IMPLEMENTATION OF THE BALANCED SCORECARD
IN AN ENGINEERING CONSULTANCY
COMPANY IN HONG KONG

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Certificate of Authorship

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ABSTRACT

This dissertation investigated the development, implementation, and evaluation of a performance management methodology founded on the alignment among the financial, customer, business process, learning and growth, and risk perspectives to bring value to any organization. A case study in an engineering consultancy organization which provided the opportunity to assess the effects of the proposed Balanced Scorecard methodology.

The Case study was conducted in three phases: Model and Concepts Design, Data Collection, and Findings. During the research, validity was pursued by using triangulation and theory to help maintain the case under research control. By using triangulation, more than one method should be used in the validation process to ensure that variance reflected that of the trait and not of the method. Each of the research methods uses one or more instruments for collecting empirical data. These instruments range from questionnaires, interviews, participant observation, and fieldwork to archival research.

The observation of the Balanced Scorecard methodology in a real organization allowed the researcher to describe the Balanced Scorecard methodology and the five perspectives’ relationships to each other. Specifically, this study sought answers to following general problems. First, what kind of system implementation initiatives should be developed in order to facilitate the implementation of the new system model? Second, what are the effects of the new system model on organizational performance? Third, what are the effects of the new system implementation on the organization’s business performance?

The research questions are answered according to this case study. A new performance management system based on the Balanced Scorecard has been developed and
implemented. The effects of the new system model on organizational performance are in the improvement of the financial results. The effects of the new system implementation on the organization’s business performance are significant improved for the financial results.

Based on the findings and conclusions, the following general recommendations are formulated. Balanced Scorecard System can be used to improve the effectiveness and efficiency in the engineering consultancy organizations. The Balanced Scorecard model can modify for further improvement on organization’s effectiveness and efficiency.

There are three limitations to this study. The first limitation, the response rate of the in-house questionnaire was 23%, i.e. the non-response rate was 77%, which possibly leads to a non-respondent bias which was the limitation of the study. It is recommended to seek for additional study of the Balanced Scorecard in field settings in an effort to further understand how the program affects organizational performance with a higher response rate. The second limitation, the current findings may suffer from the limitations posed by the research setting of one case organization. Thus, the conclusion may not be generalizable to other companies. The third limitation, the timeframe for observing differences in organizational performance was only in three years. It is possible that over a longer period of time, discernable differences in performance could be observed. Using a long timeframe would allow for determining whether this difference is temporary or permanent.
CHAPTER 1

THE PROBLEM AND ITS BACKGROUND

INTRODUCTION

The construction industry is one of the major industries in Hong Kong, including developers, architects, engineering consultancies, quantity surveyors, contractors and suppliers. These companies have been facing a very difficult business environment that started from the Asian economic turmoil of October 1997. This was only worsened by the Lehman Brothers Investment Bank bankruptcy of September 2008, which created a worldwide financial tsunami in which the construction industry was impacted increasingly in the business environment (Chan, 2008; Asia News 2009).

Singtao Newspaper stated that the business market of the construction industry dropped from HK$110 billion in 1997 to $40 billion in 2007 (Singtao, 2007). In 2011, the second quarter dropped 1.9% compared with the same period of 2010 (Singtao, 2011). The construction industry is still facing a difficult business environment.

Every organization in this industry requires their staff to accomplish multiple goals set in its strategic plans. Not only do the financial goals need to be met, but also other increasing requirements such as the strong need for efficient internal operating processes and staff multi-skilled knowledge. In the past, most of the companies emphasized financial goals only, and it is difficult for these companies to change from a financial-oriented to client-oriented strategy, as required in today’s business world. As a result: there is a need for engineering consultancy, one of the major business sectors in the construction Industry, to understand how to encourage people to allocate effort to multiple goals to achieve multiple strategies.

PERFORMANCE MANAGEMENT SYSTEM

One primary objective of performance management systems is to motivate individual effort toward achieving the organization’s goals (Simons, 1995). The design and implementation of the performance management system should influence, monitor, and control effort toward achieving the goals. The performance management system should provide incentives and report performance results that reflect the effort of the management to achieve the organization’s goals (Kaplan and Norton, 1996a; Macintosh, 1994; Simons, 1987).
Academic researchers have identified performance management system variables that organizations can implement to influence goal-related efforts (Anthony & Govindarajan, 1998; Macintosh, 1994; Shank & Govindarajan, 1993; Stahl & Grisby, 1992). Performance management system variables that have been tested experimentally include economic incentive schemes and the choice of what information to report (Harrell & Tuttle, 2001; Kershaw & Harrell, 1999; Tuttle, Harrell, & Jackson, 1997; Harrell & Harrison, 1994; Harrison & Harrell, 1993; Mento et al., 1992; Locke et al. 1981). The results generally support the notion that individuals respond to changes in economic incentives and/or to changes in what performance information is reported.

Taticchi et al. (2010) stated that interest on performance management has notably increased in the last 20 years. Particularly, it is important to note the evolution of focusing performance from a financial perspective to a non-financial perspective. Since the middle of 1980s, companies emphasized the growing need of controlling operation business processes. Companies have understood that for competing in continuously changing environments, it is necessary to monitor and understand firm performances. Measurement has been recognized as a crucial element to improve business performance (Sharma et al., 2005). A performance management system is a balanced and dynamic system that enables support of decision-making processes by gathering, elaborating and analyzing information (Neely et al., 2002). The concept of “balance” refers to the need of using different measures and perspectives that tied together give a holistic view of the organization (Kaplan and Norton, 1996).

In practice, many companies incorporate multiple goals in the implementation of strategy. These situations occur when the companies strive to achieve sustainable competitive advantages in complex competitive environments (Simons, 1995). Multiple goals inhere in a total quality strategic initiative, like the ISO 9001, ISO14001, OHSAS 18001 certification, where all strategic goals must be achieved simultaneously. Success in one area does not compensate for failure in other areas. Moreover, in order to motivate the staff to achieve the strategic goals, companies often offer bonuses for the simultaneous achievement of all goals (Kaplan and Norton, 1996b; Simons, 1995).

More and more companies are adopting comprehensive performance management systems. These systems are intended to influence individuals in the organization to balance their efforts toward achieving all strategic goals simultaneously (Simons, 1995).
Traditionally, employees manage their works in terms of physical flows and other nonfinancial resources. For example, sales managers focus on market size, sales volume, share of wallet, and similar measures. Production managers concentrate on production capacity, throughput time, productivity metrics. Human resource managers are responsible for hiring appropriately skilled personnel, and organizational development outcomes. Managers and employees throughout the organization make decisions that eventually impact the financial outcomes of the organization; to do so effectively, they need a performance management system that links the outcomes of their decisions to the strategic and financial goals of the organization. The system is most useful when it is a “leading” key performance indicator instead of “lagging” indicator, or one that is closely related to the work being performed (Effective Operations and Performance Management, 2010, p.27).

Perhaps the most prominent comprehensive performance management system is Kaplan and Norton’s Balanced Scorecard (Kaplan and Norton, 1996b).

Kaplan and Norton (1996a) state that the Balanced Scorecard models relations among leading and lagging performance measures. The Balanced Scorecard is used to reflect cause and effect relations among the measures. If the statement is valid, the Balanced Scorecard as a performance management system can be applied to encourage people to learn and improve the operational process is to improve customer satisfaction and the financial results in the companies.

**OBJECTIVES OF THE STUDY**

To address the difficulties of engineering consultancy companies face, we select Atkins China Limited, which is one of the largest engineering consultancy companies in Hong Kong and Mainland China, to conduct this study. The study has the following research objectives:

1. The establishment of a performance management system to spearhead company objectives;
2. The customization of a series of implementation initiatives for effective implementation of the new performance management system;
3. The evaluation of effects of the new performance management system implementation on organizational performance.
RESERVED QUESTIONS:

This study attempted to determine what kind of performance management system can be used to improve the company’s performance.

Specifically, this study sought answers to following general problems:

1. What kind of system implementation initiatives should be developed in order to facilitate the implementation of the new system model?

2. What are the effects of the new system model on organizational performance?

3. What are the effects of the new system implementation on Atkins’ business performance?

These research questions form the basis for the formulation of hypotheses, with two theoretical models hypothesized. Details will be discussed in Chapter 4.

SIGNIFICANCE OF THE STUDY

Any organization, whether service oriented or product oriented, has a given set of goals and objectives. It is a fact that the primary goal of an organization is more inclined on the financial aspect. Such a set of goals and objectives of an organization can only be realized if there is a performance management system being implemented in an organization.

This study was undertaken to assess whether the existence of a performance management system is effective at achieving the goals of the organization. This study will focus on the importance of a performance management system in an organization and will present the effects of this performance management system on the organization as whole and on its employees, taking into consideration some factors for the effective implementation of the system.

Furthermore, the study will present the benefits of the Balanced Scorecard system in an Engineering Consultancy firm. Previous studies of the Balanced Scorecard in accounting firms and other financial business such as banks have proven that the Balanced Scorecard system is a successful method of performance evaluation of an organization. This study proves that the Balanced Scorecard can also be a successful performance management system in an engineering consultancy company. We use Atkins China Limited to conduct the study and analyze the results.

According to the information of Hong Kong annual report, Hong Kong’s per capita GDP, i.e. US$34,400 in 2011, US$31,800 in 2010, US$30,100 in 2009. Hong Kong’s GDP is one of the
largest in Asia (Hong Kong 2011, 2011; Hong Kong 2010, 2010; Hong Kong 2009, 2009). The construction sector supports the four key industries in the Hong Kong economy, such as transportation and utilities system. The contribution to GDP stayed at around 5 per cent between 1989 and 2000, before edging down in the following years to 3 per cent in 2009 (Hong Kong 2010, 2010).

In 2010, the construction value is HK$ 214,977 million, and in 2009, the construction value is HK$179,837 million (Source: Census and Statistics Department, Hong Kong SAR).

Therefore, if the new performance management system can be successfully implemented in Engineering Consultancy company, it can also be applied to the other companies in the construction sector, i.e. it will improve the business performance of this sector and the society.

**SCOPE AND DELIMITATIONS OF THE STUDY**

The study is focused on Atkins China Limited, of which the researcher is an employee. It covers all departments of the company with 895 staff. The questionnaires were distributed among these employees, 206 survey questionnaires (representing 23%) were retrieved. The data from these 206 questionnaires were evaluated and tested.

The Balanced Scorecard system formulated in this study has been customized to meet Atkins’ special requirements. Strictly speaking, the model is only developed for application in Atkins and is not a generalizable model. The system has to be modified if it is to be implemented in other organizations. In addition, the following conditions need to be considered when applying Balanced Scorecard:

1. Balance Scorecard requires strong leadership and total participation of staff at all levels.
2. Cyber documentation and information systems require additional investment in computer hardware and software, although the Atkins’ experience proves that this investment is minimal and fully justified.

In the further development of Balanced Scorecard, it will be sensible to divide the whole system into several modules to enable other organizations to flexibly adapt one or more modules to suit their particular business situation.
STRUCTURE OF THE DISSERTATION

The dissertation is divided into five chapters covering various aspects of formulation and implementation of the new performance measurement system, Balanced Scorecard, in Atkins China Limited.

Chapter 1 highlights the business environment of the Construction industry, and the issues facing by the Atkins China Limited from which the need for this project is identified and objective formulated. The research questions are outlined before the summary of the Chapter.

Chapter 2 comprises literature review to formulate a concept of a new performance measurement model.

Chapter 3 details research strategies adopted in this study, introduces the case study research methodology to design and implement the performance measurement model. Structural equation modeling is used to validate the proposed model implemented in the organization. In addition, triangulation is used to verify the effectiveness of the performance measurement model.

Chapter 4 develops and tests the theoretical performance measurement model. The model with 12 hypotheses has been validated by the structural equation modeling method.

Chapter 5 summarises the major achievements of the study and plans for meeting the future challenges. It also highlights the limitations of the study, recommends opportunities for further research and outlines the contribution to the body of knowledge, engineering consultancy services.
CHAPTER 2
THEORETICAL FRAMEWORK

REVIEW OF RELATED LITERATURE

Performance Management Process

Bond (1999) stated that in general, the performance management process is cyclical (Figure 1). It starts with clarification of the company’s mission and strategy in line with the company’s success factors and moves on to establishing consensual objectives and goals.

After establishing the objectives that the organization strives to achieve, strategy map may be drawn to adequately show cause and effect links. The cause and effect relationships introduce dynamic system thinking. Following the strategy map appropriate performance measures are identified and relevant targets are established across a balanced set of outcomes and performance drivers. Then strategic objectives and measures are communicated throughout the entire organization. Subsequently, responses are obtained from different functional perspectives, analysed and reported to the management to take proper improvement action. The management compared the desired performance goals with current levels in order to establish strategic performance gaps. This enables the organization to monitor the viability of the existing strategy and adjust its implementation and, if necessary, to make fundamental changes in the strategy itself in a continually changing environment.

The cyclical process continues with receiving, updating and replacing the objectives in the various perspectives in accordance with the most current view of the strategic outcomes and performance drivers for the upcoming periods (Bonds, 1999; Kaplan and Norton, 1996).
Performance Management Systems

Performance management is a fundamental part of a modern and successful business. It involves providing managers with information from across an organization’s underlying processes and systems in such a way that they are able to make appropriately informed decisions. Performance management requires action to be taken and then managed as a result of these decisions (Wilkes, 2005).

Sahoo and Jenna (2012) stated that various performance management systems were utilized in the manufacturing industries and its relevance.

Various performance management systems approaches were used in different industries.

1. Deming’s Total Quality Management Approach
2. Juran’s Trilogy: Quality Planning, Control, and Improvement Approach
3. Sink and Tuttle’s Organizational Performance Measurement Approach
4. Thor’s Family of Measures Approach
5. Kaplan and Norton’s Balanced Scorecard approach

These are discussed in detail below.
Deming’s Total Quality Management Approach

Total Quality Management is one of the most popular and widely implemented performance management approaches (Sage, 1992; Sashkin and Kiser 1993; Sage, 1995). According to Deming, organizational performance improvement requires a continuous, comprehensive, integrated approach that addresses the entire organization, including its internal structure (i.e. finances, management, personnel, operations) and external structure (i.e. customers and suppliers). Deming came to this conclusion after recognizing that, while statistical quality control is essential, it is ineffective if management does not recognize its value and continually provide the needed organizational resources and supports that complement statistical quality control (Deming, 1986).

Juran’s Trilogy: Quality Planning, Control, and Improvement

Juran’s approach to organizational performance management is somewhat similar to Deming’s in that he advocates statistical quality control as a method supporting a systematic approach to organization-wide performance improvement. His approach is based on the belief that superior organizational performance does not occur without strict adherence to a systematic planning, control, and improvement philosophy, which he calls “The Juran Trilogy” (Juran, 1988). This is a systematic approach to identifying areas for improvement, and then planning, performing, analyzing, and making improvement interventions in a cyclic process similar to the Plan-Do-Check-Act cycle (Juran 1988; Sashkin and Kiser, 1993).

Sink and Tuttle’s Organizational Performance Measurement Approach

One subject on which Deming and Juran do not elaborate extensively is how performance measurement should actually be planned, analyzed, and performed. Identifying categories of performance metrics, and determining how performance data will be collected, converted into information, and then measured, requires analysis of many factors.

Sink and Tuttle (1989) have endeavored to provide a systematic approach to the selection, formulation, implementation and execution of the organizational performance improvement metrics. They stated that the most important reason for measurement is to assess performance improvement progress, and noted that there are three counterproductive measurement traps into which managers often fall instead:
• Measuring A while hoping for B. We measure the easy things, the most pressing things, the wrong things; we hope for quality while measuring and controlling only production schedules.

• Measuring to control in such a way as to make improvement more difficult. We focus on control of excess, creating a compliance mentality rather than an improvement orientation.

• Measuring to find those who have performed poorly in order to punish them while ignoring the good performers.

**Thor’s Family of Measures Approach**

Thor’s approach to the development of organizational performance management sets focuses on the identification of five categories of metrics (Thor, 1994). These are profitability, productivity, external quality (customer focused), internal quality (waste reduction), and “other” metrics such as innovation, safety, and organizational culture. Thor points out that a family of metrics is needed at every step in the process – not just at the strategic level – with some metrics being used only at the lower levels and some metrics being rolled up into organization-side metrics.
Kaplan and Norton’s Balanced Scorecard Approach

Kaplan and Norton (1992) introduced the Balanced Scorecard in 1990. The Balanced Scorecard is intended to systematically report a comprehensive set of performance measures regarding progress toward achieving multiple goals necessary to implement the company’s strategy. The overall objective is to “balance” effort allocation among multiple goals so that the probability of achieving all goals simultaneously is maximized. This balanced effort allocation is designed to prevent some goals from being achieved at the expense of failing to achieve other goals (Kaplan and Norton, 1996b). The Balanced Scorecard concept is an appropriate performance management tool to achieve strategic goals. Atkinson and Waterhouse (1997) stated that the Balanced Scorecard is one of the most significant developments in performance management.

Comparison of the five performance management systems

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Balanced Scorecard, compared with other performance management systems, it used cause and effect approach to link the financial and non-financial performance indicators together to form a model to improve the business results. (Frigo, 2002a).

The Balanced Scorecard helps the company to look at their business from four essential perspectives and answer some important questions:
1. How do customers see the company?
2. What must the company excel at?
3. Can the company continue to improve and create value?
4. How does the company appear to shareholders? (Kaplan and Norton, 2000)

The question as to whether the Balanced Scorecard can improve the organization’s performance is clarified by way of a detailed consideration of it.

**Introduction of the Balanced Scorecard**

The first Balanced Scorecard was created in 1987 at Analog Devices (Schneiderman, 2002). Kaplan and Norton (1992) developed another Balance Scorecard for performance management systems by establishing cause and effect linkages between all of the relationships from strategy selection to organizational performance, i.e. to ensure that the strategy can be taken into action by means of the Balanced Scorecard in 1990. Kaplan and Norton (1992) recognized that Balanced Scorecard can be used not only to set the strategy and goals, but also to reinforce the goals through a linkage of the goals to rewards. Some companies, such as Southwest Airlines and Cigna, pointed out that the prevention of risk by way of only the consideration of the financial figures is only possible if there is a sound measurement system in place to prevent unintended or unexpected consequences from the way targets are set. Reliable and valid measurements are required if targets are to be set fairly and reduce the risk of the program. They found that business planning must link change programs and resource allocation to long-term strategic priorities. The problem is that most companies have separate procedures and organizational units for strategic planning and for resource allocation and budgeting.

A management system must provide linkage throughout the planning process, from strategy to resource allocation and budgeting. The strategy sets the definition and drivers; the Balanced Scorecard influences the decision-making process to ensure achievement of the plan. The final step in linking strategy to action is to establish specific short-term goals or milestones for the Balanced Scorecard measurements.

McManus (2005) stated that any performance management system requires balance to perform optimally. Each of the organization’s employees has their perception of what is important to recognize, measure, and promote. High performing companies would use the Balanced
Scorecard to help gain consistency in these personal preferences and to help align them with the goals and aspirations of the organization.

The establishment of the linkages between business planning and the Balanced Scorecard enables the company to gather feedback; however, feedback without learning is useless. Kaplan and Norton stated that, “Strategic learning consists of gathering feedback, testing the hypotheses on which the strategy was based, and making the necessary adjustments” (Kaplan and Norton, 1996a).

The Balanced Scorecard develops and reports explicit linkages between and among the following: strategy to the environment; strategy to goals; goals to effort; effort to goal achievement; and organizational performance to both internal goals and the environment. Further, Balanced Scorecard uses both financial and non-financial measures to establish cause and effect linkages among and between short-term and long-term goals in all areas. The process is iterative and is designed to align all parts of the organization with the strategy and to align the strategy with the environment. The objective of this process is superior organizational performance that is balanced and sustainable (Kaplan and Norton, 1996a).

Once the strategy is defined, it is translated into goals. Critical success factors should fully reflect all goals that are essential to successfully implementing the strategy. According to Kaplan and Norton (1996b), organizations usually identify four critical success factors (which they call “perspectives”), with the most common being: 1) Financial, 2) Customer, 3) Internal Business Processes, and 4) Learning and Growth. Because of the cause and effect linkages between the critical business areas and strategy, failure to achieve the goals in any one success factor is likely to result in failure to fully implement the organization’s competitive strategy.

Norreklit (2000) stated that a balance should be considered between financial and non-financial perspectives and factors.

For each critical success factor, several performance measures are developed. According to Kaplan and Norton (1996b), these performance measures should focus on items that are essential to achieving the goals in each critical business area. Moreover, the performance measures should be logically linked to that critical success factor in a cause and effect relationship. This process continues down through the organization until it reaches the level of the individual. The result is a comprehensive performance management system that fully captures goal-relevant performance.
The Balanced Scorecard supplies three elements that are essential to strategic learning. First, it articulates the company's shared vision, defining this in clear and operational terms, and communicates a holistic model. Second, the essential strategic feedback system is to test, validate, and modify the hypotheses embedded in a business unit's strategy. Third, it facilitates the strategy review that is essential to strategic learning. They concluded that many companies started using the Balanced Scorecard to improve their performance, but came to use the process as the foundation of an integrated and iterative strategic management system. (Kaplan and Norton, 1996a)

Since introducing the Balanced Scorecard in 1992, Kaplan and Norton have helped over 200 executive teams design their scorecard programs. Initially starting with a clean sheet of paper, they would ask, “What is the strategy?”, and allow the strategy and the Balanced Scorecard to emerge from interviews and discussions with senior executives. The scorecard provided a framework for organizing strategic objectives into the four perspectives, measurement, and regular monitoring of the objectives. The results of the objectives of these organizations have been significantly improved.

