a "coach" who is the educator, and is either a registered nurse (RN) or a registered dietician (RD). The coach is the person actively involved in the following steps of the education process.

Initial assessment sessions provide basic information about what diabetes is, what clients need to watch for, the importance of diet and exercise, self-testing blood glucose or A1C levels, and if relevant, oral medication dosages and administering insulin.

Follow up sessions allow clinicians and clients to discuss any doubts they have, progress that has been made, changes in routine as needed. The number of follow-up meetings depends on a number of factors including complexity of cases and clients' psychological need for support. The average number of follow-up visits for different patient categories is discussed later in this section. Clients and educators at the RHA unit often prefer telephone sessions as it is more convenient and saves time.

Group sessions cover general and specific topics such as diet and recipes for persons living with diabetes, the importance of exercise, ways to create an active lifestyle, and simple exercise routines, herbal remedies etc., and allow a maximum of 12-15 patients and their spouses to learn useful and important skills for living well. The average number of attendees at the RHA is usually around 12, i.e. with 6 patients and 6 family members. These sessions are delivered by a single educator (either RN or RD). Though specific sessions are recommended to each client by his/her coach (usually covering two or three topics), the actual number of sessions actually attended depends on a client's personal choice and therefore varies between individuals.

Program staff:

At the time of the study, the educator staff in the program consisted of the full-time equivalent of three full-time RDs, and four full-time RNs, one of whom acted as team lead. All nursing staff teaching in the RHA's Diabetes Program are required to have a degree in nursing, and with the exception of two or three clinicians, all other educators have Certified Diabetes Educator (CDE) certification. The clinicians are assigned as coaches to specific clients, and their primary duties include triaging the cases referred to the RHA, consulting with clients in person and over the telephone, charting, and updating the referring physicians about client progress.

Three full-time administrative support staff members work in the diabetes program performing duties such as booking client visits, identifying coaches for each case based on time availability, purchasing supplies and materials, and other general administration. The management activities in the diabetes education program at the selected location include planning, budgeting, and strategic change initiatives, and are handled by the team lead, a clinical co-ordinator, and the program director.

Patient categories:

The patient education program, though including some specified modules and information, is not a single, homogenous unit of information transferred in a fixed number of sessions. Patients' clinical conditions and the existence of co-morbidities, psychological acceptance of the condition, and other personal characteristics affect the number and duration of sessions with clinicians.

The client categories that are used in the study as cost objects are

- Type-2 Stable A1C – Lifestyle only
- Type-2 Elevated A1C – Oral Meds
- Type-2 Elevated A1C –Meds & Insulin or Type-2 with Comorbidities
- Type-2 – Gestational
- Group sessions

These categories are discussed in more detail in section 4.1.3.

Appendix D
Data collection form for RHA staff

Thank you for consenting to participate in this study. Your co-operation will help provide the CHR with better information about the diabetes education program.

Kindly return the completed form by email to Atulya.Venkatramanan@uleth.ca.

SECTION 1:

Please provide the following information about your role in the diabetes education program by highlighting (bold or underline) the appropriate response. Please do not include your name or other identifying information.

1. Role in diabetes education program:
   Educator Admin support Management Other (please specify)

2. Designation/Accreditation:
   RN RD CDE Other (please specify)

3. Length of employment since accreditation
   Less than 2 years 2 -5 years > 5 years but less than 8 years > 8 years

SECTION 2:

To determine the cost of providing diabetes education, it is important to know which business processes (i.e. groups of activities) consume your time. The next two sections are devoted to collecting this information.

Please review the list of activities associated with diabetes education **for clients newly diagnosed with Type-2 diabetes (up to one year from initial assessment)** in column 1 of the following table. They are organised into four dimensions:

- The **patient dimension** includes all activities that require direct interaction or contact (face-to-face, telephone, email etc) with persons with diabetes.
- The **internal process dimension** includes all activities that support the running of the facility and delivery of service to clients but do not involve direct contact with them, such as maintaining logs and records, or purchasing materials.