Frigo (2002a) stated that non-financial performance measures can communicate strategy more clearly, and analysts and shareholders can value these. Since non-financial measures are often the leading indicators that drive lagging financial performance measures, non-financial metrics can provide a way to link current activities with future performances The Balanced Scorecard measures have a much greater content of non-financial measures that are derived from the strategy of the company.

Frigo (2002b) conducted research into the Return Driven Strategy, and found that the most successful companies were vigilant in detecting changing or unmet customer needs in large and high-growth market segments. Underlying the consistent and discipline execution of strategy, however, they found a myriad of performance metrics that encompassed the right financial measures, customer and value proposition measures, internal processes, and measures that uniquely reflected the company’s strategy and helped in its execution.

Wongrassamee and Gardiner (2003) compared the Balanced Scorecard with EFQM Excellence Model, the result is that after considering five areas of management control systems, it is evident that both approaches, the Balanced Scorecard and the EFQM Excellence Model, they are quite similar. The only major difference is that key objectives in the Excellence Model are assigned on the TQM principles whereas in the Balanced Scorecard approach, the key
objectives are based on the desired corporate strategy. Therefore, the Balanced Scorecard is considered more flexible than the excellence model (Wonggrassamee and Gradiner, 2003).

Epstein and Manzoni (1998) stated that a clear strategy can be a difficult process to define, and even more difficult to translate this strategy into action. Epstein and Manzoni compared two related tools, Tableau de Bord and Balanced Scorecard which can be cascaded down the organization to support the development and implementation of strategy. To identify some implementation difficulties that companies may encounter.

Balanced Scorecard methodology (Kaplan and Norton, 1992) is distinguishable in:

1. Making strategy operational by translating strategy into performance measures and targets.
2. Helping focus the entire organization on what must be done to create breakthrough performance.
3. Integrating and acting as an umbrella for a variety of often disconnected corporate programs, such as quality, re-engineering, process redesign, and customer service.
4. Breaking down corporate level measures so local managers, operators, and employees can see what they must do well in order to improve organizational effectiveness.

Balanced Scorecard focuses the management meeting agenda on strategic issues, teamwork and learning. Traditionally, management meetings focused only on financial measures and tactics. The Balanced Scorecard expands this process by having the meetings report and discuss all the measures relevant to the strategy plus the initiatives designed to improve measured performance (Kaplan and Norton, 2001c).

From Balanced Scorecard’s contextual perspective, the focus should be on the word “balanced”. Balanced Scorecard establishes diverse measures and causes management to focus on more than the financial outcomes –providing a more accurate, balanced view of the organization. Balanced Scorecard also maintains a balance of leading and lagging indicators for a more informed bi-directional (forward and historical) view of the business. Besides, there should also be a balance of external (customer) and internal (business process, learning and growth) measures to address the different forces shaping the business environment. Finally, a balance should also be maintained between outcomes desired and the performance drivers of those outcomes as well as between hard, objective measures and softer, more subjective measures (Kaplan and Norton, 1996c).
McCunn (1998) of KPMG Management Consulting proposed that one should not start implementing a Balanced Scorecard unless one knows what one hopes to achieve. As a management tool, the scorecard represents a radical departure from traditional approaches. It can be time-consuming and expensive to implement. However, the benefits on offer are definitely worth it. But no organization should allow itself to drift into implementing a scorecard unless it has a very clear idea of what it expects the scorecard to bring, and is determined to invest what is needed to ensure the scorecard is put in place.

Johanson (2006) stated that the Balanced Scorecard has many features to assist organizations in balancing their control process. It can ultimately change management’s understanding of the value-creation process, thereby continuously transforming the defined management control agenda. The Balanced Scorecard can potentially improve better at bridging the abstraction gap and surmounting the mental barrier between top management and employees (Johanson, et al, 2006).

Mooraj and Hostettler (1999) stated that Balanced Scorecard is a tool which adds value by providing both relevant and balanced information in a concise way for managers, creating an environment which is conducive to organisation and eliminating the need for managers to choose which type of control system to use at any given time. The entire Balanced Scorecard implementation process relies on both formal and informal processes, and that there are written and unwritten rules which must be considered for the process to be implemented successfully.

McNair (2009) stated that the Balanced Scorecard uses a top-down planning approach and a bottom-up control system that helps unravel the knot that has always existed in performance management systems, the control paradox. If individuals set their own goals (e.g., perform the planning activity) they will necessarily be focused not only on tomorrow’s plan but also on today's capability – they have an incentive to active their goals. If goals are set with some input but not directly by an individual, it is possible to sidestep the paradox created when an individual is expected to truthfully report potential performance when doing so may lead to downstream performance shortfalls. Performance measures for planning purposes start at the top, while measurements for control must be started from the bottom of the organization.

Pateman (2008) stated that Kaplan and Norton’s system succeeds by using a two-stage double loop cycle of activities to link strategy with operations in the areas of both strategy management and operations management. The interaction between stages has a multiplier effect on an organization's ability to perform well. It is in the ability to view the process holistically that allows performance breakthroughs to occur. The six stages of the process are as follows: 1.
Develop the strategy; 2. Translate the strategy; 3. Align the organization; 4. Plan operations; 5. Monitor and learn; 6. Test and adapt.

The Four Perspectives

The Balanced Scorecard views company performance from four perspectives: financial, customer, internal business process, and learning and growth. Measurements for each of these perspectives are linked together in a chain of cause and effect that “recognizes that the long-run goal for the business is to generate financial returns to investors. The financial perspective therefore serves as the last link in the chain, describing performance with traditional accounting measures of profitability, asset returns and revenue growth that are expected to relate directly to the shareholders’ return on investment.

Financial Perspective

There is a growing perception that accounting measures of performance are less than fully adequate (AICPA, 1994). Lev (1997) noted the irony that “accounting is the last vestige of those who believe that things are assets and that ideas are expendable. Company performance is an economic concept, and accounting measures often do not coincide with economic measures of performance of the same names.” For example, accounting measures of return on investment are affected by the use of historical costs, rules for expensing research and development costs, rules for depreciation, the need for periodic reporting, etc. Almost every introductory accounting text highlights the limitations of accounting information and the limited comparability of accounting measures among companies.

Positive accounting research also stated that managers use their discretion to smooth reported earnings figures and make accounting choices that may not be in the best interest of external shareholders (Watts and Zimmerman, 1990).

Customer Perspective

The customer perspective views the company from the standpoint of the customer. In Balanced Scorecard, customer measures describe the extent to which the company is meeting its customers’ needs. They addressed questions of customer satisfaction, new customer acquisition, customer retention, and customer segment profitability. Customers are, of course, the source of the company’s revenues. Long-run financial success therefore depends on the company’s ability to create and deliver products and services that are valued by customers (Kaplan and
Norton, 1996a). The central role of the customer perspective in the Balanced Scorecard is the basis for the customer focused framework.

The Balanced Scorecard emphasizes the link between the company’s products and its customers’ satisfaction with those products, i.e., the value proposition that the company delivers to its customers. Value propositions are the attributes of the product or service that drive customer satisfaction. These attributes are categorized as product/service attributes, customer relationships, and image and reputation (Kaplan and Norton, 1996a).

Product and service attributes encompass both features and price. These attributes describe the utility of the product – its functionality, quality, and timeliness – in relation to its price. Customer relationship attributes encompass elements of service, convenience, and responsiveness. These attributes describe the nature of the customer’s interaction with the company. Image and reputation attributes encompass the intangible factors that attract customers to a company. These attributes describe how the company defines itself to its customers through its advertising, professionalism, and general reputation for performance. The better a company aligns its value propositions with its customer needs, the better it can be expected to achieve customer satisfaction (Kaplan and Norton, 2001).

The marketing literature also presents customer satisfaction as a significant determinant of overall company performance (Foumier and Mick, 1999). Several marketing studies examine the nature of customer satisfaction. Most of these studies use the comparison standards paradigm. According to this paradigm, consumers hold pre-consumption expectations of product performance, observe product performance, and compare performance with their standards. They form perceptions of product performance versus their expectations and then form summary satisfaction judgments (Boulding, Steelin, and Zeitham, 1993). The confirmation or disconfirmation of expectations determines the level of satisfaction. Confirmed expectations result in moderate satisfaction. Exceeded expectations lead to high satisfaction, and unmet standards lead to dissatisfaction (Foumier and Mick, 1999).

Foumier and Mick (1999) recently examined customer satisfaction with technological products. Their findings provide further insight into the nature of customer satisfaction. In contrast to previous research, they found that expectation standards often arise simultaneously with product ownership experiences. They concluded in particular that consumer product satisfaction is a dynamic context-dependent process, evolving over time.
Internal Business Process Perspective

The third Balanced Scorecard perspective, internal business processes, considers process level performance. Internal business process measures describe the efficiency with which the company delivers its value propositions to its customers. Kaplan and Norton (1996a) presented a value chain model that separates internal business processes into three major groups: (1) the innovation process, (2) the operations process, and (3) the post-sale service process (Kaplan and Norton, 1996 (a)). The innovation process creates new products and services. The operations process delivers products and services to the customer. The post-sale service process supports customers after the purchase. The process measures are expressed in terms of time, quality, and cost in addition to throughput.

Balanced Scorecard advocates strong links between the business processes and the customer. Issues of quality, cost, and timeliness are most important when they serve to satisfy customer’s needs. Thus, the proposed customer-centric framework ties business process performance to a company’s ability to deliver its value proposition, the resulting customer satisfaction levels, and ultimate financial performance. Extra-organizational comparisons are necessary to evaluate a company’s performance relative to its competitors (Kaplan and Norton, 1996a; Thompson and Mathys, 2008).
Learning and Growth Perspective

The fourth Balanced Scorecard perspective is learning and growth. Learning and growth measures describe the company’s investment in the future. Learning and growth arise from people and systems. Kaplan and Norton (1996b) divide these measures into three principal categories: (1) employee capabilities, (2) information system capabilities, and (3) motivation, empowerment, and alignment. Employee capabilities are defined in terms of their strategic skills, training levels, and the extent to which employees in critical positions have the appropriate skills for those positions. Information systems capabilities describe the company’s information infrastructure and the availability of strategic information. Motivation, empowerment, and alignment measures indicate whether the company is creating a climate for employee action in the best interests of the organization. Performance in each of these three categories is linked to employee satisfaction and through employee satisfaction to employee productivity (Thomas, 1994; Kaplan and Norton, 19996b).

While there is a substantial body of research supporting the relationship between human resource management, information resource management, and company performance, measurement data are seldom publicly available. The customer-centric framework proposed here recognizes the importance of a company’s human capital and information systems, but focuses on learning and growth perspectives.

During the initial stages of the process, the Balanced Scorecard is used as a tool to define and communicate strategies. The scorecard then becomes a tool for tracking and assessing business performance. As a company becomes more experienced in managing its performance, the scorecard can then be used as a modeling tool to predict future performance and to track the causal links between performance and behavior (Goh, 2005).

Kaplan and Norton (1996b) base their Balanced Scorecard model on activities that develop human capital, organizational learning, and growth capability. All improvements in the organization ultimately stem from human capital and the organization’s ability to use that capital effectively to generate comparative advantages. Ulrich and Lake (1991) argue that every firm has access to the same physical capital, technology, and strategy; therefore, the true source of competitive advantage is found in exploiting the capabilities of superior employees who can generate successful ideas for improving processes and the value delivered to customers. Johnson (1992) insists that organizations will best serve customers by investing in employees’ capabilities through activities such as:
● Investing in employees through selective hiring and training,
● Investing in information software systems to support decision making, and
● Motivating and aligning goals of employees with corporate goals and empowering employees to use their knowledge and skills to the benefit of the organization.

Furthermore, these activities are hypothesized to increase employee job satisfaction, which in turn affects employee’s productivity and retention. Retaining productive employees should ensure the development of employee capability to generate successful ideas.

Learning and growth activities such as investing in employee training and information software systems and motivating employees may lead to employees feeling more satisfied with their jobs. Heskett et al. (1994) found that employee satisfaction derives from high quality support services provided by the firm, which include training. In a study of 1,798 manufacturing employees, Birdi et al. (1997) found that overall job satisfaction is significantly associated with prior participation in required on-the-job training courses and work-based development activity. Interestingly, Tsang et al. (1998) found that training beyond what was perceived as required for employees’ jobs was considered excessive and resulted in lowered job satisfaction. Ang and Koh (1997) found that satisfaction with information software systems was also an indicator of job satisfaction. Similarly, Kappelman and Guynes (1995) found that participation in information software systems training increased user and overall job satisfaction. Training is a critical element in learning and growth perspectives.

Koberg et al. (1999) studied 612 hospital employees and found an association between empowerment and employee satisfaction. Adler (2002) found that Balanced Scorecard system’s implementation in which employees received performance feedback reported higher levels of satisfaction. A longitudinal study of medical technologists revealed that employees’ satisfaction with the performance evaluation systems significantly affected job satisfaction (Blau, 1964).

Employee training has been empirically linked with a number of other Balanced Scorecard measures. Studies have documented a positive association between skill development training and employee retention (Whitaker, 1991; Wah, 1998; Black and Lynch, 2001). Training has also been linked to innovation, process improvements and customer service quality. Hurley and Hult (1998) sampled 9,648 employees from 56 organizations in a large agency of the US federal government and found that the more a group’s culture emphasized learning, the greater was its
innovation. Lynch and Black (1998) used data from a 1994 survey of US businesses and found a positive association between training and TQM effectiveness. Employee training has also been empirically linked with post-sale service quality (Lewis and Gabrielsen, 1998; Johnson, 1996).

Employee motivation, employee empowerment and alignment of employee and corporate goals have been heavily researched in the organizational behavior literature. Grahn (1995) found that the most important driver of process improvement is skilled and motivated employees. A study of 612 hospital employees showed an association between empowerment and employee productivity and retention (Koberg et al., 1999). Empowerment has also been empirically linked with increased innovation (Dougherty and Hardy, 1996; Hurley and Hult, 1998), implementation of process improvement (Landry, Wood and Lindquist, 1997), and customer service quality (Harline and Ferrell, 1996). Alignment of goals through performance evaluation has been linked to employee productivity and customer service. Sama, Kopelman and Manning (1994) found that making performance feedback available to transcription service employees increased productivity levels by 18.5% over a five-week period.

Thomas (1992) stated that people learn best when they choose what to learn and how to learn it. For the learning to be effective, the learning that occurs must facilitate the attainment of organizational goals. Training may be enjoyable, personally fulfilling and rewarding, but if it does not impact on organizational effectiveness, it is a waste of time and money.

Kaplan and Norton (1996b) considered the feedback and learning process to be the most innovative and important aspect of the entire Balanced Scorecard management process.

**Cause-and-Effect Relationship between the Four Perspectives**

The four perspectives are linked up by a cause-and-effect relationship, and this relationship is fundamental to understanding the metrics that the Balanced Scorecard prescribes. There are four stages to this chain of cause and effect to explain the performance management system. Although challenged by Norreklit (2000) on the casual link, the logically inferred links were used to explain why the measures – financial, customer, internal process and growth – and learning are inter-related to contribute to the final desirable financial outcome.

Kaplan and Norton (2001a) showed that the scorecard-design process makes the cause-and-effect linkages in the strategic hypotheses explicit. As the scorecard is put into action and feedback systems begin their reporting on actual results, an organization can test the hypotheses
of its strategy to see whether its strategy is working. Some, like Brown & Root and Sears, did the testing formally, using statistical correlations between measures on the scorecard to determine whether, for example, employee empowerment programs were increasing customer satisfaction and improving various processes. Others, like Chemical Bank, tested the hypotheses more qualitatively at meetings, where managers validated and refined the programs being used to drive service quality and customer retention.

Mobil's EVP Bob McCool commented that the Balanced Scorecard has enabled organizations to introduce a new governance and review process, one focused on strategy, not tactics. The new governance process emphasizes learning, team problem-solving and coaching. Review meetings now look into the future, exploring how to implement strategy more effectively, and identifying the changes that need to be made in the strategy based on what has been learned from the past (Kaplan and Norton, 2001a).

What is the relation between customer satisfaction and financial results? Customer satisfaction is a critical goal in the company’s strategy. The fundamental question is whether customer satisfaction measures provide leading indicators of financial performance. Ittner and Larcker (1998) noted that the evidence concerning the extent to which customer satisfaction measures provide value-relevant information beyond that contained in current accounting statements is mixed. Although they examined the relationship from multiple perspectives, their results were also mixed. Using data from a major telecommunications firm, they found significant relationships between customer-level satisfaction scores and future customer retention, revenues, and revenue changes. Using data from a financial services provider, they found significant relationships between customer satisfaction scores and revenue but not percentage change in revenue. Finally, using aggregate customer satisfaction scores published in Fortune magazine, they found evidence that these scores provide insight into company value that is not reflected in current accounting book values.

They did not, however, attempt to identify how company’s gain satisfied customers, nor did they examine the longer-term impact of customer satisfaction on company performance (Ittner and Larcker, 1998).

Banker et al (2000) examined the impact of customer satisfaction on financial performance in a hotel chain. They looked at performance before and after a change in incentive plans that incorporated customer satisfaction measures in the incentive plan. Their results suggested that overall performance improved after the implementation of the plan. Their results also showed
that one satisfaction measure was significantly related to hotel revenues and profits, although the second measure was not.

Ittner and Larcker (1998) used three different customer satisfaction measures, none of which compared customer satisfaction and the corresponding effect on performance among companies in one industry. Banker et al. (2000) examined customer satisfaction and the effect on financial performance in one hotel chain, but did not compare customer satisfaction among competitors. The Customer satisfaction index is one of the leading factor of the performance management system (Ittner and Larcker, 1998).

Cohen et al (2008) used a structured questionnaire and gathered data from 90 leading Greek companies in relation to the progress they experienced during a three-year period regarding various activities that can be broadly classified as aspects of four perspectives of Balanced Scorecard. The study supports the existence of a sequential dependency among the non-financial Balanced Scorecard perspectives. However, the relation between customer perspective factors and internal business process perspective factors seems to be stronger than the relation between learning and growth perspective factors and internal business and production process perspective factors.

**Application and Decision on Using the Balanced Scorecard**

Kaplan and Norton (2001b) said that there are five key principles common to all successful Balanced Scorecard companies:

- Translate the strategy to operational terms,
- Align the organization to the strategy,
- Make the strategy everyone’s everyday job,
- Make strategy a continual process, and
- Mobilize change through executive leadership.

Frigo (2002a) stated that a performance management system like the Balanced Scorecard is a powerful tool for executing strategy. The Balanced Scorecard is an approach to performance measurement that includes nonfinancial and financial performance measures derived from an organization's vision and strategy.
Since non-financial measures are often the leading indicators that drive lagging financial performance measures, nonfinancial metrics can provide a way to link current activities with future financial performance. Balanced Scorecard strategy maps can help management describe and test the cause-and-effect linkages inherent in key strategic themes, such as growth and productivity within the Balanced Scorecard framework. These linkages describe how improvements in performance drivers, such as faster process-cycle time or employee capabilities, can create improvements in outcome (Frigo, 2002).

Dickson (2001) stated that the key planning imperatives are purpose, strategy, core values, emotional goals, critical measures and current business priorities. He stated that you need these kinds of foundations to be understood in an organization before you can put a Balanced Scorecard in place.

Balanced Scorecard system is not an annual planning event, but rather lets you make sure that you're focusing well in key areas of your organization. Most credit unions do an excellent job of tracking financial performance, but less so in member satisfaction, employee development and organizational efficiency (Dickman, 2001).

Davison (1998) stated that, “Quantitative measures generally focus on cost, quantity, and time.” Qualitative measures center on perceived value and human satisfaction. The quantitative measures explain what happened, and the qualitative measures provide some idea why. Combining both provides insights into the causes and results of certain activities and behaviors.

Balanced Scorecard can forge the link between human and financial performance, as part of evaluating, setting, and managing a rightsizing program in measuring its success or failure. This is a proven process that helps organizations translate their goals and objectives into targeted actions. The Balanced Scorecard displays how employees, financial performance, customers/markets, and operating efficiencies all affect one another and has an impact on shareholder value (Davison, 1998).

Balanced Scorecard is a powerful tool to drive organizational change by establishing targets for the scorecard measures in three to five years to achieve that will transform the company’s culture (Kaplan and Norton, 1996a).

Many organizations emphasize the early stages of the Balanced Scorecard management process: translating vision and strategy into objectives and measures, and communicating these objectives and measures to participants inside and outside of the unit. Unless, however, the
company directs real resources toward achieving these objectives, they'll remain distant goals, not tangible targets to which everyone is committed. By establishing long-term targets for strategic measures, directing strategic initiatives and significant resources toward achieving them and specifying short-term milestones, you become committed to, and accountable for, achieving the organizational vision (Kaplan and Norton, 1996a).

Kaplan and Norton (1996a) argued that a good Performance Management system should have a mix of outcome measures and performance drivers. Implementing a Balanced Scorecard does not mean your company will use more measures. Some companies using the Balanced Scorecard actually reduce the number of measures in their performance management system. Motorola is a good example. According to Robert A. Joy, Financial Planning Manager in the Automotive, Component, Computer and Energy Sector at Motorola, some performance measurements are eliminated. Some new measures were identified when developed by the scorecard system. The net impact was a reduction in the number of measures used. The philosophy is a continual cleansing and renewal process for the performance management system. One of the benefits of using Balanced Scorecard is that it helps management to focus on the vital performance measurements (Frigo, 2003).