- The **learning & growth dimension** includes all activities undertaken by staff to maintain skills and abilities relevant to type-2 diabetes awareness and education.
- The **external stakeholder** dimension includes all activities undertaken to fulfill the expectations of persons external to CHR such as government and regulatory organizations, and the general public.

In column 2 indicate the average time you spend on each activity, using ranges if required. If time varies for different client types or based on other factors, please indicate the different ranges in the columns provided.

In column 3 indicate whether the time estimates in column 2 are for an individual session, per day, week, month or year; or specify other factors if appropriate. If a particular activity is not relevant to your position, please mark N/A beside it.

The first two rows are examples to illustrate what is required.

1 **Process / Activity**	**2** **Time estimate (in minutes)**							**3** **Per client/ session/day/ week/month/y ear etc.**
	Same time for all categories	*Type-2 Lifestyle only*	*Type-2 Oral meds*	*Type-2 Oral meds & Insulin / Comorbidities*	*Type-2 Pregnancy*	*Other category (please specify)*	*Other category (please specify)*	
Example: Book client	***45***							*Client*
Example: Conduct initial assessment		***60-70***	***60***	***90***	***100-120***			*session*
				CLIENT				
Book client								
Triage new cases								
Conduct initial assessment								
Schedule visits & follow-up with clients								
Prepare for 1-1 sessions								
Conduct follow-up sessions (face to face)								

1 Process / Activity	2 Time estimate (in minutes)							3 Per client/ session/day/ week/month/y ear etc.
	Same time for all categories	*Type-2 Lifestyle only*	*Type-2 Oral meds*	*Type-2 Oral meds & Insulin / Comorbidities*	*Type-2 Pregnancy*	*Other category (please specify)*	*Other category (please specify)*	
Conduct follow-up sessions / consults (telephone)								
Maintain individual patient records								
Prepare for group sessions								
Conduct group sessions								
INTERNAL PROCESS								
Develop employee schedules								
Develop resource materials								
Check email & phone messages								
Answer telephone calls (with persons other than clients)								
Deliver faxes								
Pull labs								
Attend group meetings								
Consult with other clinicians								
Interact with physicians								

1 Process / Activity	2 Time estimate (in minutes)							3 Per client/ session/day/ week/month/y ear etc.
	Same time for all categories	*Type-2 Lifestyle only*	*Type-2 Oral meds*	*Type-2 Oral meds & Insulin / Comorbidities*	*Type-2 Pregnancy*	*Other category (please specify)*	*Other category (please specify)*	
Travel between centres								
Purchase general office supplies / equipment								
Provide IT support								
Monitor computer system								
Create and update internal documents								
Carry out staffing functions								
Maintain accounts								
Prepare budgets								
Evaluate changes in the system								
Develop strategic plans for diabetes program (e.g. awareness drives)								
LEARNING & GROWTH								
Attend diabetes-related conferences								
Obtain BGM certification								
Organise learning fairs								
Attend learning fairs								

1 Process / Activity	2 Time estimate (in minutes)							3 Per client/ session/day/ week/month/year etc.
	Same time for all categories	*Type-2 Lifestyle only*	*Type-2 Oral meds*	*Type-2 Oral meds & Insulin / Comorbidities*	*Type-2 Pregnancy*	*Other category (please specify)*	*Other category (please specify)*	
Read literature to update knowledge								
Attend training sessions for diabetes education								
Attend training sessions for systems such as IT								
Practice using IT system								
EXTERNAL STAKEHOLDER								
Manage program funding								
Create public awareness about diabetes and the BHL program								
Provide information and support to drop-ins								
Ensure regulatory compliance								

SECTION 3:

A] Are there any activities that you perform **interacting directly with clients with Type-2 diabetes** that have not been included in the above list? If yes, include the activity in the columns below, providing time estimates as in the previous section. Please feel free to add rows if necessary.