Kaplan and Norton (2001b) introduced the Balanced Scorecard to provide a new framework for describing value-creating strategies that link intangible and tangible assets. The scorecard does not attempt to “value” an organization's intangible assets, but it does measure these assets in units other than currency. The Balanced Scorecard describes how intangible assets get mobilized and combined with intangible and tangible assets to create differentiating customer-value propositions and superior financial outcomes.

The Balanced Scorecard’s combination of measuring performance through varied indicators and communicating strategic goals throughout the organization is the kind of management system businesses need to survive in the market competition. The Balanced Scorecard helps businesses react more quickly as a whole from the executive suite to the front lines. Even more importantly, in an era of rapidly shifting markets and erratic product life cycles, it helps them anticipate circumstances so they can plan rather than react (Scott, 1998).

The Balanced Scorecard application represents a high-level strategic feedback and performance management application. Organizations can deploy additional analytical applications that provide detailed decision support analysis such as service profitability analysis, customer
satisfaction and retention, and risk analysis. These types of applications are highly synergistic with the Balanced Scorecard application and should work in harmony with it (Silk, 1998).

Venkatraman and Gering (2000) stated that the Balanced Scorecard is intended to change people's behavior. People are required to make it work. This is the most important and challenging step in introducing a scorecard.

Shih-Jen and McKay (2002) stated that companies can use the Balanced Scorecard to accomplish the following objectives:

- Clarify a consensus strategy,
- Communicate strategy throughout the organization,
- Align departmental and personal goals to the strategy:
  - Link strategic objectives to long-term targets and annual budgets,
  - Identify and align strategic initiatives,
- Perform periodic and systematic strategic reviews, and
- Obtain feedback to improve strategy.

Germain (2000) stated that the Balanced Scorecard can enable companies to identify and measures the drivers and outputs that are crucial to their success, and that balanced thinking can lead an effective project management decisions. Many basic elements of the project cycle can link to one or more of the balanced perspectives. Understanding these links will help project managers’ select appropriate management strategies and tools.

The Balanced Scorecard has already been used in project management applications by Stewart (2001), Norrie and Walker (2004), Norrie (2006) and Niebecker et al. (2008).

According to Stewart’s, Norrie and Walker’s, and Niebecker’s point of view, it is worth conducting a study on an engineering consultancy company for the application of the Balanced Scorecard.

In addition, Kaplan and Norton (1993) stated that most organizations that do not have a balanced set of measures concentrate almost exclusively on short-term financial measures and ignore longer-term more strategic measures such as customer satisfaction, employee satisfaction, and growth (Kaplan and Norton, 1993).
Davis (1996) said that the process used in General Electric could be replicated in any company. Higher level objectives always need to be converted into activities and measures that are meaningful to lower level employees. The following guidelines are recommended for developing an “Employee Balanced Scorecard”.

First, the employee scorecard should be closely integrated with the plant, divisional, group and corporate measures of the company. This keeps the entire organization focused on the same agreed set of objectives.

Second, lower level employees should be involved in the development of the measures. Employee participation will inspire greater ownership of the measures and the commitment to accomplishing them. This approach is compatible with “open book management” in which a great deal of financial and non-financial information is shared with employees. By showing employees how their performance influences the bottom line, front-line employees are encouraged to act like owners and ensure the future of their jobs.

Third, if the plant is unionized, union officials should be included in the earliest discussion of the measurement system. Union members will need to be assured that the system gives employees more, not less, control over their jobs.

Fourth, the measures selected must be timely. Production employees need information in real time so that they can respond and solve problems on the spot.

Fifth, the measures selected should focus on the critical aspects of performance. Plant personnel should use root cause and Pareto analysis to determine what aspects of the work have the largest impact on the targeted performance goals. Root cause analysis should be done on an ongoing basis as part of a company's continuous improvement efforts.

Sixth, new measures that are introduced should be balanced with the other scorecard measures. A typical Balanced Scorecard in a manufacturing plant will probably include measures of quality, volume, material cost, yields and labor usage. These measures need to be balanced and prioritized. It is also important not to create too many measures that may overload frontline employees.

Seventh, Balanced Scorecard measures should be entered into the computer so that current figures can be accessed instantly by people in different departments and at different levels of the company.
The corporate Balanced Scorecard can be a valuable tool in getting all members of the organization to focus on a few common business goals. The employee scorecard is the vital link that can increase the probability that upper level, corporate and divisional scorecards are translated into frontline measures that employees can achieve (Davis, 1996; Quezada et al., 2009).

Kaplan and Norton (2001a) stated that many people think of measurement as a tool to control behavior and to evaluate past performance. The measures on a Balanced Scorecard, however, should be used as the cornerstone of a management system that communicates strategy, aligns individuals and teams to the strategy, establishes long-term strategic targets, aligns initiatives, allocates long- and short-term resources, and, finally, provides feedback and learning about the strategy.

The learning and growth process can be considered the most innovative and important aspect of the entire Balanced Scorecard management process. Learning provides the capability for organizational development at the executive level. The Balanced Scorecard enables people to monitor and adjust the implementation of their strategy, and to make fundamental changes in the strategy itself.

A good Balanced Scorecard should have a mix of outcome measures and performance drivers. Outcome measures without performance drivers do not communicate how the outcomes are to be achieved. They also do not provide an early indication about whether the strategy is being implemented successfully. Conversely, performance drivers (such as cycle times and part-per-million defect rates) without outcome measures may enable the business unit to achieve short-term operational improvements, but will fail to reveal whether the operational improvements have been translated into expanded business with existing and new customers, and, eventually, to enhance financial performance. All the measures on a Balanced Scorecard should eventually be linked to achieving superior current and future financial performance (Kaplan and Norton, 2001a).

Dinesh and Palmer (1998) stated that the Balanced Scorecard’ success depends on whether the organization can find ways to meet rapid external change while maintaining an organization-wide measurement system, and manage the human relations model in conjunction with goal setting. The Balanced Scorecard is applied according to its philosophical and practical intention.
Birch (2000) mentioned that the Balanced Scorecard is a system of critical measurements for an organization. It exists in recognition of the fact that financial results are the most lagging of indicators and that the primary components of organizational health can be tracked. The Balanced Scorecard shows how results are achieved and provides a linked system of short-term (goals) and long-term (vision) indicators to help managers manage people and processes and to help people manage their own work.

Brewer and Speh (2000) recommended that a Balanced Scorecard should have 15 to 25 measures that support a company’s strategy and are linked together in the form of cause-and-effect hypothesis statements. Forming these linkages encourages a company to specify how investments in learning and growth will drive continuous process improvement, increasing customer satisfaction and financial prosperity. Using Dell as an example, the Balanced Scorecard’s learning and growth measure might include: Training dollars spent per full-time equivalent by customer segment to ensure that well-educated business segment managers provide state-of-the-art advice to customers. Internal process measure might include: Number of customer-initiated product innovations. The customer measure might include: customer retention. The financial measure is revenue growth by segment.

Kaplan and Norton (1996) said that to embed the scorecard into an integrated long-range strategic planning and operational budgeting process, one must take the following steps.

1. Set ambitious targets for balanced-scorecard measures that all employees can accept and buy into. The cause-and-effect relationships in the scorecard help identify the critical drivers that will allow breakthrough performance on important outcome measures, particularly financial and customer measures.

2. Set priorities and rationalize strategic initiatives and capital investments. The gaps between the ambitious targets for scorecard measures and the current performance on those measures enable managers to set priorities for capital investments and action programs intended to close the gaps. Managers reduce or eliminate initiatives and investments that won't have a major impact on one or more scorecard objectives.

3. Link to annual resource allocation and budgets. Managers link the resources to a five-year strategic plan to discretionary expenses and budgeted performance milestones for the upcoming year. The milestones enable managers to track the business unit's trajectory along its strategic journey.
Atkinson and Waterhouse (1997) provided only limited support for Kaplan and Norton’s primary view, charging that financial performance measures lack the requisite variety to give decision makers the range of information they need to manage processes. This view is insufficient. While there is no basic quarrel with this process approach to performance measurement, it is incomplete because it fails to adequately highlight the contributions that employees and suppliers make to help the company achieve its objectives.

McKenzie and Shilling (1998) criticized that, by depending on the structure of the Balanced Scorecard, participants can succeed in some measures while failing in others and still receive a significant payout.

**Using measures that are difficult to quantify**

Some measures are difficult to quantify, making it difficult to base compensation on them. Customer satisfaction is undoubtedly an important measure for any business. However, surveys, opinion boxes, or informal polls often capture a disproportionate number of dissatisfied customers. Happy, satisfied customers may never offer valuable, positive feedback. The measure must go to the root of the issue. Perhaps much of customer satisfaction is based on product defects, customer returns, or repeat business, which are accurately measured, easily tracked, and within the control of program participants.

**Lack of focus**

The scorecard approach can lead to far too many performance measures. With too many goals in each category, participants will have difficulty determining which are important and may take none seriously. This could be called the “mission statement trap” in which every possible measure is included “just to make sure we didn't miss anything.” The result is a potentially powerful tool that has lost its impact because of ambiguity and a lack of focus.

Smith (1998) also criticized the Balanced Scorecard for, while being a possible means of overcoming short-termism, still providing no clear indication of a weighting system that would enable the four perspectives to be combined in a satisfactory manner to yield organizational effectiveness. The question of comparability also remains unclear, because different market situations, product strategies and competitive environments will all require different scorecards.

Brown (1994) stated that although measurement is critical to improved performance, organizations do not always get what they measure. If measurement itself really had that much impact on behavior, no one who owns a scale would ever be fat. Measurement only provides
you with data. If the data are not used to make good business decisions and to drive improvement efforts, a good measurement system is of little value (Brown, 1994). Zagotta and Robinson (2002) stated that the Balanced Scorecard did not far enough. For example, if customer satisfaction rating is one of the leading indicators, it’s usually not tied in a visible, specific way to the strategic initiative but applies resources against. Customer satisfaction drops, the alert on the Balanced Scorecard flashes red, and everyone panic. Numbers simply do not tell the whole story because they do not provide a guide to the execution of the initiative.

Ittner and Larcker (1998) are among the few critics who provide more extensive remarks on the disadvantages of Balanced Scorecard:

- Time and cost required can be substantial. The costs of a system that tracks a large number of financial and non-financial measures can be greater than its benefits. Development can consume considerable time and expense, not least of which is selling the system to skeptical employees who have learned to operate under existing rules. A greater number of diverse performance measures frequently requires significant investment in information systems to draw information from multiple (and often incompatible) databases.

- Bureaucracies can cause the measurement process to degenerate into mechanistic exercises that add little to reaching strategic goals.

- There is no common denominator for non-financial measures, which makes evaluating performance or making trade-offs between attributes difficult.

- Lack of causal links (articulating the relations between the measures or verifying that they have a bearing on corporate performance).

- Lack of statistical reliability (certainty that a measure actually represents what it purports to represent).

- Not pragmatic to capture fully the many dimensions of organizational performance and no wonder there are additional perspectives to be added or dropped (Ittner & Larcker, 2000).

McKenzie & Shilling (1998) studied the linking up between Balanced Scorecard and compensation in a number of companies and came up with the following comments:
• Assumed the Balanced Scorecard is a perfect tool for compensation,
• Reduced focus on performance management,
• Using measures that are difficult to quantify,
• Lack of focus,
• Contradicting goals and benchmarking, and
• Getting tied-up in implementation.

A study on the impact of the Balanced Scorecard’s financial and non-financial measures on manager evaluations of subordinates or divisions. They conjectured that financial results could change how managers rely on financial and nonfinancial performance metrics in underlying decisions. They believed this since prior research showed that individuals could fixate on the outcomes of decisions and ignore other pertinent processes and cues when rendering related evaluations and decisions (Brown and Soloman, 1993).

Avoid Pitfalls of Implementation

Pitfalls that can sidetrack a Balanced Scorecard program include a lack of commitment from senior management, the failure to let scorecard responsibilities “cascade down” to all employees, and treating the scorecard as a one-time event. Additionally, another failure includes developing stretch targets to test the organization's ability to “go beyond.”

Gradually stretching target values keeps the organization on its toes by creating a highly competitive and ever changing environment. There is no way one can produce a scorecard that will be valid forever or represent the complete and absolute truth. Management also must remember to reward employees for recognition when they succeed.

Krumwiede, Eaton, and Swain (2000), based on an analysis of the subjects’ importance ratings of financial and nonfinancial criteria, found that subjects who evaluate managers under favorable financial conditions were more likely to focus on the financial metrics in making the evaluation. When the financial measures were poor, the subjects believed the opposite – nonfinancial measures were more relevant. These outcome biases go against the underlying principle of the Balanced Scorecard, which stresses the importance of balancing both financial and nonfinancial measures.
Krumwiede, Eaton, and Swain (2000) suggested that weightings for financial and non-financial measures might reduce biases from financial results. Lewis (2004) stated that there is a lack of clarity about the goals of measurement, limited understanding about the process, confusion about the tools and conflict about the accuracy of conclusions. Recognizing the importance of measurement is easy; implementing and executing an effective measurement strategy is not. We often fail to stop and consider the reasons why we're measuring effectiveness. Before launching a measurement effort, we should be asking ourselves, "Who wants us to measure? How will the results be used? What variables will guide future decision-making?"

Lewis & Doolittle (2008) stated that there are multiple levels of measurement and tools to assess each, but the goal in evaluating different perspectives effectiveness must be to determine the impact of perspectives on business strategy execution and to inform operational planning.

**Past and Current types of Balanced Scorecard**

There are three types of Balanced Scorecard concepts, reflecting the different stages of evolution that this management information system went through, since Kaplan and Norton's introduction (Speckbacher et al., 2003).

**Type 1 Balanced Scorecard** - Kaplan and Norton's 1992 concept, presenting a multidimensional framework combining financial and nonfinancial indicators that illustrate organizational vision and strategy.

**Type 2 Balanced Scorecard** - A representation that includes Type 1 Balanced Scorecard plus a description of strategy on a basis of cause and effect relationship between the different sets of indicators. Learning and growth indicators have an impact on internal processes and these will influence clients' indicators. At the end of this cause and effect chain the financial indicators will reflect the result of all previous activity in the firm, and therefore the need for both lead and lag indicators in the BSC is imperative (Bourguignon et al.2004) for the organizational moves into the future shouldn't depend purely upon financial indicators (Norreklit, 2003).

**Type 3 Balanced Scorecard** - A version that includes Type 2 Balanced Scorecard plus an integrated structure to serve strategy implementation, defining organizational goals, plans, results and incentives. (Kaplan and Norton, 1996a, b)

Type 3 BSC is a true strategic management system connecting strategic objectives to operational activities allowing for strategic learning. This most developed concept of BSC
emphasizes its usefulness in the strategic implementation process over the strategic formulation phase (Veen-Dirks and Wijn, 2002).

The Balanced Scorecard concept attracted the attention of several researchers over the years and new models have been put forward, inspired by the initial idea (Thompson and Mathys, 2008).

**Benefits Received on the Balanced Scorecard**

Chow, Haddad, and Williamson (1997) looked at four companies from different industries: electronics manufacturing, food ingredients, banking, and biotechnology. They stated that the Balanced Scorecard appears to be an exciting new idea that may help companies restructure to survive in difficult times. The Balanced Scorecard also appears to be a concept that helps management direct its attention to those goals and objectives and the measures that drive the company toward achieving those goals and objectives that will allow the company to reengineer or restructure to meet the needs of the 21st Century.

The Balanced Scorecard is not structured in way that allows it to serve all organizations uniformly. Instead, its strength lies in providing management the ability to design a unique scorecard that specifically fits the needs of that company, subunit, or individual employee.

Kaplan and Norton (1996a) said that today's company knows that yesterday’s accounting results tell little about what can actually help grow market share and profits – things like employee development and turnover, innovative services that enhance customer value, the quality of vendor services, and benefits from advancements in research and development. A key advantage of the Balanced Scorecard is that it puts strategy, structure, and vision at the center of management's focus.

Another advantage is that, because the Balanced Scorecard emphasizes an integrated combination of traditional and nontraditional performance measures, it keeps management focused on the entire business process and helps ensure that actual current operating performance is in line with long-term strategy and customer value. In so doing, the Balanced Scorecard helps maintain a balance between building long-range competitive abilities and recognizing investors' attention to financial reports. To this extent, the Balanced Scorecard does retain traditional financial measures. But these financial measures are viewed in the larger context of the company's competitive strategies for creating "future value through investment in customers, suppliers, employees, processes, technology, and innovation."
Bailey, Chow, and Haddad (1999) summarized the following benefits from the use of Balanced Scorecards across the range of business users:

- Promoting the active formulation and implementation of organizational strategies,
- Making organizational strategies updated and highly visible,
- Improving communication within the organization,
- Improving alignment among divisional or individual goals and the organization's goals and strategies,
- Aligning annual or short-term operating plans with long-term strategies, and
- Aligning performance evaluation measurement and long-term strategies.

The value of using the Balanced Scorecard is that it creates balance. It is not just heavily focused on either finance, or customers, or internal processes of those enabling things like Human Resources and IT, but is rather able to optimize the business unit’s overall performance (McNerney, 1996).

According to recent study, companies that adopt a Balanced Scorecard outperform firms that do not over a three-year period. The results reinforce the value of this proven performance management tool and confirm the experience of Palladium Group, Inc., the global market leader in helping organizations execute their strategies, and standards-keeper of the prestigious results. (Anonymous, 2010).

Crabtree & DeBusk (2008) provided further evidence that the Balanced Scorecard is an effective strategic management tool that leads to improved shareholder returns. Researchers used a long-horizon event study methodology to examine the relationship between Balanced Scorecard adoption and shareholder returns. Using a matched pair design with various matching criteria, they found the following results:

- Balanced Scorecard firms performed statistically better than control firms for matches based on market value of equity, book-to-market ratios, and net assets.
- Over the three-year post-adoption period, Balanced Scorecard adopters outperformed their industry counterparts who chose not to adopt the Balanced Scorecard by 27 to 30 percentage points.
- There is also evidence that firms earn greater excess returns after adoption of the
REVIEW OF RELATED STUDIES

Companies applied the Balanced Scorecard and Case Studies

Lawrie and Cobbold (2001) conducted a case study in Crosshouse a multi-national FMCG company. This company began to develop a Balanced Scorecard in late 1990. There are two key points to note. First, the company must first be clear about the objectives of their management (i.e. their intended application). Second, it must use an appropriate design approach to ensure it meets those objectives. Crosshouse successfully and radically changed its approach to strategic management, including planning, communication and performance reporting, which triggered changes in management behavior and helped to initiate a greater sense of ownership and understanding of corporate strategic priorities throughout the company (Lawrie and Cobbold, 2001).

Birchard (1996) stated that Cigna Property & Casualty is a prime example of a company that adopted a measure for turning strategy into action. Cigna first used the Balanced Scorecard to articulate strategy, and then to communicate the strategy down through the organization. The third way was to drive detailed business planning, and the fourth was for continuous feedback and learning. The result of the transformation was that, in the first six months of 1996, Cigna reported a net operating profit of $32 million, compared with a $16 million loss in the first half of 1995. It was a rapid improvement.

Denton and White (2000) explained how White Lodging Services (WLS) used the Balanced Scorecard in an effort to align owners and managers’ goals and to overcome the slippery problem of assessing management’s effectiveness in a service operation. White Lodging Services Corporation manages a hotel portfolio chiefly comprising Marriott Limited, including Courtyard, Fairfield Inn, and Residence Inn. WLS began developing its Balanced Scorecard system in January 1997 to monitor performance at the property and corporate level and thus to ensure that owners’ long-term objectives were being satisfied. During the first two years of the Balanced Scorecard implementation, White Lodging Services recorded performance improvements in several areas. In addition to a number of quantitative improvements in revenue and profitability, managers and owners achieved a greater level of alignment of objectives than before. The scorecard can thus be seen to be facilitating the cooperation needed
to create the infrastructure that permits meeting long-term goals and ownership objectives (Denton and White, 2000).

Goulian and Mersereau (2000) showed Standard Life’s Canadian branch that several issues needed to be resolved after a Balanced Scorecard was implemented.

1. In the first place, management has experienced some challenges in using the Balanced Scorecard as an integrated strategic management tool. Despite efforts to get managers to see the scorecard as doing more than just delineating functional responsibility, some still think of it as a compendium of individual responsibilities rather than a summary of collective processes. One key consequence of the functional view has been the difficulty in identifying the measures to be reported under the processes enabler. It is extremely important to resolve this issue, since management must agree on the key corporate processes before determining appropriate measurements.

2. If the scorecard process is to work properly, the company will need to understand how its business programs fit together to create value. This means developing a business model that links the measures in the scorecard. Most companies have relatively little experience in this area and only a few external studies have been published so far. Standard Life executives and corporate planners felt that they understood the cause-and-effect relationships among the measures.

3. A second issue is the agreement on the scorecard's overall size and content. Some managers saw it as a collection of a few key indicators, the role for which it was intended. Others, however, conceived the scorecard as a sort of one-stop shopping center, where all the pertinent information related to organizational performance could be stored and accessed. Some managers wondered why areas in which they actively worked were not included. Others felt that certain measures applied exclusively to their particular function and were reluctant to include these in the scorecard.