1 Process / Activity	2 Time estimate (in minutes)						3 Per client/ session/day/week/ month/year
	Same time for all client types	*Type-2 Lifestyle only*	*Type-2 Oral meds*	*Type-2 Oral meds & Insulin / Comorbidities*	*Type-2 Pregnancy*	*Other category (please specify)*	

B] Are there any activities that you perform that are **necessary for providing services to clients** but do not involve direct contact with them, that have not been included in the above list?? If yes, add the activity below, providing time estimates as in the previous section. Please add rows if necessary.

1 Process / Activity	2 Time estimate (in minutes)						3 Per client/ session/day/week/ month/year
	Same time for all client types	*Type-2 Lifestyle only*	*Type-2 Oral meds*	*Type-2 Oral meds & Insulin / Comorbidities*	*Type-2 Pregnancy*	*Other category (please specify)*	

C] Are there any activities that you perform in order **to maintain your skills and abilities** to provide the best services to clients that have not been included in the above list? If yes, include the activity below, providing time estimates as in the previous section. Please add rows if necessary.

1 Process / Activity	2 Time estimate (in minutes)						3 Per client/ session/day/week/ month/year

D] Are there any activities that you perform to **fulfill the expectations of people other than your clients** (such as the general public or regulatory agencies) that have not been included in the above list? If yes, include the activity below, providing time estimates as in the previous section. Please add rows if necessary.

1 Process / Activity	2 Time estimate (in minutes)						3 Per client/ session/day/week/ month/year

~

THANK YOU for your time and the valuable information that you have provided!

Appendix E
Sample interview protocol for a clinician interview

Greeting and introduction

~ *Appreciation of participation*

Response-specific questions

~ I notice you recorded spending – minutes per week on the activity "Maintain patient records". Please tell me a little more about this activity.

(Similar question repeated for all activities consuming relatively larger amounts of employee time)

~ For activity "Consult with clinicians", you note spending – minutes per day. Does the amount of time spent vary with the number of clients or sessions in the day?

~ You say you spend – minutes for every group session. Can you tell me a little more about what the group sessions are about?

~ How many educators are present at each group session?

~ You have added the activity "Interact with physicians". What exactly does this involve or what is the purpose of this interaction?

~ You have added the activity "Read diabetes-related journals". Could you estimate how much time you spend on this activity?

General questions

~ Can you think of any other activities that have been missed that should be included?

~ Do you have any other questions or comments about the study?

~ If you think of any other activities that you think are significant, please feel free to email or call me.

Thanks and closing remarks

Appendix F
Study Assumptions

1. A newly diagnosed case is considered to extend up to one year following initial assessment.
2. For simplicity it is assumed that, within each of the identified categories, the number of sessions, time spent in individual sessions, and the resources consumed remain constant for all individuals.
3. Costs are apportioned between Type-1 and Type-2 diabetes based on the proportion of cases.
4. It is assumed that the Director spends 25% time on the diabetes program.
5. The following information was used while estimating the costs of different processes and activity dimensions at the RHA centre. All numbers are based on input from RHA staff and internal documents, unless otherwise stated.

Number of clients in different categories per year – Type 2		
		% of total
Lifestyle only	2437	85
Oral medication required	143	5
Oral medication & Insulin required	72	2.5
Pregnancy	215	7.5
TOTAL	**2868**	
Number of group sessions	48	`
Average number of clients per session	5	

Time spent on individual sessions					
	Number of sessions		**Time per session (in minutes)**		**Total time per client (in minutes)**
	Initial assessment	Follow-up	Initial assessment	Follow-up*	
Lifestyle only	1	2	50	35	120
Oral medication required	1	4	70	40	230
Oral medication & Insulin required	1	9	60	30	330
Pregnancy	1	6	90	45	360

* 2/3 of follow-up is assumed to be done face-to-face while the remaining 1/3 is done over the telephone.

Information about selected processes*				
Process	*Performed by*	*Average time (in minutes)*	*Driver*	*Descriptive note*
Book client	Administrative staff	10	Per client	
	Educator	5		
Schedule visits & follow-up with clients	Administrative staff	5	Per face-to-face session	Include initial assessment and face-to-face follow-up sessions
	Educator	5		
Deliver group sessions	Educator	150	Per session	
Handle & maintain records	Educator	15	Per individual session	Including all sessions except group sessions
Attend to correspondence & communication	Administrative staff	295	Per day	Per employee
	All other staff	120	Per day	Per employee
Develop & handle educational materials	Educator	620	Per month	Total for all educators
	Administrative staff	60	Per month	Total for all admin staff
Travel to deliver education	Educator	75	Per week	Total for all educators
Consult with clinicians & physicians	Educator	315	Per week	Total for all educators
Sustain operations	Administrative staff	1175	Per week	Total for all admin staff
	Manager	167	Per week	Total for all managers
Maintain certification	Educator	625	Per year	Total for all educators
	Manager (Trainer)	1850	Per year	Total for all managers
Update skills – conferences	Educator	2500	Per year	Total for all educators
	Manager	6000	Per year	Total for all managers
Update skills – Discussion & reading	Educators	1550	Per month	For all educators
Maintain supporting system skills	Administrative staff	1600	Per year	Total for all admin staff
	Educator	6200	Per year	Total for all educators

* Time taken by different staff levels is shown separately due to differences in pay scales.

Information about selected processes*				
Process	*Performed by*	*Average time (in minutes)*	*Driver*	*Descriptive note*
Create & implement strategic plans	Director	260	Per week	
Manage funding	Director	185	Per week	
Interact with public & drop-in clients	Admin	6660	Per year	Total for all admin staff
	Manager	7400	Per year	Total for all managers

* Time taken by different staff levels is shown separately due to differences in pay scales.

Compensation information

Employee category	Pay scale Per hour (in $)	Source of information
RD	32.58	Union Collective agreement
RN / Manager	32.56	Union Collective agreement
Administrative staff	25.00	Assumption
Director	50.00	Based on average Director-level salary in Annual Report

Appendix G
List of RHA education and support activities grouped into processes

Dimension	Activity	Process
CLIENT	1. Print off lab results 2. Review referral for priority 3. Triage referral 4. Book referral 5. Sort referral and organize 6. Mail package to client	1. Book client
	7. Conduct initial assessment	2. Conduct initial assessment
	8. Book sessions	3. Schedule visits & follow-up with clients
	9. Call clients to confirm session bookings	
	10. Follow-up with clients who miss sessions	
	11. Prepare for 1-1 sessions 12. Conduct follow-up sessions (face to face)	4. Deliver face-to-face follow-up
	13. Conduct follow-up sessions / consults (telephone)	5. Deliver telephone follow-up / consults
	14. Prepare for group sessions 15. Conduct group sessions	6. Deliver group sessions
INTERNAL PROCESS	16. Maintain individual patient records 17. Pull labs	7. Handle and maintain records
	18. Check email & phone messages 19. Answer telephone calls (with persons other than clients) 20. Deliver faxes	8. Attend to correspondence & communication
	21. Develop resource materials	9. Develop & handle educational materials
	22. Travel between centres	10. Travel to deliver education
	23. Attend group meetings 24. Consult with other clinicians for specific cases 25. Interact with physicians for specific cases	11. Consult with clinicians & physicians
	26. Purchase general office supplies / equipment 27. Provide IT support 28. Create and update internal documents 29. Monitor computer system 30. Develop employee schedules 31. Carry out staffing functions 32. Maintain financial records	12. Sustain operations
	33. Evaluate system changes 34. Create budgets 35. Develop other strategic plans	13. Create and implement strategic plans