4. A third issue that needs to be resolved is the distribution of scorecard information. One of the scorecard’s main potential benefits is its ability to communicate strategic directions throughout the organization. To do so, however, the scorecard must be widely circulated. In the early stages of the project, distribution was restricted to members of the executive committee. However, executives now forward the scorecard information to their respective managers who in turn are encouraged to communicate relevant facts to their direct subordinates. This process has been somewhat flawed, as the scorecard-user survey
launched indicated: it showed that the bulk of the management team had little understanding of the issues addressed by the scorecard and limited awareness of how their actions might affect the results. A policy is needed on how best to cascade scorecard information throughout the company. An alternative is to share detailed strategy and results with all employees, using the existing scorecard. This would mean increasing employees' understanding of the measures or providing highly summarized scorecard information directly to operational personnel, in the form of a second employee-oriented scorecard.

5. The fourth issue relates to the application of the scorecard concept to other management levels. The scorecards developed for the finance and IT departments were specific attempts to take the scorecard approach to another level. However, the departmental scorecard concept has not been significantly embraced beyond these two areas. This may be due to timing or pertinence. However, it raises important questions concerning the perceived roles of the scorecard itself, as well as of the corporate planning staff that manage the process. A communications and education program describing IT's and finance's positive experiences may address these concerns.

6. A fifth issue that is currently being addressed is the link between the scorecard and the corporate remuneration system. Companies implementing a corporate scorecard must find a solution that balances the two extremes. Some organizations have favored tying scorecard performance directly to managerial remuneration. Their argument is that the existing bonus scheme, if not adjusted, will undermine the effectiveness of the scorecard. Others believe that linking remuneration too closely to specific scorecard measures will make future changes to the scorecard much more difficult. The Human Resources Department has introduced a new employee bonus scheme to link with company performance by using the measurement of the Balanced Scorecard. (Goulianand Mersereau, 2000)

The implementation of the corporate scorecard at Standard Life initiated a continuous performance-management process based on corporate strategies and long-term action plans. This project has been considered a success. The scorecard provided a balanced view of the organization that streamlined and focused the reporting process, and launched a review, at the highest level, of the appropriateness and feasibility of the strategic initiatives that had been selected.
Standard Life believed that the successful implementation of the scorecard rests on the following principles:

Executive support was obtained from the beginning and it provided important reinforcement during the development phase. As the project evolved, executives began to quote scorecard results in presentations and clearly use the document in managing company operations. Linking the scorecard with the corporate planning cycle has also helped management focus on strategy and progress measurement (Goulian and Mersereau, 2000).

Turner (2000) explained that United Parcel Service (UPS) was hardly in the red when it adopted the Balanced Scorecard programs; in fact, it has been one of the most admired companies in its industry for more than a decade. But UPS wanted to improve their performance even more. And they did, after implementing the Balanced Scorecard. They aligned their vision for the future ensuring each employee knew how their contributions impacted the bottom line.

One UPS manager described the effect of the transformation in this way: “The service provider in front of the customer is now a salesperson, helping to market the company and develop sales leads.” As a result, UPS was named company of the year for 1999 by Forbes magazine (Turner, 2000).

The Balanced Scorecard had now evolved as a proven management system (Kaplan and Norton, 1994). This success was supported strongly by the following case studies: “Diversified Holdings Company’s chemical division” (Vitale et al., 1994), and The Pepsi “Dashboard” (Jensen and Gerr, 1994).

In 1999, hospitals in Ontario, Canada, collaborated with a university-based research team to develop a report, based on the Balanced Scorecard framework that included the relative performance of individual hospitals in Canada’s most populated province. The indicators of performance were developed in four areas:

- Financial performance and condition,
- Patient satisfaction,
- System integration and change, and
- Clinical utilization and outcomes.

Pineno (2002) stated that, from the above measurement, the hospital may utilize the technique to obtain a rather comprehensive view of operational results. The performance index allows the
weighting of the measures to determine an overall result. The incremental approach allows management to develop realistic alternatives and the ability to test causality, determine a range of target measures based on probabilities, and evaluate ex-post the reasonableness of the targets for future periods (Pineno, 2002).

The FEI Research Foundation commissioned a study of two companies to assess the benefits of employing the measurement and any competitive advantage after applying the Balanced Scorecard. The study had four core objectives: to present factors that affect the satisfaction of CFOs with their performance measures; to identify characteristics of Balanced Scorecard users and non-users; to describe successful Balanced Scorecard user practices and contrast them with practices of non-users; and to examine the practices of four leading firms in the development of their Balanced Scorecard. The researchers claimed that one of the companies, Mayo Clinic Rochester, had all the characteristics identified for successful scorecard implementation, adopted a flexible approach, and had the strong commitment of leaders at all levels of the organization to the scorecard approach. In another company, Southwest Airline Co., the researchers summarized that the company achieved their goal of pushing information to the front lines so employees there can tie their performance to the good of the entire enterprise. Although the organization faced low technological complexity, the top-level managers who were directing this effort acknowledge the complexity in articulating the Balanced Scorecard through a diverse organization. The managers who were initially opposed to formalizing the process became among the strongest proponents of the system (Moriarty, 2001).

Ho& McKay (2002) studied two companies in the United States. One was an automobile manufacturer LMN and another was an International British Based Bank.

The management of the LMN plant was very satisfied with the Balanced Scorecard. It helped clarify management’s responsibility and link authority and responsibility with improved accountability. The British bank implemented Balanced Scorecard and, after three and a half years’ implementation, the management replaced Balanced Scorecard with a Compensation Plan (CP) program because the bank encountered a number of problems with the application of Balanced Scorecard. Regulatory changes in the banking, insurance, and securities industries also made Balanced Scorecard inappropriate as a performance measurement system. The first difficulty the Bank confronted was the different interpretations that regions and branches had in implementing the Balanced Scorecard. In some regions, branch managers met to discuss their Balanced Scorecard results and distribution of the bonuses, comparing and justifying
results. In other regions, it was left to the branch managers individually. Moreover, in some branches the division of the bonus pool created problems. As one interviewee explained, “I think the greatest obstacle… was the differentiation in branches of people getting different-size checks for being above par.”

Schroeck (2002) stated that in order for the Balanced Scorecard to be effective, the measures and related accountability associated with Balanced Scorecards must cascade from the executive level throughout the organization.

Past Balanced Scorecard efforts often consisted of metrics that were aggregated, using spreadsheets on standalone Balanced Scorecard applications that were not integrated with either the processes or the information being used to measure and manage the underlying business units and functions. As a result, these Balanced Scorecard implementations lacked the critical alignment, shared responsibility, and cause-and-effect relationships that are absolutely vital (Schroeck, 2002).

The Bank of America also implemented a Balanced Scorecard, and research of this revealed a number of interesting findings.

First, prompt feedback is essential to the effectiveness of Balanced Scorecard. The delay in feedback at the bank may have contributed to Balanced Scorecard's replacement.

Second, Balanced Scorecard works best if employees have input into the formation of the parameters. When the bank used Balanced Scorecard, the parameters were already set at the corporate level. The initial challenge for the managers was to determine how to apply the new measurements directed by the top management; employees had to define how it would be applied. This involvement, while frustrating and time-consuming, may have contributed to Balanced Scorecard's ultimate acceptance.

Third, Balanced Scorecard may be most necessary during times of organizational change. Balanced Scorecard is designed to ensure that critical feedback loops are maintained and monitored. Managers can be fixated on isolated events, and during organizational change quick-fix solutions are developed without attention to longer-term consequences. For example, at this bank, the organization's shift toward acquiring new customers and product sales may undermine customer service. This may not be recognized as a problem until customers start moving their accounts to other banks, at which point it may be too late.
Finally, the number and type of parameters selected in a Balanced Scorecard must be well thought out in advance. A manageable number of parameters should be used; otherwise, the system will become cumbersome and too time-consuming. The way it designed its Balanced Scorecard program was too time-consuming, and when the organization was faced with the change, the prospect of redesigning the Balanced Scorecard program thus became overwhelming (Ho & McKay, 2002).

Chen et al. (2008) used the Hualien First Credit Cooperative Bank (Taiwanese bank) as a case study. They used four kinds of performance evaluation indices based around traditional financial performance evaluation, the Data Envelopment Analysis approach, a general Balanced Scorecard, and a Balanced Scorecard with risk management. This case thus only considered financial indices and its result thus appears to be partial to control functions.

The findings can briefly be summarized as follows: First, these models, which include financial, internal process and learning/ growth perspectives, are closely related to firm performance by time period. However, this does not include a risk management perspective. Second, every perspective seems independent and the empirical research shows that, when original perspectives are added to the model one by one, the result will consequently be affected. What the positive and strong correlations of different performance indices reveal is the need to acknowledge the linkages of the indices (Wang, 2006). Third, regarding technical efficiency, considering the financial perspective alone will not be enough to reach levels of highest efficiency. There are five perspectives of the Balanced Scorecard in the banking industry, and by using all of these the firm will produce an overall performance and attain a better efficiency value. Fourth, in comparing DEA with the Balanced Scorecard performance tool, the traditional performance approach is similar to the DEA approach in which efficiency scores are different from the Balanced Scorecard.

There are actually doubts that Balanced Scorecard can truly reflect the correlation between indicators and actual success. In fact, scholars promoting Balanced Scorecard do find it difficult to translate the empirical world of case studies into theory. Hence, while hoping to achieve breakthrough performance as a likely consequence of properly implemented Balanced Scorecard, not only must caution be paid to the implementation process, but financial implications must also be considered. Adopting Balanced Scorecard as “strategic” project without a cost-and-benefit analysis is too risky in some business units.
Hepworth (1998), who showed the successful application of the Balanced Scorecard in a number of transformation projects, identified that it could also be a medium to communicate and align a new strategic approach. It has been successful because it is able to identify linkages between the four key areas that generate and perpetuate success.

The impact of Balanced Scorecard measures considered in isolation would probably be minimal; success is derived from comprehensive visibility of all key influences. The added value of the Balanced Scorecard is in the drawing together of all the key business areas and identifying and exploiting the linkages that deliver success. These are explained in some detail by Hofecker and Goldenberg (1994), who emphasized that the impact of a decision in one area on the other areas can be recognized before the decision is implemented, offering more strategic management visibility than would normally be expected. This holistic approach has resulted in better performance, resulting from more informed management decision making.

Abernathy (1997) was involved with over 30 companies that have successfully used organization-wide Balanced Scorecard. These companies represent a wide array of industries, including retail, banking, health care, manufacturing, and distribution. The average gain across these organizations' scorecards has been 54.4%. The success of these companies is a testament to the practicality and value of the Balanced Scorecard concept.

In a 1996 survey conducted by Tower Perrin Consulting, 64% of the respondents rated “satisfaction or value received” from Balanced Scorecard implementation higher than that from performance measurement approaches used in the past. In contrast, only 37% of the respondents reported “employee understanding of performance measures and goals” from Balanced Scorecard implementation higher than that from performance measurement systems used in the past (Ittner and Larcker, 1998).

Khimand Hian (2001) used the information collected from 83 companies. Correlation and regression results provide support for the Balanced Scorecard. Specifically, findings suggest that the Balanced Scorecard can be used as a tool for monitoring the long-term value creation process. Undoubtedly, providing training to employees or implementing innovative techniques consumes a significant amount of resources. Top management often wonders about the payback of this type of investment.

Frigro (2001) conducted an Institution of Management accounting (IMA) survey on performance measurement, as well as other studies that examined the role of nonfinancial
measures. The IMA surveys provided some insight as to the importance and limitations of nonfinancial performance measures. In the most recent survey, the vast majority of financial professionals surveyed said nonfinancial performance measures should be used more extensively within their company. Many claimed that nonfinancial measures are more closely aligned to strategic initiatives and have more calls to action. Others suggested that the right nonfinancial metrics can help employees focus on customer performance and priorities. An overall theme expressed by the respondents was that nonfinancial measures represent the drivers of financial performance. Clearly, there is a belief that nonfinancial metrics can be a valuable part of performance measurement systems. But in which areas are nonfinancial metrics most or least effective, and where do opportunities for improvement exist?

Figro (2001) stated that in the IMA survey results, financial performance measures were given high ratings. In contrast, nonfinancial measures, including metrics in customer performance, internal processes, innovation, and employee capabilities, were rated as being much less effective. These nonfinancial categories represent areas for improvement in many performance measurement systems.

The survey also asked how well performance measurement systems support and communicate strategy within an organization. Over half the respondents rated their performance measurement system as poor to less than adequate in communicating strategy to employees. There is thus a clear gap in this area that can be filled by using follow-up interviews that can use of nonfinancial measures (Frigo, 2001).

Wallace (1998) reported a study conducted by a general manager, Bridget Wickham, of Carter Holt Harvey Plastic Products, who received a prestigious Harkness Fellowship in New Zealand to assess how the Balanced Scorecard works in practice in the United States in a six-month period. She concluded that the Balanced Scorecard is developing a best practice for companies, private and public sectors. It can provide a vital part of a change management process. The benchmarks provide a basis for measuring change as well as ensuring the change to change the right things – the real value drivers of the business.

**Study in Bangladesh**

Khan, Habib-Uz-Zaman, Halabiand Khan (2010) conducted an investigation of whether most leading Balanced Scorecard (BSC) perspectives are correlated with each other at a statistically significant level for selected Bangladeshi companies. This supports the theoretical grounding of the BSC, in that there is a sequential dependency among the non-financial BSC perspectives.
The relationship between customer perspective factors and internal business process factors seems to be stronger than the relationship between learning and growth factors and internal business process. Further, the relation between customers and learning and growth (i.e. those that are not modeled sequentially) exhibit limited statistically significant relationships. The study also found supporting evidence that the companies that improved their financial indicators increased their efforts towards business activities more than the companies that have not. For example, companies that have increased the ROA and ROE had shown an increased orientation to their internal environment compared to the companies for which these ratios have decreased. The study also indicates that a lead-lag relationship hypothesis can be supported from empirical data. Management accounting literature advocates the use of non-financial performance measures as a tool to support and overcome deficiencies attributed to financial measures. The proponents of Balanced Scorecard (BSC) claim that lead factors interrelate and their improvement ultimately leads to increased financial performance (Kaplan and Norton, 1996a). The result of the study has a number of implications and has increased our knowledge of the management accounting practices of a developing country such as Bangladesh. To begin with, the study has shown that Bangladeshi companies that implement and improve their nonfinancial perspectives ultimately benefit from increased financial performance. This then provides managers with greater motivation to adopt various learning and growth factors, internal business process factors and customer factors. In today’s rapidly changing business environment, this would ultimately result in the company coping with competition better. A further implication is that this study has shown that a company actually applying BSC models, given that firms can systematically monitor this, would contribute to performance in organizations. This study also has implications for customers, who by their spending habits influence company performance. The results show that companies that initiate and increase their customer focus improve financial performance. If companies are to achieve long-term superior financial performance, they must create and deliver products and services that are valued by customers, and improve customer relationships. That is to say, good customer relationships / satisfaction should be maintained by surveyed firms and other Bangladeshi companies to increase the bottom line. Moreover, this study contributes to the literature by incorporating into the analysis some variables that are not available in the external databases. This study is also different in that they used published data to assess the causal link among perspectives. The use of survey data in this paper coupled with additional secondary sources overcomes the mono-method bias incurred by studies that rely solely on data retrieved by questionnaires. This study used generic ratio measures in order to deal with the heterogeneity.
of the sample companies, and the performance variables chosen were objective indicators. Lastly, because there is a limited amount of research on Bangladesh and other developing countries in BSC context, the findings of this study are considered most important and are expected to add to our understanding of this issue from developing countries’ data.

This study made no effort to investigate or differentiate companies on the basis of their “BSC adoption” or “non-Adoption”. Further, the study made no effort to investigate the actual use of the BSC model or the degree or level of BSC usage (that is, do companies follow the BSC model fully or partially, and if it is followed partially, which of the perspectives are being followed?). Future studies could investigate these areas, and whether the conclusions drawn from this study – particularly the cause and effect concept of the BSC – are consistent.

It is recommended to have future research with a BSC focus can contribute to the literature on why and how companies implement BSC, the pitfalls in implementing BSC, and its success in achieving intended goals.

This study has shown the importance of BSC and that Bangladeshi companies support the theoretical hypotheses of the BSC model. This finding is important, and contributes to our knowledge of the BSC model, specifically for Bangladesh.

**Study in Russia**

Svirina (2010) conducted a study of Russian companies, the result of which showed that the Balanced Scorecard approach should be used to improve managerial efficiency. This approach is based on the idea that a single manager cannot measure all the activities a manager should undertake, and is thus concerned with estimating system efficiency, where the system can consist of a single person or a large organization.

Managerial balance should be achieved in all cases. While creating a Balanced Scorecard system, managers should pay attention not only to the way management functions are performed but also to the specific features of the industry in which a company performs. These features can be used to identify what company’s activity indicators are to be included in the performance management system.

There is a relation between the balance of management and the financial results of the company, and there are also relations in resources put into performing different functions. First of all, enterprises the management of which can be described as balanced or somewhat misbalanced
tend to achieve better financial results and cover a larger market share than misbalanced ones. Balanced companies also tend to hold an acceptable level of EBITDA to department, which has proven to be an important issue during the crisis. The results also concern the relation between management functions. The best companies viewed themselves as putting too much effort into control. That is usually due to the fact that there is inter-management misbalance; for instance, top-managers pay no attention to motivation while managers of the lowest level spend a lot of time on that issue. Such inner misbalance forces top-management to lose trust and thus over-control. In general, when emphasis on motivation increases, the first function to decrease is control. The relation between motivation and organization can also be seen from the research: the more resources are put into motivation the more self-organized a company becomes, and hence the need to perform the organizational function decreases. The same is true for motivation and coordination and organization and coordination.

**Study in Australia**

A study in 2006 was conducted to examine the nature and the extent of the use of the Balanced Scorecard in Australian manufacturing firms, and whether Balanced Scorecard adopters who perceive that their scorecard measures are linked to strategy and affect each other in a causal manner also perceive a higher level of effectiveness of the Balanced Scorecard. A questionnaire was sent to 280 medium and large manufacturing companies randomly selected from the Kompass database. From the 280 organizations, 74 completed responses were received, at a response rate of 26.4%. (Bedford et al., 2008)
In this study, approximately 59% of the respondents claimed to have adopted the Balanced Scorecard. However, only 20% of the respondents used it “extensively”, and the majority (73%) of the Balanced Scorecard adopters in the sample used it only “to some extent”. Additionally, only 54.5% of the Balanced Scorecard adopters had all four perspectives (i.e., financial, customers, internal business processes, and learning and growth) within their Balanced Scorecards. It was found that, although all the respondents had the financial perspective in their Balanced Scorecards, the other three perspectives did not have the same level of importance, with 93% of respondents having the customer's perspective, 91% having internal business processes perspectives, and only 66% having learning and growth perspectives in their Balanced Scorecards. This study suggests that, while manufacturing organizations are still placing a relatively high emphasis on the financial aspect of organizational performance, customer and internal business process strategic areas are also gaining recognition in measurement systems. Learning and growth still seems to attract less attention as a critical strategic area in performance measurement systems. There were a number of organizations that used additional perspectives, such as environment, safety, people/behavior and ethics. The inclusion of further perspectives in the Balanced Scorecard may be due to the nature of those organizations’ mission and strategy (Kaplan and Norton, 1996).

The finding that 93% (41/44) of the responding organizations are using both financial and non-financial measures is encouraging as it suggests that, although the Balanced Scorecard is still not used extensively, organizations are moving away from the more traditional financial focused measurement systems to multi-dimensional measurement systems.

Strategy link and causal links have been suggested as the features that make the Balanced Scorecard an effective strategic performance measurement and management system (Kaplan and Norton, 1996; 2001). This study provides empirical evidence to support that proposition. The study found that both strategy and causal links are positively associated with the effectiveness of the Balanced Scorecard, and the additive effect of those two links on the effectiveness of the Balanced Scorecard is greater than when only one link exists. However, no significant interactive effects between the strategy and the causal links were found on the effectiveness of the BSC.
This study also shows that most organizations that claim to adopt the Balanced Scorecard do not seem to recognize the importance of incorporating these critical design features in their Balanced Scorecards. Of the 44 firms in the sample, only 15 (34%) firms and 8 (18%) firms paid a high level of attention to incorporating strategy and causal links respectively when designing their Balanced Scorecards. It appears that managers consider the strategy link relatively more than the causal links when developing the Balanced Scorecard, which could be due to managers' limited understanding of the meaning and importance of the causal links (Malmi, 2001). More disturbing was the finding that only a very small number of adopters (16%) incorporate both the strategy link and the causal links to a large extent in their Balanced Scorecards.

The findings of this study are interesting for a number of reasons. Firstly, the study found that the strategy and causal links within the Balanced Scorecard are positively and significantly associated with the effectiveness of the Balanced Scorecard, implying that Balanced Scorecard adopters should pay careful attention to those features when designing their Balanced Scorecards. Secondly, the study provides empirical evidence to suggest that, more than a decade since its initial introduction, the Balanced Scorecard is still not widely used in large and medium size manufacturing organizations in Australia. Thirdly, the study shows that Balanced Scorecards used by different organizations seem to have different design features. For instance, they vary in terms of the number of perspectives within the Balanced Scorecard as well as the extent of consideration given to organizations' strategy and the causal links between measures when designing the Balanced Scorecard. This finding (in relation to the varying use of the Balanced Scorecard) is consistent with that of Ax and Bjornenak (2005). Fourthly, the study suggests that the strategic use of the Balanced Scorecard by organizations is not widespread due to the limited attention paid to the strategy and causal links within the Balanced Scorecard. Nevertheless, managers might still find the Balanced Scorecard effective for other purposes that concern the employment of multiple measures. Fifthly, although these two features are not extensively used by most organizations, managers who perceive that their scorecard measures are linked to strategy and affect each other in a causal manner also perceive a higher level of effectiveness of the Balanced Scorecard. Sixthly, the study also suggests that some companies that claim to use the Balanced Scorecard may either not be using it, or may be using some other form that fits their requirements better (Yu et al., 2008).

Another survey driven by the CPA Australia and the University of Technology, Sydney, on the topic of whether different designs in the Balanced Scorecard have any impact on expected
benefits for large cross-section of Australian organizations. The survey was randomly selected from the representative of the population sample in terms of size and industry. The mail-out to 2400 members was conducted between October 2004 and March 2005 in two stages. A total of 426 surveys were returned, representing an initial response rate of 17.8%.

Examination of Australian organizations showed that the Balanced Scorecard approach has been followed, but interestingly 72.5% and 62.6% of firms have implemented the Balanced Scorecard at the team and individual levels, respectively (Bedford et al., 2008; Brown, 1994).

The implementation of Balanced Scorecard by Australian organizations provides a number of interesting insights. First, there is, as expected, a large variation in the design and application of the Balanced Scorecard in practice. Second, it seems that more than any other design characteristic the use of the cause-and-effect principle between measures and perspectives impacts the extent of benefits gained. One of the key problems is that almost half of adopting organizations did not include the cause and effect in their Balanced Scorecard design. Consequently, it seems that there is much potential value to be gained for organizations that can push their Balanced Scorecard design to this next stage.

Third, a large number of firms have included perspectives other than the traditional four suggested by Kaplan and Norton. This emphasizes the need for an adopting organization to adapt the original Balanced Scorecard design to suit their specific information and management requirements (Bedford et al., 2008; Brown, 1994).

Another study in Australia by Chavan (2009) showed that the Balanced Scorecard approach may require some substantial changes in culture within the organization. The Balanced Scorecard requires understanding, commitment and support from the very top of the business down. The balanced scorecard will evolve. As culture changes and develops to accept the new approach, and members of the organization mature within the new culture, the organization will find new things to measure, new goals in different areas in supporting a growing and viable organization.

The above research results show in a very positive way that Balanced Scorecard can act as a strategy tool and management control system in the United States and Australia.
The Study in Mainland China

Xiong et al. (2008) conducted a survey in Mainland China regarding the use of the Balanced Scorecard, with the results showing that many Chinese firms currently use both financial and nonfinancial measures in their performance measurement systems. They also consider cause-effect relationships and strategy implementation measures in the design and selection of performance measures.

The Study of Application of the Balanced Scorecard in Hong Kong

A survey study of Hong Kong industries that had implemented the Balanced Scorecard was undertaken by CPA Hong Kong branch in 2002. It showed a CPA Australia's Strategic Business Management Centre of Excellence cell Hong Kong China division, conducted a study on public awareness of the Balanced Scorecard as a formal system of performance measurement. The specific objectives of the study were to explore the general awareness and knowledge of the Balanced Scorecard approach among professional accountants in Hong Kong; whether Hong Kong organizations have a formal system in place to measure their performance and, in particular, the Balanced Scorecard approach; the reasons for implementing the Balanced Scorecard and its real benefits; the difficulties, if any, encountered in the implementation of the Balanced Scorecard; and the general perceptions on the Balanced Scorecard approach in terms of its applicability in the Hong Kong business environment. (Anonymous, 2002)

A questionnaire survey was prepared; data was collected through a survey of 200 members of the CPA Australia - Hong Kong - China division, who attended a seminar. The members were selected not only as a convenience sample, but also as they were expected to be involved in strategic planning and designing performance measurement systems within their organizations to increase their opportunity of exposure to the Balanced Scorecard.

There were 199 usable responses – 40% were employed as managers, senior managers, CFO or CEO, and 53% were from companies with 100 or more employees.
Industries represented in the results include wholesale/trading (21%), professional services (16%), manufacturing (13%), finance/banking (7%), real estate/ construction (7%), IT (6%), education (5%) and public/government services (4%), and the remainder represented other industries.

Respondents were asked to classify the management style of their organization: 44% classified their organizations as using a Western style, 42% Hong Kong Chinese, 5% Japanese, 3% mainland Chinese and 6% as other Asian styles.

Of the 199 respondents, 51% indicated that their organizations had a formal system to measure corporate performance, but only 25% (49) were familiar with the Balanced Scorecard approach to performance measurement. Specifically, among these 49 respondents, 84% had some knowledge, 10% had an in-depth understanding, and 4% were actively involved, while 2% had just heard about it. It seemed that a majority of the respondents were qualified accountants for over ten years and may not, therefore, have been exposed to Balanced Scorecard through their education.

The Balanced Scorecard was generally perceived as more than an evaluation system. It was also seen as a management system primarily used for determining strategic direction, and required organizations to be strategy driven. The Balanced Scorecard was also seen as good for corporate governance. A significant number of respondents agreed that the advantages of the Balanced Scorecard outweigh the disadvantages. They also viewed it primarily as fitting a Western management approach.

These results suggested that a majority of the 46 respondents have correct ideas about the Balanced Scorecard. However, their perceptions that the Balanced Scorecard was a radical change from their existing performance measurement system and was expensive to implement might deter adoption of the Balanced Scorecard. A majority of respondents were neutral to the opinions that the Balanced Scorecard required too much disclosure of confidential information, could be implemented quickly and was not suited to Hong Kong.

The results showed that only nine respondents' companies indicated adoption of the Balanced Scorecard at various levels. Of these companies, six were of medium to large size (100 or more employees); seven considered themselves to use a Western management style, while only two classified their management style as Hong Kong Chinese.
The adopters were from various industries. They implemented the Balanced Scorecard mainly due to strategic reasons and to integrate management and measurement systems. Also, with the Balanced Scorecard, these companies aimed to make senior and middle managers more accountable for results.

By implementing the Balanced Scorecard, the realized benefits included better staff motivation (30%), improved competitive position (20%), increased customer satisfaction (15%), increased profitability (10%) and rapid growth (5%).

In implementing the Balanced Scorecard, a majority of these companies experienced difficulties in defining key performance indicators. Further, it was found that sudden organizational changes made some performance measurements obsolete.

Some respondents found that implementing the Balanced Scorecard was more expensive and took longer than expected. Another difficulty was the fact that middle management and staff resistance was encountered.

In addition, implementing the Balanced Scorecard caused problems with existing systems: many changes in operations and IT systems were required because of implementation.

The study showed that a small number of companies use formal performance measurement systems. This could result in a further barrier to acceptance of Balanced Scorecard within these organizations as it would require a huge leap from not having any formal performance appraisal to a strategy-focused, and performance focused measure, to encourage a wide adoption of the Balanced Scorecard to enhance the competitive advantage of Hong Kong organizations. Unless they have a better idea of why, and how, to implement the Balanced Scorecard, it would be difficult for them to introduce it into their organizations and achieve the anticipated benefits.

A recent study was conducted by an international bank in Hong Kong to implement a Balanced Scorecard in its Work Process Section (WPS). With the proper implementation of the structured methodology, managers will have a better chance of success with the same business strategies because the problem with implementation will be handled by Balanced Scorecard. Besides, the balanced nature of Balanced Scorecard in performance measurement perspectives tied in well with WPS’s customer-oriented mission. In fact, WPS’s management philosophy was well-reflected in the ‘Linkage assumption’ of the Knowledge Driver Index. This reveals the need to induce learning and knowledge enrichment of WPS’s staff to enhance the services and output to clients. This will raise their satisfaction and ultimately cause the business to grow and lead
to higher WPS profit. This assumption is analogous to Balanced Scorecard’s logical cause-and-effect link that learning and growth in staff will lead to better internal processes that help performance except the revenue (but not profit) per team. Within WPS, performance was rated on generic criteria, such as competency, cooperativeness, punctuality, self-initiation, teamwork, performance under pressure, etc. Managers were compensated without significant differences between high performer and average workers. This is part of the culture of the whole bank group. However, with one of the eight new strategic imperatives for the parent bank group targeted at “attract, retain and motivate the very best people”, an objective performance measurement system that can examine issues beyond the purely financial, like Balanced Scorecard, should be a natural choice to WPS (Li, 2002).

Mass Transit Railway Corporation Limited, which implemented the Balanced Scorecard in their Total Management System, included the fifth perspective, i.e. risk management, to strengthen their system (Creelman and Makhijani, 2005).

From the CPA Hong Kong survey of 2002, there were around 5% of the response companies applying the Balanced Scorecard, which is quite a small ratio compared with the United States. The implementation of the Balanced Scorecard in the International Bank, Bank of America, and the Mass Transit Railway Corporation Limited in Hong Kong gave the researcher some ideas on how to apply the Balanced Scorecard in an engineering consultancy company in Hong Kong.
CONCEPTUAL FRAMEWORK

A theoretical framework is a conceptual model of how one theorizes the relationships among the factors that have been identified as important to the research topic. The following is the theoretical framework constructed for the study:

**Figure 2**
Conceptual Paradigm

**Independent Variables**
- Senior management’s commitment to develop a companywide strategy.
- Senior management’s awareness of concept and principles of performance management system.
- Senior Management develops Balanced Scorecard.

**Dependent Variables**
- Selection of four perspectives of Balanced Scorecard.
- Implementation of Balanced Scorecard in an engineering consultancy.

Purposeful sampling will be used to select cases based on their contribution to the proposed study. Atkins China Limited is a typical engineering consultancy company and can be used for this case study research purpose (www.atkins.com.hk).
HYPOTHESIS OF THE STUDY

This study investigates 12 hypotheses concerning the relationship among leadership and strategic management, people management, process management, information management, continuous improvement, customer focus and organizational performance. These hypotheses were proposed based on theoretical argument and practical needs. Focus group was organized to identify these hypotheses. The 12 hypotheses to be tested are as follows:

Hypothesis H1: Leadership has a positive effect on people management
Hypothesis H2: Leadership has a positive effect on process management
Hypothesis H3: Leadership has a positive effect on continuous improvement
Hypothesis H4: People management has a positive effect on process management
Hypothesis H5: People management has a positive effect on information management
Hypothesis H6: People management has a positive effect on customer focus
Hypothesis H7: Process management has a positive effect on continuous improvement
Hypothesis H8: Process management has a positive effect on information management
Hypothesis H9: Information management has a positive effect on continuous improvement
Hypothesis H10: Information management has a positive effect on customer focus
Hypothesis H11: Continuous improvement has a positive effect on customer focus
Hypothesis H12: Customer satisfaction has a positive effect to overall organizational performance

In these 12 hypotheses, organizational performance is a dependent variable, and other six are independent variables.
Contributions to the Body of Knowledge

This study fills the gap identified by Zain et al. (2001a; 2001b) that there is lack of study to further develop a management model to meet organizations’ development needs. The study of Zain et al. (2001a) on a sample of UK doctorate theses with a research focus on performance management reveals that the research outputs are mainly in the form of guidelines and frameworks, and that little attempt is made to build on previous research to create a meta-model of performance management. The work undertaken is, furthermore, primarily retrospective, and there is little attempt to speculate on what the next generation of quality tools, techniques, and paradigms will look like. They express concern over the lack of forward-looking management models to meet the rapidly changing requirements of the new e-commerce business world. These findings are further confirmed by their comprehensive review of the existing literature on performance management using a range of resources including books, research, professional and practitioner journals, postgraduate theses, journalistic articles, and conference publications (Zain et al., 2001b).

This research has developed a fit-to-purpose management system model to meet the development needs of Atkins Consultancy. The research attempts to predict what is required by Atkins to become the leading engineering consultancy company in Hong Kong, and develops a Balanced Scorecard model to this end. This model is an evolving Balanced Scorecard model to integrate various management systems requirements. The new model has been implemented through state-of-the-art intranet technology in the face of the coming knowledge age. The effect of Balanced Scorecard implementation on organizational performance has been verified by a performance measurement model that proves to be positive statistically. This result has been validated by triangulation from actual performance data. With appropriate modification, the process in this study can be replicated for application in other engineering consultants and even other industries.

The organizational performance model has verified that the Balanced Scorecard implementation has positive effects on the organizational performance in terms of Balanced Scorecard. The causal relationship among five perspectives of the Balanced Scorecard has also been verified empirically by survey data. It is believed that this empirical verification is the first of its kind, and thus to have filled the research gap identified by Neely et al. (1995). Their research indicated that there is lack of empirical evidence on the causal linkage of the four perspectives of the Balanced Scorecard.
The successful implementation of Balanced Scorecard has met the purpose of the study in pursuit of a suitable management system by establishing and implementing a Balanced Scorecard System.

The project has fulfilled the need for a breakthrough improvement and helped the engineering consultancy industry to cope with the enormous expansion that is expected in the near future. The experience of system implementation over the past three years has indicated that the Balanced Scorecard model is consistent and provides effective support to management for reacting quickly and decisively to the challenges of managing the business even under the recessionary economic period in 1997.

DEFINITION OF TERMS

For a clearer understanding of some terms used, the researcher defined the following terms as used in this manuscript:

**Atkins China Limited.** – is an engineering consultancy company that provides professional, technologically based consultancy and support services to both public sector organizations and private sector companies. It is one of the largest engineering consultancy companies in Hong Kong and mainland China.

**Balanced Scorecard** – a performance management system used to achieve the strategic goals of an organization. It is one of the most significant developments in management accounting (Atkinson & Waterhouse).

**BSC Model** – a Balanced Scorecard Model to be developed in Atkins China Limited

**Engineering Consultancy Company** – a kind of organization the main objective of which is to provide management and consultancy services in the field of engineering and technology. It provides professional services to infrastructure projects and other engineering-related services from feasibility studies, design, analysis and solutions to engineering and technology related problems.

**Performance Management System** – a performance system to motivate individual effort toward achieving the organization’s goals (Simons, 1995). It influences, monitors, and controls effort toward achieving the goals, and provides incentives and reports of performance results that would reflect the effort of the management to the organization’s goal (Kaplan and Norton, 1996).
CHAPTER 3
METHODS OF RESEARCH AND TECHNIQUES OF THE STUDY

The present study examined the implementation of a performance management system in an engineering consultancy company by investigating the business results after the implementation. This chapter provided the design of the study, research population, data collection and analysis. The research design is described, and a review of how the qualitative and quantitative research methods were used in the study is covered. Moreover, a description of the subjects and instrumentation used in conducting this research is presented.

This study examined the following research questions:

1. What kind of system implementation initiatives should be developed in order to facilitate the implementation of the new system model?
2. What are the effects of the new system model on organizational performance?
3. What are the effects of the new system implementation on Atkins’ business performance?

This study used the qualitative and quantitative research methods, and case study techniques guided the process.

According to Miles and Huberman, the appeal of taking a qualitative approach to research lies in the fact that “it is a source of well-grounded, rich descriptions and explanations of processes occurring in local contexts” (1984, p.15). Case study research method can be defined as a method of conducting qualitative research and evolved as a distinctive approach to scientific inquiry, partly as a reaction to perceived limitations of quantitative research (Gall, Borg & Gall, 1999, p.11). According to another definition, a case study is an empirical enquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident (Yin 1994, p.13).

Qualitative analysis has several benefits, which assist in constructing a more useful study (Marshall, 1985). It allows the researcher to look at informal work processes as they are from the employees’ frames of reference. In addition, qualitative case study research can provide
answers as to why and how some phenomenon occurs. The case study research method facilitates the exploration of complex social processes by taking a holistic perspective on real-life events, leaving all of their potentially rich and meaningful characteristics intact. The most commonly used quantitative data-gathering methods in the research are undoubtedly the questionnaire and the structured interview. Questionnaires have to be prepared in such a way that respondents can complete them without any assistance (Blaikie, 2000).

CASE STUDY METHOD

The case study research method can be defined as a method of conducting qualitative research that has evolved into a distinctive approach to scientific inquiry, partly as a reaction to the perceived limitations of quantitative research (Gall, Borg, and Gall, 1996). Another definition is that a case study is an empirical enquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between the phenomenon and its context are not evident (Yin, 1994, p.13).

Ragin (1987) mentioned the strengths of case study methods:

Case oriented methods stimulate the researcher to explore the interactions between ideas and evidence. Because these methods are flexible in their approach to the evidence, they do not restrict or constrain the examination of evidence. Few simplifying assumptions are made. Case studies provide a basis for examining how conditions combine in different ways and in different contexts to produce different outcomes. Case oriented methods force researchers to consider their cases as whole entities. Researchers examine cases as wholes, not as collections of variables. An interest in interpreting specific cases and in pin-pointing the causal complexes that produce specific outcomes encourages researchers to view cases as wholes. The different parts or conditions that make up the case are understood in relation to each other. (p. 52)

Besides, case study methods can be considered to fill gaps left by quantitative science. The gaps are: (1) probability samples and significant test do not ensure adequate explanation; (2) the scientific method does not control for researcher bias; and (3) the survey research preferred by scientific method advocates is not useful for applied questions.
One of the frequently cited limitations of the case study method is the difficulty in generalizing the findings. The counter-argument is that generalization of case study findings is a legitimate outcome, based on an understanding of the nature of that generalization. In Yin’s view, “generalizing from case studies is not a matter of statistical generalization (generalizing from a sample to a universe) but a matter of analytic generalization (using single or multiple cases to illustrate, represent, or generalize to a theory). Case studies involve only analytic generalizations” (Yin, 1994).

Related to the generalizability issue is the concern that case studies can oversimplify or exaggerate a situation, leading the reader to distort or erroneous conclusions about the actual state of affairs, as distinct from the report itself (Guba and Lincoln, 2006). Skillful data collection, analysis, and reporting can reduce the possibility of such an outcome. Researchers should not attempt to use case studies to address enumerative questions that qualitative data are poorly equipped to answer, such as how often, how many, or the way in which most people respond. Qualitative researchers must be careful not to use quantitative descriptions in their nonrandom samples, including the use of percentages to describe the sample’s behaviors, because this lends a false impression of generalizability to the larger population (Williams, 1991).

A benefit of multiple-case studies is that they are generally considered to strengthen or broaden the analytic generalizations. This can be done through literal replication, in which cases are designed to replicate each other and produce corroborating evidence, or through theoretical replication, in which cases are designed to cover different theoretical conditions and produce contrasting results for predictable, theoretical reasons (Yin, 1994). The number of cases to be included in a multiple-case study in the positivist model becomes a matter of the number of replications desired, which in turn depends on the certainty desired for the results. Greater certainty comes from larger numbers, but if the rival theories are grossly different and the purpose of the study does not require excessive certainty, two or three cases are sufficient. If the rivals are only subtly different, or if a high degree of certainty is desired, five, six, or more replications are appropriate. Miles and Huberman (1994) generalize that “the more cases in a study and the greater the variation across cases, the more compelling an interpretation can be. By looking at a range of similar and contrasting cases, we can … strengthen the precision, validity, and stability of the findings.”
However, Wolcott (1992) argues that the study of multiple cases reduces the attention the researcher is able to give to any one of them and serves to weaken rather than strengthen the case study.

A second category of criticism is the skill limitations and/or bias on the part of the researcher. Case studies are dependent on the sensitivity and integrity of the investigator. The researcher is the primary data gathering instrument, and not all researchers are equally skilled in observation and interviewing. Additionally, there is limited standardization in data analysis, and there may be confusion between data and interpretation of the data, resulting in selective presentation of evidence. Further, there may be unethical selection of data, bias, and failure to distinguish between stated and observed behaviors and attitudes. Apprenticing inexperienced researchers to experienced ones, using multiple researchers within a given case study, developing data collection and analysis protocols, and disclosing within the research report both the ethical perspective of the researcher and any relevant biases can variously mitigate these factors (Yin, 1994).

**POPULATION OF THE STUDY**

For empirical studies, it is important to plan the sample size so that needed protection against both Type I and Type II errors can be obtained and the estimates of interest have sufficient precision to be useful (Hair et al., 1998 Anderson et al., 1995). This planning is necessary to ensure that the sample sizes are large enough to detect important differences with high probability. Planning of sample size is therefore an integral part of the research design. Sample size can influence the statistical test by either making it insensitive (at small sample size) or overly sensitive (at very large sample size) (Marsh et al., 1998; Tanaka, 1987; Hair et al.; 1998 Mann and Kehoe, 1994). In other words, an increase in the size of the sample chosen would result in an increase in power; a decrease in the size of the sample selected would result in a decrease in power. Structural Equation Modeling requires large sample size due to the large number of estimations that are made (Hair et al., 1998). The critical question in SEM is how large a sample is needed. As the sample size becomes large (exceeding 400 to 500), the method becomes too sensitive and any difference between the proposed model and the actual pattern of relationships is almost always detected, making all goodness-of-fit measures indicate a poor fit (Tanaka, 1987; Marsh et al., 1998). While there is no correct sample size, a reasonable recommendation is to co-test a model with a sample size of about 200 (Bentler, 1990).
The survey covered all departments among 895 staff. The questionnaire was sent to the identified staff members via their department heads and, upon completion, the questionnaires were returned individually. A total of 206 survey questionnaires in anonymity were returned, with a response rate of about 23%.