Dimension	Activity	Process
LEARNING & GROWTH	36. Maintain CDE certification 37. Maintain BGM certification	14. Maintain certification[7]
	38. Attend diabetes-related conferences 39. Attend training sessions for diabetes education 40. Organize learning fairs 41. Attend learning fairs	15. Update knowledge and skills - Conferences
	42. Read literature to update knowledge 43. Discuss new methods & information	16. Update knowledge and skills – Reading & discussion
	44. Attend training sessions for systems such as IT 45. Practice using IT system	17. Maintain supporting system skills
EXTERNAL STAKEHOLDER	46. Manage program funding	18. Manage funding
	47. Create public awareness about diabetes and the BHL program 48. Provide information and support to drop-ins	19. Interact with public & drop-in clients

[7] CDE: Certified Diabetes Educator; BGM: Blood Glucose Monitoring

Appendix H
Resources, cost drivers and activity drivers at the RHA

Cost drivers linking resources with processes:

All the resource costs considered in the study were annual costs. Seasonal variations are therefore incorporated into the total, and are averaged out.

Staff compensation

~ This cost includes basic salaries, and health and other benefits for administrative and clinical personnel such as RDs and RNs.

~ This resource was allocated to processes based on the time spent by staff on each of the 19 processes. Time estimates for the different activities were collected from RHA staff.

Program Director's compensation

~ This cost includes basic salary, and other benefits for the Diabetes program director. As the Director plays multiple roles, including management of initiatives other than diabetes education, an assumption is made about the amount of the time spent on the diabetes program. The proportionate amount of compensation is what is considered here.

~ This resource was allocated to processes based on the time spent by the director on each of the identified processes.

Educational material

~ This expense includes the cost of developing, printing and photocopying any educational material, such as brochures, handouts, health journals, etc.

~ The expense is directly allocated to the process of development of educational materials.

Travel

~ This cost primarily consists of the reimbursements made to employees for travel between two different teaching sites.

~ It is directly allocated to Process 10 (Travel to deliver education).

Office supplies and small equipment

~ These expenses relate to running and maintaining an office and include items such as printing expenses and stationery.

~ It is allocated directly to Process 12 (Sustain operations).

License fees and memberships

~ This is the cost of membership to professional associations and unions.

~ It is allocated directly to Process 12 (Sustain operations).

Education and reference books

~ These are educational costs and clearly relate to the processes of maintaining skills (Processes 14-16).

~ They are allocated to the different processes in the proportion of time spent on each.

Laboratory

~ This expense category includes the cost of running and maintaining the in-house laboratory that is used for regular tests such A1C testing, and includes unit-level costs (such as specimen collection supplies), and overheads (such as lab staff salaries). The lab is used by diabetes patients other than those with Type-2 diabetes, by other programs

besides diabetes, and also by some external users. While unit-level costs can be traced directly to individual types of users, the overheads are allocated to the different groups of users, including Type-2 diabetes education, based on the number of clients.

~ The lab costs are further allocated to Process 2 (Conduct initial assessment) and Process 4 (Deliver follow-up), as these are the points at which the services of the lab are usually made use of. The costs are allocated based on the number of individual sessions, which includes each time a client returns. So, if following an initial assessment session, a client returns for two follow-up sessions, the total number of individual sessions is three.

Equipment lease

~ This cost includes the maintenance cost for computers, and other equipment. It is allocated directly to Process 12 (Sustain operations).

Medical supplies

~ This includes items such drugs and surgical supplies such as lancets and sharps.

~ These items are usually used in individual sessions with clients, and so are allocated to Process 2 (Conduct initial assessment) and Process 4 (Deliver follow-up) based on the number of sessions.

Occupancy

~ This cost category includes items such as utilities, repairs and maintenance, and insurance of premises that are charged to the diabetes program from the shared facility where it is located.

~ It is assigned to Process 12 (Sustain operations) directly.

Promotion & advertising

~ This category includes all expenses related to creating awareness about diabetes, the importance of education, and type of services provided by the RHA.

~ As the purpose of this expense is to create awareness among the general community, it is assigned to Process 19 (Interact with public).

Telecom

~ The telecommunications expense category includes telephone, fax, and Internet charges.

~ The allocation of this expense is made to Process 3 (Schedule visits), Process 5 (Deliver telephone follow-up/consults), and Process 8 (Attend to communication and correspondence), as these are the major consumers of the resource.

Allocated overheads

~ This includes a portion of the costs of the RHA's central management, executive offices, organization-wide IT system development and maintenance, financial costs etc., which are passed on to the health unit of which diabetes education is a part. An allocation of these overheads is in turn made to the diabetes program, based on a suitable cost driver, in this case, the number of full-time equivalent employees.

~ The portion passed on to the diabetes program is further charged directly to the process of sustaining operations (Process 12).

Description of activity drivers linking processes with cost objects:

Number of clients

~ This driver is used to assign processes 1 (Book client) and 2 (Conduct initial assessment) to the cost objects. The number of clients in each category is estimated from internal records.

Number of individual sessions

~ An individual session is identified as a one-to-one interaction directly between an educator and a client. This number is different from the number of clients, as a client may return for more than one follow-up.

~ The absolute number of sessions is considered for processes where each session requires activities to be carried out, irrespective of the duration of each session. Process 3 (Schedule visits and follow-up) is an example.

Number of follow-up sessions

~ This is the number of sessions clients in each category attend, either in person or over the telephone, once the initial assessment has been completed.

~ This category can be further divided into # *of face-to-face follow-ups* and # *of telephone sessions*. The number of sessions in each of these sub-groups is based on estimates by staff.

Number of initial assessment minutes

~ The time taken in each one-to-one client session varies significantly between the different patient categories, and the cost of the process should, therefore, reflect this.

Number of follow-up session minutes

~ This includes the average time in minutes spent on follow-up (both face-to-face and telephone).

Number of group sessions

~ The group sessions at the RHA cover a variety of topics including basic knowledge of diabetes, diet and nutrition issues, recipes, exercise needs and regimens etc. These are not included as separate cost objects due to the similarity in resource requirements for all. The activity driver here, therefore, includes all types of group sessions.

Number of consultation minutes

~ This driver is used specifically for Process 11 (Consult with clinicians and physicians). This process is usually only applicable to cases where medication dosage has to be adjusted, or other unusual circumstances exist.

~ The RHA staff identified the patient categories to which the process applied, and then estimated the percentage of cases within those categories requiring consultation with other qualified staff.

Some processes such as Process 12 (Sustain operations) and Process 14 (Maintain certification) include activities essential for delivery of the client education. However, instead of being consumed directly by the cost objects, these service-sustaining processes facilitate other processes. Such processes are reallocated to the processes consuming them in the proportion of staff time taken up by the consuming processes.

Appendix I
Results of sensitivity analysis

Assessment of sensitivity of average cost per client:

	Baseline value	*Max value*	*Min value*	*Lifestyle only (LS) cost ($)*			*Oral medication (OM) only cost ($)*			*Medication & Insulin (M&I) cost ($)*			*Pregnancy (PREG) cost ($)*		
				Base	Max	Min	Base	Max	Min	Base	Max	Min	Base	Max	Min
Proportion of Type-2 cases	85%	95%	75%	144.77	145.59	143.84	278.70	278.00	277.77	423.66	423.68	423.89	402.37	402.39	402.61
Educator Pay (per hour)	32.56	37.50	28.22	144.77	144.75	144.76	278.70	277.16	278.11	423.66	424.32	422.81	402.37	403.27	401.27
Follow-up done by telephone	33%	70%	0%	144.77	145.02	144.66	278.70	275.56	277.39	423.66	413.19	431.34	402.37	399.40	404.15

Assessment of sensitivity of activity dimension costs (as a % of total program cost):

	Baseline value	*Maximum value*	*Minimum value*	*Client (%)*			*Internal process (%)*			*Learning & Growth (%)*			*External stakeholder (%)*		
				Baseline	Max	Min	Baseline	Max	Min	Baseline	Max	Min	Baseline	Max	Min
Educator Pay (per hour)	32.56	37.50	28.22	36	38.5	34.6	59	58.5	60.4	2.6	2.6	2.5	2.4	2.5	2.5