WHAT IS TRIANGULATION?

Triangulation is generally defined by Denzin (1978: 291) as "the combination of methodologies in the study of the same phenomenon." The triangulation metaphor is from navigation and military strategy, which use multiple reference points to locate an object's exact position (Smith, 1975). Given the basic principles of geometry, multiple viewpoints allow for greater accuracy. Similarly, organizational researchers can improve the accuracy of their judgments by collecting different kinds of data bearing on the same phenomenon.

In the social sciences, the use of triangulation can be traced back to Campbell and Fiske (1959) who developed the idea of "multiple operationism." They argued that more than one method should be used in the validation process to ensure that variance reflected that of the trait and not of the method. The convergence or agreement between two methods "enhances our belief that the results are valid and not a methodological artifact" (Bouchard, 1976).

This kind of triangulation is labeled by Denzin (1978) as the "between (or across) methods" type, and represents the most popular use of triangulation. It is largely a vehicle for cross validation when two or more distinct methods are found to be congruent and yield comparable data. For organizational researchers, this would involve the use of multiple methods to examine the same dimension of a research problem. For example, the effectiveness of a leader may be studied by interviewing the leader, observing his or her behavior, and evaluating performance records. The focus always remains that of the leader's effectiveness, but the mode of data collection varies. Multiple and independent measures, if they reach the same conclusions, provide a more certain portrayal of the leadership phenomenon.

Triangulation can have other meanings and uses as well. There is the "within-method" kind (Denzin, 1978), which uses multiple techniques within a given method to survey research. This can take the form of multiple scales or indices focused on the same construct. For qualitative methods such as participant observation, this can be reflected in "multiple comparison groups" (Glaser and Strauss, 1965) to develop more confidence in the emergent theory. In short, "within-
method" triangulation essentially involves cross-checking for internal consistency or reliability, while "between-method" triangulation tests the degree of external validity.

Blending and integrating a variety of data and methods, as triangulation demands, may be seen on a continuum that ranges from simple to complex designs. Scaling – that is, the quantification of qualitative measures – would be at the simple end. Smith (1975) concluded that scaling is only a "primitive triangulatory device." It does not effectively force a mix of independent methods, nor does it reflect fundamentally diverse observations or varieties of triangulated data. Another primitive form of triangulation often found in organizational research is the parenthetical, and even somewhat patronizing, use of field observations to strengthen statistical results. For example, a hypothetical study of job satisfaction among employees might revolve around a significant chi square result demonstrating deep discontent. To support the results, it might be noted that a strike occurred earlier that year, without informed about the intensity, dynamics, meaning, and aftermath of the strike. In such instances, important qualitative data is insufficiently integrated with quantitative findings. A somewhat more sophisticated triangulation design, already discussed, would be the "within-methods" strategy for testing reliability. The limitations of this approach lie in the use of only one method. Denzin (1978) stated, "Observers delude themselves into believing that five different variations of the same method generate five distinct varieties of triangulated data. But the flaws that arise using one method remain." Next in the continuum is the conventional form, the "between methods" approach designed for convergent validation. The use of complementary methods is generally thought to lead to more valid results, as noted. It is currently the archetype of triangulation strategies.

Triangulation, however, can be something other than scaling, reliability, and convergent validation. It can also capture a more complete, holistic, and contextual portrayal of the units under study. That is, beyond the analysis of overlapping variance, the use of multiple measures may also uncover some unique variance which otherwise may have been neglected by single methods. It is here that qualitative methods, in particular, can play an especially prominent role by eliciting data and suggesting conclusions to which other methods would be blind. Elements of the context are illuminated. In this sense, triangulation may be used not only to examine the same phenomenon from multiple perspectives but also to enrich our understanding by allowing for new or deeper dimensions to emerge.
In all the various triangulation designs, one basic assumption is buried. The effectiveness of triangulation rests on the premise that the weaknesses of each single method will be compensated by the counter-balancing strengths of another. That is, it is assumed that multiple and independent measures do not share the same weaknesses or potential for bias (Rohner, 1977). Although it has always been observed that each method has specific assets and liabilities, triangulation purports to exploit the assets and neutralize, rather than compound, the liabilities. Perhaps the most prevalent attempts to use triangulation have been reflected in efforts to integrate fieldwork and survey methods. The viability and necessity of such linkages have been advocated by various social scientists (e.g., Vidich and Shapiro, 1955; Reiss, 1968; McCall and Simmons, 1969; Spindler, 1970; Diesing, 1971; Sieber, 1973). They all argue that quantitative methods can make important contributions to fieldwork, and vice versa.

Thus, researchers using qualitative methodology are encouraged to systematize observations, to utilize sampling techniques, and to develop quantifiable schemes for coding complex data sets. As Vidich and Shapiro (1955: 31) wrote, "Without the survey data, the observer could only make reasonable guesses about his area of ignorance in the effort to reduce bias." Survey research may also contribute to greater confidence in the generalizability of results.

Conversely, quantitative-oriented researchers are encouraged to exploit "the potentialities of social observation" (Reiss, 1968: 360). Among other assets, field methods can contribute to survey analysis with respect to the validation of results, the interpretation of statistical relationships, and the clarification of puzzling findings (Sieber, 1973: 1345). Thus, informants can be utilized during the course of quantitative research (Campbell, 1955) and "holistic interpretation" (i.e., context variables) can be used to shed light on quantitative data (Diesing, 1971). More implicitly, the very selection of a research site is typically a function of qualitative data, as is the process of building and pretesting a survey instrument. Diesing (1971) concluded that the variety of combinations is so great that survey research and fieldwork are better viewed as two ends of a continuum rather than as two distinct kinds of methods. Yet, research designs that extensively integrate both fieldwork (e.g., participant observation) and survey research are rare. Moreover, journals tend to specialize according to methodology, thus encouraging purity of method.

Fortunately, there are some exceptions. Some particularly good examples of combining methods include LaPiere's (1934) seminal investigation of the relationship between attitudes and behavior, Reiss' study of police and citizen transactions (1968: 355), Sales' (1973) study of
authoritarianism, Van Maanen’s (1975) data on police socialization, and the studies described in, or modeled after, Webb triangulation approach is embedded in many doctoral theses that, when packaged into articles, tend to highlight only the quantitative methods. Thus, the triangulation model is not new. However, this model of research and its advantages have not been appreciated. In this respect, it would be helpful to articulate and describe its usage.

Therefore, to verify the validity of the model developed, we used triangulation (Cooper & Schindler, 2006). Through triangulation we can improve the accuracy of judgments, and thereby results, by collecting data through different methods or collecting different kinds of data on the subject matter of our study (Titko & Natalja 2011).

The general study of the concept of Balanced Scorecard involves three stages:

The first stage. Within the framework of the previous research: (1) collection of definitions of the terms “Balanced Scorecard, and (2) quantification of definitions selected, using the procedures both of classical and interpretative content analysis. The second stage. Verification of model validity, using the methods of interview and survey. The third stage. Additional verification of model validity: (1) selection of data, and (2) distillation of value affecting factors, using AMOS analysis.

For the procedure of content analysis, the program AMOS was used. AMOS, in summary, is a program for the generation of theory on the basis of qualitative data. The special characteristic of the program is its ability of the cause and effect relationship of the perspectives of Balanced Scorecard and to allow the researcher to draw conclusions by relating categories to each other, i.e., by exploring the occurrence of typical and repeated configurations of category representations in the data (Huber & Gürtler, 2010).

**INSTRUMENTS OF THE STUDY**

Therefore, by using triangulation, each of the research methods uses one or more instruments for collecting empirical data. These instruments range from questionnaires, interviews, participant observation and fieldwork to archival research. Written data sources can include published and unpublished documents, company reports, memos, letters, reports, email messages, faxes, newspaper articles and so forth. Primary sources are unpublished data that the researcher has gathered from the people or organization directly. Secondary sources refer to any materials (books, articles, etc.) that have been previously published (Oppermann, 2000).
**Questionnaire**

The most commonly used quantitative data-gathering methods in the research are undoubtedly the questionnaire and the structured interview. Questionnaires have to be prepared in such a way that respondents can complete them without any assistance (Blaikie, 2000).

Many researchers have used questionnaire surveys and developed their questionnaires for data collection according to their own research purpose, and their questionnaires thus differ from each other. For this study, it is necessary to develop a new questionnaire to meet this research purpose, which is to develop a Balanced Scorecard model with the aim of improving overall organizational performance. The design of the questionnaire should cover the scope of two areas:

1. The items developed for measuring indicators should be based on the seven constructs and 49 implementation initiatives; and
2. The items developed for measuring overall organizational performance should be based on the balanced scorecard concepts of four constructs.

The questionnaire is shown in Appendix 1.

**Interviews**

Qualitative interviews may be used as the primary strategy either for data collection, or in conjunction with observation, document analysis, or other techniques (Bogdan and Biklen, 1982). Qualitative interviewing utilizes open-ended questions that allow for individual variations. Patton (1990) writes about three types of qualitative interviewing: (1) informal, conversational interviews; (2) semi-structured interviews; and (3) standardized, open-ended interviews.

Informal interviewing or unstructured interviewing are so labeled because the interviewer does not enter the interview setting with a planned sequence of questions to ask the respondent (Sekaran, 1992). The objective of the unstructured interview is to surface some preliminary issues so that the researcher can formulate a good idea of what variables need further in-depth investigation. Broad, open-ended questions would be asked and the replies to these questions would give the researcher an indication of the perceptions of the individuals.
Structured interviews are those conducted by the interviewer when he or she knows exactly what information is needed and has a predetermined list of questions that will be posed to the respondents (Sekaran, 1992). The questions are likely to focus on factors that were surfaced during the unstructured interviews and considered relevant to the problem. As the respondents express their views, the researcher notes the responses on the schedule. The same questions will be asked of everybody in the same manner.

In semi-structured interviews, a predetermined list of questions is asked in a largely open-ended format. The interviewer is prepared to be flexible in terms of the order in which the topics are considered and the interviewee can respond freely.

**Observations**

The classic form of data collection in naturalistic or field research is observation of participants in a natural context. Observational data are used for the purpose of description – of settings, activities, peoples, and the meanings of what is observed from the perspective of the participants. Observation can lead to deeper understandings than interviews alone, because it provides knowledge of the context in which events occur, and may enable the researcher to see things that participants themselves are not aware of, or that they are unwilling to discuss (Patton, 1990).

There are several observation strategies available. In some cases it may be possible and desirable for the researcher to watch from outside, without being observed. Another option is to maintain a passive presence, being as unobtrusive as possible and not interacting with participants. A third strategy is to engage in limited interaction, intervening only when further clarification of actions is needed. Alternatively, the researcher may exercise more active control over the observations to elicit specific types of information. Finally, the researcher may act as a full participant in the situation, with either a hidden or a known identity.

Data observed are likely to be prone to observer biases. Moreover, where several observers are involved, inter-observer reliability has to be established before the data can be accepted. Observer fatigue could also be a source of bias. To minimize observer bias, observers are usually given training on how to observe and what to record.

The presence of an observer is likely to introduce a distortion of the natural scene that the researcher must be aware of, and work to minimize. Critical decisions, including the degree to which researcher identity and purposes will be revealed to participants, the length of time spent...
in the field, and specific observation techniques used, are wholly dependent on the unique set of questions and resources brought to each study. In any case, the researcher must consider the legal and ethical responsibilities associated with naturalistic observation (Patton, 1990).

**Unobtrusive Measures**

Unobtrusive measures include both archival and non-archival data, as well as erosion and accretion measures of human remains. For instance, the wear and tear on journals in the project library could be a good indication of their popularity, their usage, or both. Signatures on drawings and reports could be indicative of the extent of forgery and frauds; actuarial records are good sources for determining the project requirements, clients’ expectations of the projects. Company records reveal much personal information about employees, the extent of company efficiency, and other data as well.

**TEST OF VALIDITY AND RELIABILITY**

Case studies use the tests designed to establish the quality of any social science research. Reliability is the extent to which a measurement procedure yields the same answer however and whenever it is carried out, and validity is the extent to which it gives the correct answer (Kirk & Miller, 1986, p.19).

There are three types of tests for validity and reliability in case study research. If case studies cannot consistently produce valid results, the predictions or inference made on the basis of the case study findings cannot be relied on. Knowing what conclusions to draw when findings differ across studies depends on evaluations of the validity and reliability of observations (Kirk & Miller, 1986).

Construct validity deals with the use of instruments and measures that accurately operationalize the constructs of interest in a study (Yin 1993, p.39). It establishes correct operational measures for the concepts being studied. Construct validity can be increased by:

- The use of multiple sources of evidence in a manner encouraging convergent lines of enquiry. A major strength of case study data collection is the opportunity to use many different sources of evidence that allow researchers to address a broader range of historical, attitudinal, and observational issues (Yin, 1994, p.97). Hence, this multi-method strategy could lead to converging lines of inquiry as it provides multiple measures of the same phenomenon,
• Establishing a chain of evidence, which is also relevant during data collection. In order to maintain the credibility of the case study findings, the researchers must ensure there is explicit documentation in the various phases of the case study research. The documentation includes (see Yin, 1994, p.102) (i) citing specifics of documents, interviews, or observations; (ii) indicating the circumstances under which the actual evidence is collected e.g. the time and place of the interview; (iii) these circumstances should be consistent with the content in the case study protocol; and (iv) there should be a link between the content of the protocol and the initial study questions. The rationale is that the reader or the external observer of the case study is able to follow from one portion of the case study to another. This procedure can increase the reliability of the information because there is clear cross-referencing, which has already been built into the case study.

• Having the draft case study report reviewed by key informants (Yin 1994, pp.33-35). To validate the accuracy of the case study, it is necessary to let the subjects (e.g. participants and informants) of the study review the draft case study report. This validating procedure can check against distortion and falsely reported events. Sometimes, such review can give constructive feedback and possibly produce further evidence as the informants and participants may identify that the research account may not accord with their feelings and behaviors during the initial data collection period.

Internal validity establishes a causal relationship whereby certain conditions are shown to lead to other conditions. Internal validity is a concern for explanatory case studies in which a researcher is trying to determine if event x led to event y. The research design fails to deal with some threat to internal validity if the researcher incorrectly concludes that there is a causal relationship between x and y without knowing that some third factor may have actually caused both x and y. The concern over internal validity for case study research may be extended to the broader problem of making inferences.

Yin (1994) suggested applying three analytic tactics to address internal validity problems. They are:

• Pattern-matching involves comparing the pattern of actual and predicted data to examine whether the conclusions or inferences drawn from the causal relationship between x and y are real or spurious. If there is a match between the two potential
patterns, then we are confident that changes in the dependent variable (effect) can be attributed to the independent variable (cause) rather than to other potential factors (Cook and Campbell, 1979). Moreover, in an explanatory case study, the patterns may be linked to the dependent or independent variables. Yin (1994) added that, for descriptive case study, pattern matching was relevant as long as the predicted pattern of specific variables was defined prior to the data collection. He further cautioned that pattern-matching did not involve any statistical techniques as none of the variables in the pattern would have a variance.

- Explanation-building technique is used to build explanations about the case after a series of iterations that involve constant checking of the theories and concepts against the findings and a constant refinement of the theories and concepts during the process of research.

- Time-series analysis techniques examine some relevant “how” and “why” questions about the relationship of events over time instead of just focusing on the time trends alone. Time-series analysis is usually adopted to observe changes in a dependent variable for some time before and after the treatment (e.g. new products, special advertising campaigns, new social reforms, etc.) is introduced.

External validity establishes the domain within which a study’s findings can be generalized. This test deals with the problem of knowing whether a study’s findings are generalizable beyond the immediate case study (Yin, 1994, pp. 33, 35-36). It is a good practice for any case study researcher to preempt possible criticism by addressing the issue of generalization. There should be an explicit defense against the allegation that you cannot generalize from case study findings. A researcher should try to generalize results of the case study to previously developed theories or propositions. If the same theory is supported by the results of two or more cases (multiple-case studies), then the replication is said to have taken place. So, to tackle external validity problems, one can use multiple-case design, which follows replication logic rather than sampling logic. Within the multiple-case design, each individual case may be holistic (single unit of analysis) or embedded (multiple units of analysis).

**Reliability**

Reliability is an evaluation of measurement consistency (Cook and Campbell, 1979). It measures the ability to replicate the study. Reliability is a prerequisite to establishing validity (Hair et al., 1998). Reliability is concerned with the extent to which an instrument, test or any
measuring procedure yields the same results in repeated trials (Saraph et al., 1998). It is a statistical measure of how reproducible the survey data of the instrument is (Hair et al., 1998). There are four methods commonly used for assessing reliability, namely, (1) the test-retest method, (2) the alternate-form method, (3) the split-halves method, and (4) the internal consistency method (Nunnally, 1967).

Test-retest reliability is measured by having the same set of respondents complete a survey at two different times to see how stable the set of responses is. It is a measure of how reproducible a set of results is. Correlation coefficients are collectively referred to as the survey instrument’s test-retest reliability. In general, if correlation coefficients equal or exceed 0.7, test-retest reliability is considered good (Hair et al., 1998). Alternate-form reliability is a method of evaluating the reliability of a survey instrument. It involves employing differently worded items to measure the same attribute. Questions and responses are reworded, or their order changed, to produce two items that are similar but not identical. Items are only different in their wording. Items or scales are administered to the same population at different time points. In the same way, correlation coefficients are calculated. If they are high, the survey instrument is considered to have good alternate-form reliability (Hair et al., 1998).

The split-halves method is a way to evaluate the reliability of the survey instrument. To use the split-halves method, the sample should be large enough to be divided in half and each alternate form administered to half of the group. Results from the two halves are then compared. Half-samples are randomly selected when split-halves methods is used. To do so, it can be ensured that no group differences exist (Litwin, 1995).

One of the most common methods used for the assessment of reliability is the internal consistency method. It is an indicator of how well the different items measure the same concept. This is important because a group of items that purport to measure one variable should indeed be clearly focused on that variable. Internal consistency is measured by calculating a statistic known as Crobach’s coefficient alpha (Nunnally, 1967).

Coefficient alpha measures internal consistency reliability among a group of items combined to form a single scale. A statistic reflects the homogeneity of the scale. Generally, reliability coefficients of 0.70 or more are considered good, while those of 0.50 or more are acceptable (Nunnally, 1967).
Among the four methods mentioned above, it is clear that the first three have some limitations, particularly for field studies. These limitations include, for example, requiring two independent administrations of the instrument on the same group of people and requiring two alternate forms of the measuring instrument. In contrast, the internal consistency method does not require either the splitting or repeating of the item. Instead, it requires only a single test administration and provides a unique estimation of reliability for the five-test administration. It is the most general form of reliability estimation (Nunnally, 1967). Therefore, the internal consistency method is used in evaluating the reliability of the survey instruments in this research.

**Item Analysis**

Nunnally (1967) developed a method of evaluating the assignment of items to scales that considers the correlation of each item with each scale. Specifically, the item-score to scale score correlations are used to determine whether an item belongs to the scale as assigned, to some other scales, or should be eliminated. The scale-score is obtained by computing the arithmetic average of the scores of the items that comprise that scale. He suggests that the values of item to scale correlations should be greater than 0.50; those lower than 0.50 do not share enough variance with the rest of the items in that scale. Therefore, it is assumed that the items are not measuring the same construct and should be deleted from the scale. Saraph et al. (1989) used this method to evaluate the assignment of items to scales in developing their instrument for measuring the critical factors of quality management. It was judged that item analysis should be performed in order to understand whether items were assigned appropriately. The table 5 of Chapter 4 demonstrates the correlation matrix for the six scales of the Balanced Scorecard implementation (scales 1-6) and their measurement items. All the values of item to their respective scale correlations are greater than 0.50. It can be concluded that all items had been appropriately assigned to scales.

**Validity Analysis**

Validity is defined as the extent to which any instrument measures what it intends to measure. The three most popular methods of evaluating the validity of a measurement instrument are content validity, construct validity and criterion-related validity (Carmines and Zeller, 1979). However, due to limitations known to be valid, many researchers did not evaluate the criterion-related validity of their instruments (e.g. De Jong, 1999; Kemp, 1999). In this study, only content validity and construct validity are used to evaluate the measurement instrument.
Content Validity

Content validity depends on the extent to which an empirical measurement reflects a specific domain of content. It cannot be evaluated numerically; it is a subjective measure of how appropriate the items seem to various reviewers with some knowledge of the subject matter. The evaluation of the content validity typically involves an organized review of the survey’s contents to ensure that it includes everything it should, and does not include anything it should not. Strictly speaking, content validity is not a high scientific measure of a survey instrument’s accuracy. Nevertheless, it provides a solid foundation on which to build a methodologically rigorous assessment of a survey instrument’s validity. In this research, however, it is argued that the six scales for measuring Balanced Scorecard implementation constructs and the five scales for measuring overall organization performance have content validity. Since the development of these measuring constructs, the Senior Management Group of the organization items on an extensive review of the literature and detailed evaluations.

Construct Validity

Construct validity measures the extent to which the items in a scale all measure the same construct (Flynn et al., 1995), and can be evaluated by the use of factor analysis. Factor analysis addresses the issue of analyzing the interrelationships among a large number of items and then explaining these items in terms of their common underlying dimensions (factors). In fact, the general purpose of factor analysis is to find a way of condensing or summarizing the information into a smaller set of new composite dimensions (factors) with a minimum loss of information (Hair et al., 2005). There are two forms of validity analysis, exploratory factor analysis and confirmatory factor analysis. According to Hair et al., (2005), there is continuous debate concerning the appropriate role of factor analyses. Many researchers consider it only exploratory, useful in researching for structure among a set of variable, or as a data reduction method.
COLLECTION OF DATA

The principal approach for collecting the data uses a survey instrument to determine the critical success factor to implement Balanced Scorecard. The survey questions were designed as closed-ended questions. Closed-ended questions were used because they do not require opinions by the respondent or interviewer, and their analysis is straightforward. According to Nachmias and Nachmias (1987), open-ended questions are difficult to answer and even more difficult to analyze. Closed-ended questions are suited to this research study because the objective is to measure the respondents’ agreement (or disagreement) and an explicit point of view.

The questionnaires were distributed among the 895 staff of the different departments of Atkins China Limited. The questionnaires were sent to the identified staff members through their department heads and 206 questionnaires were retrieved from the 895 staff.

Managers were interviewed, and the focus of the interview was issues relating to the design and implementation of the balanced scorecards.
DATA PROCESSING AND STATISTICAL TREATMENT

Pattern-matching strategy was used to compare an empirically verified pattern with a predicted one. If the patterns coincide, the results can help a case study strengthen its internal validity.

Structural Equation Modeling

Over the last 25 years, Structural Equation Modeling (SEM) has become one of the most important data analysis techniques in social science (Kaplan, 1995). SEM has become a language with which to formulate social science theories, and a language with which to talk about the relationship between variables (Kaplan, 1995). SEM is a highly sophisticated multivariate technique that combines the best features of factor analysis, multiple regressions, and path analysis into a single, more powerful method (Hair et al., 1998; Mueller, 1996). SEM, as defined by Kaplan (1995), is a class of methodologies that seeks to represent hypotheses about the means, variances, and co-variances of observed data in terms of a number of “structural” parameters defined by a hypothesized underlying model.

SEM is used to study complex relationships among a series of variables, some of which can be directly measured and some of which cannot. This ability to deal with complex latent variables is what separates SEM from other multivariate analytical methods. In many cases, the most interesting theoretical constructs are those that cannot be measured directly, or have been limited in the past to single item measurement. The use of structural modeling allows for a fuller representation of the constructs of interest. SEM allows for estimation of multiple and interrelated relationships while including unobservable concepts in these relationships and accounting for measurement error in the estimation process (Hair et al., 1998). Multiple regressions allow only one dependent variable and accept only one measurement for each independent variable. Factor analysis examines the relationship between measured variables and individual latent constructs, but does not allow for study of directional relationships among latent constructs. Path analysis allows only one measure for each latent construct. The combination of all of these methods into SEM allows for a versatile method that considers multiple measurements and directional relationships in hypothetical models (Hair et al., 1998; Mueller, 1996).

SEM is well suited for this study. It provides a straightforward method of dealing with multiple relationships simultaneously while providing statistical efficiency. However, there has been growing concern for the correct use of, and the conclusions that can be legitimately drawn from,
multivariate procedures (Bullock et al., 1994). Bullock et al. (1994) suggest that SEM methods may offer potential for tentative causal inferences to be drawn when used with carefully specified and controlled design supported with theory (Bullock et al., 1994). Figure 3 below indicates a conventional approach to structure equation modeling, which is being adopted in this study:
Figure 3

Structural Equation Modeling

Theory

Model Formulation

Sample & Measure

Estimation

Assessment of Fit

Discussion

Model Modification

(Figure extracted from Kaplan, 1995)
The conventional approach, as described by Kaplan (1995), starts with theory. The structure equations as represented in the path diagram are seen as one-to-one representations of the theory. A sample is then selected and measures are obtained on the sample. This is followed by the estimation of the parameters of the model. At this stage, the measuring model can be estimated first, followed by the structural model, or the full model can be estimated at once. This is followed by an assessment of the goodness to fit of the model, followed by model modification if necessary. Typically, this stage is cyclical with the model continually being modified and evaluated in terms of goodness of fit until a decision is made that the model meets some standard of adequate fit. Once the model is deemed to fit, a discussion of the findings follows.

A clear feature of the conventional approach, according to Kaplan (1995), is the connection it makes between the theory and the specification of the equations of the model as represented by the path diagram. He emphasizes that the goal of obtaining fit by modifying models is driven by the view that better suggests closer alignment with theory. Hence, such modifications should be supported by the theory.

**Selection of SEM Software Program**

According to Rigdon (1996), there are 15 SEM and related software packages (Amos, proc CALIS, COSAN, EQS, LINCs, LISCOMP, LISREL/PRELIS.SIMPLIS, MECOSA, MX, PLS-PC, PLS, SAS, PLS Graph, Ramona, SEPath, and TETRAD), among which, LISREL is the most popular but more difficult to use compared to AMOS. In Amos, the path diagram is the model and the user does not have 15 manipulate sets of equations or matrices with Greek names. Thus, modeling with AMOS is much simpler. Miles (2000) stated that Amos is an excellent program, both user-friendly and technically advanced, it will meet most needs that researchers using SEM are likely to encounter, and makes applying these techniques a less arduous task, especially for those starting out with SEM. Among various software packages for SEM, Hox (1995) considers “The AMOS approach of using a path diagram specifies a model is perfectly natural. …Amos is a clear winner”. Hence, the structure equation modeling software, AMOS version 3.6 (Arbuckle, 1997) has been employed in testing the theoretical models hypothesized in this research.
There are two ways of estimating a model. First, all paths of the measurement model and the structure model are estimated simultaneously. Secondly, the paths of both models can be estimated separately, which is a two-stage analysis. Many researchers are now proposing a two-stage process of structural equation modeling (Hair et al., 1998). In this research, a two-stage analysis approach is adopted for estimation. The path analysis technique is used to test the possibility of putative causal relationships between one variable and another. Path analysis is the basis for the empirical estimation of the strength of each causal relationship depicted in the path model, and is based on calculating the strength of the causal relationships from the correlation among the constructs. The procedure can be formulated as one of estimating the coefficients of a set of linear structural equations representing the cause and effect relationships hypothesized by researchers (Jöreskog and Sörbom, 1996). The system of relationships involves variables of two kinds: independent (or cause) variables and dependent (or effect) variables.

In this research, a Balanced Scorecard model is hypothesized to investigate the relationship between the six Balanced Scorecard implementation constructs and overall organizational performance. The six Balanced Scorecard implementation constructs are independent variables. The five organizational performance constructs are combined into one dependent variable. Estimating a path analysis with AMOS is entirely straightforward. AMOS treats the model as a system of equations and estimates all the structure coefficients directly.
CHAPTER 4

PRESENTATION, ANALYSIS AND INTERPRETATION OF DATA

Introduction

In this study, a research questionnaire (Appendix 1) was developed and used to obtain empirical data from staff of Atkins China Limited in order to test the theoretical Balanced Scorecard management system model hypothesized in this study. In the questionnaire, there are two measurement instruments measuring the Balanced Scorecard implementation and overall organizational performance respectively. Each instrument has some measuring scales. Regarding the Balanced Scorecard implementation, there are six scales covering leadership and strategic management, process management, people management, information management, continuous improvement and customer focus. As for organizational performance, it has four scales, which are the four perspectives of the Balanced Scorecard.

Before testing the theoretical models, it was necessary to first evaluate the reliability and validity of the instrument; only on the basis of reliable and valid measurement scales can hypothesis testing be conducted.
PRESENTATION OF DATA

The Respondents

Table 1 provides the demographics of the respondents in terms of departments / sections and staff categories respectively:

<table>
<thead>
<tr>
<th>Departments</th>
<th>Department Heads Response/(Not response)</th>
<th>Principal / Senior Staff Response/(Not response)</th>
<th>Engineer/ Admin Staff Response/(Not response)</th>
<th>No. of Respondents by Departments/Sections Response/(Not response)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civil &amp; Structure</td>
<td>3/(9)</td>
<td>10(37)</td>
<td>20(61)</td>
<td>33/(107)</td>
</tr>
<tr>
<td>Geotechnical</td>
<td>4/(13)</td>
<td>9/(36)</td>
<td>12(35)</td>
<td>25/(84)</td>
</tr>
<tr>
<td>Building Structure</td>
<td>5/(17)</td>
<td>8/(30)</td>
<td>14/(41)</td>
<td>27/(88)</td>
</tr>
<tr>
<td>Tunnelling</td>
<td>5/(16)</td>
<td>7(32)</td>
<td>9(21)</td>
<td>21/(69)</td>
</tr>
<tr>
<td>Safety &amp; Reliability</td>
<td>3/(10)</td>
<td>4/(19)</td>
<td>6/(19)</td>
<td>13/(48)</td>
</tr>
<tr>
<td>Highways &amp; Transportation</td>
<td>4/(18)</td>
<td>6/(32)</td>
<td>8/(23)</td>
<td>18/(73)</td>
</tr>
<tr>
<td>Environmental &amp; Water</td>
<td>3/(0)</td>
<td>7/(27)</td>
<td>7/(21)</td>
<td>17/(48)</td>
</tr>
<tr>
<td>Rail</td>
<td>2/(4)</td>
<td>6/(33)</td>
<td>5/(8)</td>
<td>13/(45)</td>
</tr>
<tr>
<td>Site Supervision</td>
<td>5/(19)</td>
<td>12/(42)</td>
<td>22/(61)</td>
<td>39/(122)</td>
</tr>
<tr>
<td>Sub-total:</td>
<td>34/(106)</td>
<td>69/(288)</td>
<td>103/(290)</td>
<td>206/(684)</td>
</tr>
</tbody>
</table>

Proportion of Totals: 24% 19% 26% 23%

Total no. of respondents is 206, and total no. of non-respondents is 684.
Table 1 presents the nine departments of Atkins China Limited. The respondents include 34 Department Heads, 69 Principal or Senior Staff and 103 Engineer/Administrative Staff with 206 respondents.

Measurement of Constructs

There are six scales for measuring the six measuring constructs for the constructs for Atkins China Limited. For each scale, there are a number of items to measure it.

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Number of items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leadership and strategy management</td>
<td>8</td>
</tr>
<tr>
<td>People management</td>
<td>9</td>
</tr>
<tr>
<td>Customer focus</td>
<td>4</td>
</tr>
<tr>
<td>Information management</td>
<td>11</td>
</tr>
<tr>
<td>Process management</td>
<td>10</td>
</tr>
<tr>
<td>Continuous improvement</td>
<td>7</td>
</tr>
</tbody>
</table>

Table 2 above presents the six constructs developed, and each construct has a corresponding number of items. For every construct, there are number of factors to be considered for the implementation of the Balance Scorecard.
The internal consistency method is applied to the six scales of the Balanced Scorecard model respectively. From Table 3 above, it can be seen that Cronbach’s Alpha for all the components is greater than 0.8, and thus the response from each main component is regarded as reliable. Cronbach’s alpha for each scale was determined using the SPSS.

### Item to Scale Correlation

Nunnally (1967) developed a method of evaluating the assignment of items to scales that considers the correlation of each item with each scale. Specifically, item-score to scale score correlations are used to determine whether an item belongs to the scale as assigned, to some other scales, or should be eliminated. The scale-score is obtained by computing the arithmetic average of the scores of the items that comprise that scale. He suggests that the values of item to scale correlations should be greater than 0.50; those lower than 0.50 do not share enough variance with the rest of the items in that scale. Therefore, it is assumed that the items are not measuring the same construct and it should be deleted from the scale. Saraph et al. (1989) used this method to evaluate the assignment of items to scales in developing their instrument for measuring the critical factors of quality management. It was judged that item analysis should be performed in order to understand whether items were assigned appropriately.
### Table 4
**ITEM TO SCALE CORRELATION MATRIX**

<table>
<thead>
<tr>
<th>Item Number</th>
<th>Scale Number</th>
<th>Scale 1</th>
<th>Scale 2</th>
<th>Scale 3</th>
<th>Scale 4</th>
<th>Scale 5</th>
<th>Scale 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Scale 1</td>
<td>0.828</td>
<td>0.710</td>
<td>0.820</td>
<td>0.739</td>
<td>0.693</td>
<td>0.793</td>
</tr>
<tr>
<td>2</td>
<td>Scale 1</td>
<td>0.803</td>
<td>0.778</td>
<td>0.854</td>
<td>0.776</td>
<td>0.805</td>
<td>0.791</td>
</tr>
<tr>
<td>3</td>
<td>Scale 1</td>
<td>0.606</td>
<td>0.785</td>
<td>0.771</td>
<td>0.717</td>
<td>0.792</td>
<td>0.796</td>
</tr>
<tr>
<td>4</td>
<td>Scale 1</td>
<td>0.770</td>
<td>0.732</td>
<td>0.860</td>
<td>0.744</td>
<td>0.737</td>
<td>0.749</td>
</tr>
<tr>
<td>5</td>
<td>Scale 1</td>
<td>0.723</td>
<td>0.712</td>
<td>-----</td>
<td>0.815</td>
<td>0.788</td>
<td>0.870</td>
</tr>
<tr>
<td>6</td>
<td>Scale 1</td>
<td>0.719</td>
<td>0.740</td>
<td>--</td>
<td>0.698</td>
<td>0.808</td>
<td>0.845</td>
</tr>
<tr>
<td>7</td>
<td>Scale 1</td>
<td>0.721</td>
<td>0.772</td>
<td>--</td>
<td>0.764</td>
<td>0.786</td>
<td>0.850</td>
</tr>
<tr>
<td>8</td>
<td>Scale 1</td>
<td>0.779</td>
<td>0.661</td>
<td>--</td>
<td>0.708</td>
<td>0.800</td>
<td>--</td>
</tr>
<tr>
<td>9</td>
<td>Scale 1</td>
<td>--</td>
<td>0.691</td>
<td>--</td>
<td>0.741</td>
<td>0.773</td>
<td>--</td>
</tr>
<tr>
<td>10</td>
<td>Scale 1</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>0.752</td>
<td>0.787</td>
<td>--</td>
</tr>
<tr>
<td>11</td>
<td>Scale 1</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>0.671</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

**Note:** Item number in this table is the same as the item number in the instrument. The Symbol “--” means “not available.”

The above table demonstrates the correlation matrix for the six scales of the Balanced Scorecard implementation (Scales 1-6) and their measurement items. All the values of items to their respective scale correlations are greater than 0.50. It can be concluded that all items had been appropriately assigned to scales. Table 4 shows the result of the correlation matrix obtained by using the SPSS software. It revealed that the values of item to scale are higher than 0.50.
Factor Analysis

Many researchers consider it only exploratory, useful in researching for structure among a set of variable, or as a data reduction method. In this study, six constructs were developed in order to measure the performance management system implementation. These constructs evolved from the empirical research results that are subject to confirmatory factor analysis, ensuring that they are reliable indicators of those constructs (Nunnally, 1967). A cutoff loading of 0.55 (as shaded in Table 5 below) is used to screen out variables that were weak indicators of the constructs. Eighteen variables failed to make this cutoff, leaving 31 variables constituting the six constructs.
## Table 5

### FACTOR ANALYSIS FOR THE SIX MEASURING CONSTRUCTS

<table>
<thead>
<tr>
<th>Construct</th>
<th>Q5.9</th>
<th>Q5.7</th>
<th>Q4.10</th>
<th>Q6.5</th>
<th>Q6.4</th>
<th>Q6.6</th>
<th>Q6.1</th>
<th>Q5.10</th>
<th>Q6.4</th>
<th>Q5.3</th>
<th>Q5.7</th>
<th>Q4.11</th>
<th>Q6.7</th>
<th>Q4.9</th>
<th>Q5.2</th>
<th>Q2.8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous</td>
<td>0.786</td>
<td>0.708</td>
<td>0.665</td>
<td>0.651</td>
<td>0.631</td>
<td>0.595</td>
<td>0.594</td>
<td>0.574</td>
<td>0.553</td>
<td>0.542</td>
<td>0.529</td>
<td>0.522</td>
<td>0.507</td>
<td>0.471</td>
<td>0.463</td>
<td>0.438</td>
</tr>
<tr>
<td>Improvement</td>
<td>0.317</td>
<td>0.215</td>
<td>0.130</td>
<td>0.139</td>
<td>0.269</td>
<td>0.280</td>
<td>0.208</td>
<td>0.249</td>
<td>-8.738E-03</td>
<td>0.227</td>
<td>0.170</td>
<td>0.265</td>
<td>0.229</td>
<td>0.103</td>
<td>0.291</td>
<td>0.350</td>
</tr>
<tr>
<td></td>
<td>6.021E-02</td>
<td>8.530E-02</td>
<td>0.055</td>
<td>0.233</td>
<td>6.870E-02</td>
<td>0.240</td>
<td>0.109</td>
<td>0.142</td>
<td>6.738E-03</td>
<td>0.311</td>
<td>0.170</td>
<td>0.241</td>
<td>0.390</td>
<td>0.326</td>
<td>0.325</td>
<td>0.350</td>
</tr>
<tr>
<td></td>
<td>0.132</td>
<td>0.201</td>
<td>0.131</td>
<td>0.314</td>
<td>0.235</td>
<td>0.291</td>
<td>0.212</td>
<td>0.347</td>
<td>0.280</td>
<td>0.407</td>
<td>0.281</td>
<td>0.176</td>
<td>0.353</td>
<td>0.115</td>
<td>0.380</td>
<td>0.292</td>
</tr>
<tr>
<td></td>
<td>7.094E-02</td>
<td>0.320</td>
<td>0.282</td>
<td>0.176</td>
<td>5.712E-04</td>
<td>0.176</td>
<td>0.282</td>
<td>0.147</td>
<td>0.145</td>
<td>0.171</td>
<td>0.287</td>
<td>0.201</td>
<td>0.225</td>
<td>0.345</td>
<td>0.145</td>
<td>0.130</td>
</tr>
<tr>
<td></td>
<td>1.427E-02</td>
<td>8.817E-02</td>
<td>0.242</td>
<td>0.289</td>
<td>0.233</td>
<td>0.201</td>
<td>0.192</td>
<td>0.223</td>
<td>0.177</td>
<td>0.124</td>
<td>0.128</td>
<td>0.108</td>
<td>0.225</td>
<td>0.311</td>
<td>0.178</td>
<td>0.193</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Construct</th>
<th>Q2.4</th>
<th>Q2.2</th>
<th>Q2.3</th>
<th>Q1.7</th>
<th>Q1.8</th>
<th>Q2.5</th>
<th>Q1.6</th>
<th>Q1.3</th>
<th>Q1.5</th>
<th>Q1.2</th>
<th>Q1.4</th>
<th>Q1.1</th>
<th>Q5.10</th>
</tr>
</thead>
<tbody>
<tr>
<td>People</td>
<td>0.244</td>
<td>0.207</td>
<td>0.178</td>
<td>0.290</td>
<td>0.115</td>
<td>0.194</td>
<td>0.415</td>
<td>0.199</td>
<td>0.106</td>
<td>0.148</td>
<td>0.328</td>
<td>0.291</td>
<td>0.311</td>
</tr>
<tr>
<td>Management</td>
<td>0.699</td>
<td>0.674</td>
<td>0.619</td>
<td>0.595</td>
<td>0.560</td>
<td>0.494</td>
<td>0.490</td>
<td>3.155E-02</td>
<td>0.287</td>
<td>0.425</td>
<td>0.327</td>
<td>0.285</td>
<td>0.232</td>
</tr>
<tr>
<td></td>
<td>0.120</td>
<td>0.224</td>
<td>0.100</td>
<td>0.176</td>
<td>0.397</td>
<td>0.207</td>
<td>0.195</td>
<td>-3.155E-02</td>
<td>0.626</td>
<td>0.620</td>
<td>0.579</td>
<td>0.571</td>
<td>0.386</td>
</tr>
<tr>
<td></td>
<td>0.238</td>
<td>0.205</td>
<td>0.252</td>
<td>0.360</td>
<td>0.168</td>
<td>0.216</td>
<td>0.224</td>
<td>0.680</td>
<td>0.092</td>
<td>0.282</td>
<td>0.121</td>
<td>0.252</td>
<td>0.362</td>
</tr>
<tr>
<td></td>
<td>2.517E-02</td>
<td>0.128</td>
<td>0.252</td>
<td>0.360</td>
<td>0.216</td>
<td>0.313</td>
<td>0.249</td>
<td>1.355E-02</td>
<td>0.137</td>
<td>8.995E-02</td>
<td>0.167</td>
<td>0.182</td>
<td>0.179</td>
</tr>
<tr>
<td></td>
<td>8.658E-02</td>
<td>0.243</td>
<td>0.310</td>
<td>0.174</td>
<td>0.232</td>
<td>0.167</td>
<td>0.103</td>
<td>8.869E-02</td>
<td>0.149</td>
<td>0.172</td>
<td>0.184</td>
<td>0.211</td>
<td>0.118</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Construct</th>
<th>Q4.3</th>
<th>Q4.4</th>
<th>Q4.1</th>
<th>Q4.2</th>
<th>Q4.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information</td>
<td>0.297</td>
<td>0.257</td>
<td>0.311</td>
<td>0.437</td>
<td>0.434</td>
</tr>
<tr>
<td>Management</td>
<td>0.227</td>
<td>0.117</td>
<td>0.194</td>
<td>0.141</td>
<td>0.186</td>
</tr>
<tr>
<td></td>
<td>-1.362E-02</td>
<td>0.215</td>
<td>0.203</td>
<td>0.120</td>
<td>0.317</td>
</tr>
<tr>
<td></td>
<td>0.721</td>
<td>0.650</td>
<td>0.616</td>
<td>0.613</td>
<td>0.460</td>
</tr>
<tr>
<td></td>
<td>0.116</td>
<td>0.191</td>
<td>0.129</td>
<td>0.195</td>
<td>0.335</td>
</tr>
<tr>
<td></td>
<td>0.219</td>
<td>0.130</td>
<td>0.179</td>
<td>0.137</td>
<td>0.181</td>
</tr>
</tbody>
</table>
Using the software AMOS, Table 5 shows the results of the factor Analysis conducted to perform construct Validity. The factor analysis is based on six factors assigned, which has led to six factor components, as indicated in Table 5.

### Model Construct and Variables

SEM not only estimates multiple interrelated relationships but also has the ability to incorporate latent constructs into an analysis. A latent construct cannot be measured directly but can be approximated by observed or measured variables. The measured variables, which are also known as manifest variable or indicators, are obtained from responses to questions in the questionnaire.
### Table 6
THE SIX CONSTRUCTS AND MEASURED VARIABLES

<table>
<thead>
<tr>
<th>Constructs</th>
<th>No</th>
<th>Measured Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Leadership and Strategic Management</strong></td>
<td>1.1</td>
<td>Management shows support for effective implementation of the Balanced Scorecard System.</td>
</tr>
<tr>
<td></td>
<td>1.2</td>
<td>‘Top-down’ and ‘bottom-up’ communication channels are established.</td>
</tr>
<tr>
<td></td>
<td>1.3</td>
<td>Social accountability and responsibility involvement are achieved.</td>
</tr>
<tr>
<td></td>
<td>1.4</td>
<td>Process for formulation and deployment of strategies is in place.</td>
</tr>
<tr>
<td></td>
<td>1.5</td>
<td>The strategies are communicated to and understood by staff.</td>
</tr>
<tr>
<td><strong>People Management</strong></td>
<td>1.7</td>
<td>Teams are aligned towards divisional objectives.</td>
</tr>
<tr>
<td></td>
<td>1.8</td>
<td>Objectives are deployed to each level to ensure individual contribution to achievement.</td>
</tr>
<tr>
<td></td>
<td>2.2</td>
<td>Feedback is provided to staff on their performance</td>
</tr>
<tr>
<td></td>
<td>2.3</td>
<td>Training is provided to ensure staff competence is adequate for current and future needs, and to meet statutory requirements.</td>
</tr>
<tr>
<td></td>
<td>2.4</td>
<td>Job responsibilities are documented and periodically reviewed.</td>
</tr>
<tr>
<td><strong>Process Management</strong></td>
<td>2.6</td>
<td>Staff is motivated to support and participate in process improvement activities.</td>
</tr>
<tr>
<td></td>
<td>2.9</td>
<td>Incentive schemes and promotion programs are organized to enhance risk, safety, quality and environmental awareness.</td>
</tr>
<tr>
<td></td>
<td>5.4</td>
<td>Core processes are managed and optimized for the organization.</td>
</tr>
<tr>
<td></td>
<td>6.2</td>
<td>Adequate and effective control is maintained to ensure outsourced works (including design, CADD works) meet defined requirements.</td>
</tr>
<tr>
<td>Constructs</td>
<td>No</td>
<td>Measured Variables</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-----</td>
<td>-------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Information Management</td>
<td>4.1</td>
<td>Operations documents are effectively maintained, easily and readily retrieved from intranet ACN.</td>
</tr>
<tr>
<td></td>
<td>4.2</td>
<td>Operations documents are updated in a timely and effective manner.</td>
</tr>
<tr>
<td></td>
<td>4.3</td>
<td>Operations documents in intranet ACN are made in readable style and format.</td>
</tr>
<tr>
<td></td>
<td>4.4</td>
<td>Practices are in place to ensure information contained in operations documents has appropriate level of detail.</td>
</tr>
<tr>
<td>Continuous Improvement</td>
<td>4.10</td>
<td>Accident/incident and risk information are analysed to formulate preventive measures.</td>
</tr>
<tr>
<td></td>
<td>5.8</td>
<td>Emergency procedures (covering contingency plans, equipment required, persons responsible, etc) are established for specific situations.</td>
</tr>
<tr>
<td></td>
<td>5.9</td>
<td>All accidents and incidents are reported and investigated according to defined procedures.</td>
</tr>
<tr>
<td></td>
<td>5.10</td>
<td>Documents (i.e. procedures and work instructions) related to risk, safety, quality and environmental requirements are in place and implemented accordingly.</td>
</tr>
<tr>
<td>Continuous Improvement</td>
<td>6.1</td>
<td>Corrective and preventive measures are in place to reduce/eliminate recurrence of incidents or potential incidents.</td>
</tr>
<tr>
<td></td>
<td>6.3</td>
<td>Office and Site Safety inspections are conducted as planned and improvement actions closed out.</td>
</tr>
<tr>
<td></td>
<td>6.4</td>
<td>Benchmarking or other best practice tools are used.</td>
</tr>
<tr>
<td></td>
<td>6.5</td>
<td>Improvement plans are regularly monitored and reviewed.</td>
</tr>
<tr>
<td></td>
<td>6.6</td>
<td>Audits are planned and carried out to ensure system compliance and integrity.</td>
</tr>
<tr>
<td>Customer Focus</td>
<td>3.1</td>
<td>Customer needs and expectations are understood and translated into corresponding service requirements or System Performance Standards.</td>
</tr>
</tbody>
</table>
The proposed model has seven latent constructs: leadership and strategic management, people management, process management, information management, continuous improvement, customer focus and organizational performance. All seven constructs and their measured variables are summarized in Table 6.

**The Initial Theoretical Model**

In order to empirically test the theoretical models hypothesized in this study, it is first necessary to operationalize these theoretical constructs so that empirical investigation is possible. Therefore, a set of items to measure the constructs of BSC model (consisting of leadership, people management, process management, information management, continuous improvement, and customer focus) and constructs of organizational performance (including process performance, staff learning and growth, customer satisfaction and financial performance) have to be carefully developed. Items have been developed to tap the conceptual domain of the theoretical constructs as comprehensively as possible.

The following diagram, which is translated from the proposed initial BSC model, demonstrates the hypotheses made for these constructs:
This study investigates 12 hypotheses concerning the relationship among leadership and strategic management, people management, process management, information management, continuous improvement, customer focus and organizational performance. The 12 hypotheses to be tested are as follows:

**Hypothesis H1:** Leadership has a positive effect on people management

**Hypothesis H2:** Leadership has a positive effect on process management

**Hypothesis H3:** Leadership has a positive effect on continuous improvement

**Hypothesis H4:** People management has a positive effect on process management

**Hypothesis H5:** People management has a positive effect on information management

**Hypothesis H6:** People management has a positive effect on customer focus
Hypothesis H7: Process Management has a positive effect on continuous improvement

Hypothesis H8: Process management has a positive effect on information management

Hypothesis H9: Information management has a positive effect on continuous improvement

Hypothesis H10: Information management has a positive effect on customer focus

Hypothesis H11: Continuous improvement has a positive effect on customer focus

Hypothesis H12: Customer focus has a positive effect on overall organizational performance

In these 12 hypotheses, organizational performance is a dependent variable, and the other six are independent variables.

Table 7
BALANCED SCORECARD ELEMENTS VS FOUR PERSPECTIVES

<table>
<thead>
<tr>
<th>Performance Management elements</th>
<th>Four Perspectives of BSC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organizational Performance</td>
<td>Financial Perspective</td>
</tr>
<tr>
<td>Customer Focus</td>
<td>Customer Perspective</td>
</tr>
<tr>
<td>Process Management</td>
<td>Internal Business Process Perspective</td>
</tr>
<tr>
<td>Information Management</td>
<td>Learning and Growth Perspective</td>
</tr>
<tr>
<td>People Management</td>
<td>Learning and Growth Perspective</td>
</tr>
<tr>
<td>Continuous Improvement</td>
<td>Internal Business Process Perspective</td>
</tr>
<tr>
<td>Strategic Management</td>
<td>Learning and Growth</td>
</tr>
</tbody>
</table>

The table shows the relationship between the seven constructs and the four perspectives of the Balanced Scorecard.
ESTIMATION AND INTERPRETATION OF TEST RESULTS

Model Estimation

AMOS provides the following methods for estimating structured equation models: Maximum likelihood (ML), unweighted least squares (ULS), generalized least squares (GLS), Browne’s asymptotically distribution-free criterion (BADFC), and scale-free least squares (SFLS). According to Jöreskog and Sörbom (1989), the ULS estimate should be used. However, the problem with this method is that a rather large sample is required (Kemp, 1999). According to De Jong (1999), ML estimates are consistent (the probability that the parameter estimate approaches the true parameter value increases with the size of the sample), and efficient (they produce the most reliable estimates). Kemp (1999) and De Jong (1999) adopted the ML estimation for testing their theoretical models, which produced reliable results. Therefore, it was decided that the ML estimation method would be used for testing the theoretical model.

Assumptions

The structured equation model shares three assumptions with the other multivariate methods: independent observations, random sampling of respondents, and the linearity of all relationships. Furthermore, this model is more sensitive to the distribution characteristics of the data, particularly the departure from the multivariate normality or strong kurtosis or skewness in the data. A lack of multivariate normality is particularly troublesome since it substantially inflates the chi square statistic and creates upward bias in critical values for determining coefficient significance (Hair et al., 1998). The ML estimation method can produce the best estimates if the variables have a multi-normal distribution.

Structural Model Fit

AMOS provides the Critical Ratio (CR) to identify whether the estimated path coefficients are significant or not, and have the hypothesized sign. In fact, the CRs are the t-values, which are the ratio of parameters estimated to the respective standard errors.
## Table 8
**ESTIMATES AND CRS OF THE PROPOSED AND REVISED MODELS**

<table>
<thead>
<tr>
<th>Path</th>
<th>Proposed Model</th>
<th>Revised Model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Estimate 1</td>
<td>CR 2</td>
</tr>
<tr>
<td>People Leadership Management</td>
<td>0.739</td>
<td>10.645</td>
</tr>
<tr>
<td>Process People Management</td>
<td>0.682</td>
<td>4.826</td>
</tr>
<tr>
<td>Process Leadership Management</td>
<td>0.314</td>
<td>2.795</td>
</tr>
<tr>
<td>Information Process Management</td>
<td>0.939</td>
<td>5.316</td>
</tr>
<tr>
<td>Information People Management</td>
<td>-0.057</td>
<td>-0.310</td>
</tr>
<tr>
<td>Continuous Information Management</td>
<td>0.283</td>
<td>3.339</td>
</tr>
<tr>
<td>Continuous Process Management</td>
<td>0.623</td>
<td>4.361</td>
</tr>
<tr>
<td>Continuous Leadership Improvement</td>
<td>0.006</td>
<td>0.065</td>
</tr>
<tr>
<td>Customer People Focus Management</td>
<td>0.703</td>
<td>6.349</td>
</tr>
<tr>
<td>Customer Continuous Focus Improvement</td>
<td>0.282</td>
<td>6.349</td>
</tr>
<tr>
<td>Customer Information Focus Management</td>
<td>0.109</td>
<td>1.098</td>
</tr>
<tr>
<td>Organizational Customer Performance Focus</td>
<td>0.693</td>
<td>8.202</td>
</tr>
</tbody>
</table>
For one-tail tests, the CR ratio between 1.282 and 1.645 corresponding to $p$-value < 0.10 (weakly significant), a CR ratio between 1.645 and 2.326 corresponds to $p$-value < 0.05 (moderately significant), and the CR larger than 2.326 corresponds to $p$-value < 0.01 (strongly significant) (Harnett and Murphy, 1985). It is noted that $p$-value ($p$) represents 1-$p$ confidence, which indicates that the relationship in the path are confirmed. The estimate (path coefficient) is the dependent or mediating variable for each unit change in the variable predicting it.

The estimates of the proposed model are listed in the second column and their CRs, which demonstrate whether these estimates are statistically significant or not, are shown in the third column of Table 8. These results indicate that, among the 12 estimates, three are statistically insignificant. The AMOS software was likewise used in obtaining the results shown in Table 8. Deleting the insignificant paths one by one until all paths are significant, the results in columns four and five are obtained, which demonstrate that the other paths are significant at 0.01 levels. The CRs in the same table demonstrate that all of the paths are significantly positive at 0.01 level (CR > 2.326). The resulting model is shown in Figure 5.

Overall, we can conclude that from the study that Organizational Performance is affected by Leadership, People Management, Process Management, Information Management, Continuous Improvement, Customer Focus factors.

Two things about AMOS must be kept in mind.

1. AMOS does not calculate standard errors on the indirect and total ‘regression weights,’ but these can be estimated by bootstrapping.

2. AMOS does not calculate separate indirect effects via each of the mediating factors. (Blunch, 2008)
Overall Model Fit

In theoretical model testing, a major issue is whether the theoretical model is in conflict with reality, as observed in the sample; namely, how well the theoretical model fits the data (De Jong, 1999). In AMOS, relative chi square, also called normal chi square, is adopted to evaluate the global fit, which is the only statistical based measure of goodness-of-fit available in a structural equation model (Byrne, 1998). Relative chi square is the chi square fit index divided by degree of freedom, in an attempt to make it less dependent on sample size. Carmines and McIver (1981) state that relative chi square should be in the range of 2 to 3 for an acceptable model. Kline (1998) says 2 or less is acceptable. Some researchers allow as high as 5 to consider a model adequate fit, while others insist relative chi square be two or less. Amos lists relative chi square as CMIN / DF (minimum sample discrepancy/degree of freedom). In this study, it is 2.09 (CMIN =1374.530, DF = 656, CMIN / DF = 2.095), which is close to the 2 used by convention, and the null hypothesis that the model fits the data is accepted. The theoretical model of BSC is illustrated in Figure 5 below.

**Figure 5**

The Final Theoretical Model of BSC
The final BSC model is in fact a reflection of various implementation initiatives launched to facilitate the implementation of the Balanced Scorecard in the organization. The response to the questionnaire has outlined the perception of the staff on Balanced Scorecard implementation during the four years (2007-2011). Though this empirical study verifies the cause and effect relationship of the seven constructs the BSC model, it has been customized for the application in the Atkins; hence, the model is not a generic model that can be applied in other engineering consultancy companies without further study. This is the area in which further study should be performed, as recommended in the further research opportunities of Chapter 5.

**Interpretation of results**

Madu et al. (1996) suggested that one of the most interesting parts of conducting empirical research is to interpret the research findings. However, caution should be exercised in interpreting the results obtained from statistical data analysis. There may be a temptation to overstate the findings. In fact, interpretation should be based on a total view of the sampling plan. For example, the use of a small sample may reduce the power of the test. Therefore, care should be taken not to overgeneralize the results (Madu et al., 1996). There are several inherent weaknesses in the questionnaire survey. When analyzing the data in the questionnaire, it is important to keep in mind the following issues:

1. The results might be affected by the positions of the respondents in the firm. For example, the questionnaire in this study was completed by managerial levels employees and engineers, as they were involved in the Balanced Scorecard implementation. These respondents’ views might be different from those of other staff members of the company.

2. The results might be affected by the awareness and knowledge of the respondents.

3. Some respondents might tend to answer questions in a way that would show their department in a positive light.
4. Some respondents might tend to answer questions in a way that would show their department in a negative light.

Thus, consideration should be given to these factors when interpreting research findings. In this study, the implementation of the BSC model in practice and the actual results on implementation helped the author to interpret the questionnaire findings. The possible bias of interpretations might be avoided. More explanations are provided for the hypotheses that are not confirmed by the data.

1. **Leadership**

The questionnaire findings revealed that the leadership and strategic management has positive effects ($p<0.01$) on people management (H1) and process management (H2) but insignificant effects on continuous improvement (H3). During the past two years, management was heavily committed to the implementation of the new BSC model. The strategy formulation and deployment system have been reshaped. The balanced scorecard has been introduced, which has linked strategies with the departmental business plan and individual targets. Various management systems have been integrated with core business processes reengineered. Teams in management, supervisory and frontline levels have been aligned to spearhead corporate goals. However, it is the staff’s perception that leaders are not involved directly in the continuous improvement but obtain such results through people. This probably explains why the leadership has a strong link with the people management but less so for continuous improvement. The questionnaire findings are consistent with the results of the actual Balanced Scorecard implementation practice.

2. **People Management**

The questionnaire findings strongly confirmed the hypotheses that people management has positive effects ($p<0.01$) on process management (H4) and customer service (H6) but insufficient evidence on information management (H5). These findings reflect the Atkins staff day-to-day operation. People manage the processes and serve the customers either directly or indirectly. They do not manage information, though they use it every
day. The questionnaire reflects the staff perception that information systems are being developed and managed by the related department.

3. **Process Management**

The hypotheses that process management has positive effects on continuous improvement (H7) and information management (H8) were strongly confirmed by data (p<0.01). The Balanced Scorecard implementation has led to a development of web-based documentation and the information of an effective use of the IT technology to manage the process, which has led to substantial productivity gains. The findings are in line with the practices.

4. **Information Management**

The hypothesis that information management has a positive effect on continuous improvement (H9) was strongly confirmed by data (p<0.01), which in fact directly reflects the importance of using intranet to manage information in a much more efficient manner. However, information management has insufficient evidence on customer focus (H10). This reflects the fact that information system now does not provide customer information accessible by general staff.

5. **Continuous Improvement**

The hypothesis that continuous improvement has a strong positive effect (p<0.01) on customer focus (H11) demonstrates that the nature of the business is to serve our customers. Most improvement initiatives are related to the customer services. The questionnaire result is consistent with the current practice of the company.

6. **Customer Focus**

The questionnaire survey findings strongly confirm the hypothesis that customer focus has positive effects (p<0.01) on organizational performance (H12). This finding has confirmed the company vision – to be the most customer orientated design firm in the built environment in the world.
CONSTRUCTION OF THE BALANCED SCORECARD

Management Information System

Atkins developed a Management Information System (MIS), which served as the core reporting system for business performance monitoring of the company.

The company adopted the author’s proposal to formulate and implement a balanced scorecard approach to measure its performance. This approach facilitated the translation of the company’s vision and mission to departmental strategies, which were further cascaded to the operational level through formulating appropriate sectional objectives and initiatives to meet the company’s goals. These, together with the system audit and management review, form the core elements of the performance management system.

Taking advantage of being a facilitator and also an implementer of the Balanced Scorecard, the author adopted a simplified version of the Kaplan and Norton’s (1993) eight-step process to develop and implement Balanced Scorecard.

Identification of the Objectives (Reflect)

Objectives for each of the perspectives of the Balanced Scorecard, in Table 9, are derived from the identified vision, mission and strategies documented in the Quality Manual.

<table>
<thead>
<tr>
<th>Perspectives</th>
<th>Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial</td>
<td>Increase profit and productivity</td>
</tr>
<tr>
<td>Customer</td>
<td>Provide professional and quality engineering services</td>
</tr>
<tr>
<td>Business Process</td>
<td>Provide effective and efficient processes</td>
</tr>
<tr>
<td>Learning and Growth</td>
<td>Improve design engineering techniques and innovation</td>
</tr>
<tr>
<td>Risk</td>
<td>Risk Management and Control</td>
</tr>
</tbody>
</table>
Formulation of Measures for the BSC (Plan)

Appropriate quantifiable measures were determined for each of the perspectives of the Balanced Scorecard with the ultimate goal of fulfilling the established strategy, mission and vision of the company. During the formulation process, the measures identified were mapped out, showing the cause-and-effect relationships between them. This mapping facilitated managers in the identification of any measures omitted or missing issues that are vital for the fulfillment of the defined objectives. Senior management approved the measures selected for the Balanced Scorecard.

Targets Setting and Monitoring (Act)

Based on the confirmed measures for the four perspectives, an annual target as well as a five-year rolling target was defined for each of the measures. These were discussed, debated, modified and finally approved by senior management.

The monthly and the year-to-date performance results for the Balanced Scorecard were compiled. Senior management reviewed the results and formulated appropriate actions to cater for any discrepancies identified. The progress and effectiveness of the follow-up actions were further reviewed quarterly. For long-term monitoring, an annual evaluation report was compiled to ascertain the achievements of departmental objectives and review the appropriateness of the defined five-year rolling targets. Endorsement from senior management needs to be obtained for any amendments to the defined requirements of the Balanced Scorecard.

Post Implementation Review (Observe)

Interviews

A comprehensive review on the performance measuring system has been conducted.
Table 10
LIST OF INTERVIEWEES

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Position held at time of interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Divisional Director</td>
</tr>
<tr>
<td>2.</td>
<td>Financial Controller</td>
</tr>
<tr>
<td>3.</td>
<td>Principal Engineer</td>
</tr>
<tr>
<td>4.</td>
<td>Engineer</td>
</tr>
<tr>
<td>5.</td>
<td>Department Secretary</td>
</tr>
</tbody>
</table>

The table shows that five staff of different levels were interviewed about the criteria of the performance management system.

The aim of the review was to ensure that the system was fulfilling its intended purpose and able to drive overall performance improvement. Relevant company documents were studied to examine the alignment of the company's vision and mission with the organization structure, management systems, strategies, initiatives and performance measures in use. The staff in Table 10 were selected for interview as an important source of information for the review:

These interviews focused on the following issues relating to the design and application of balanced scorecards:

- Methodology for identifying major initiatives in the business plan;
- Strategic issues identified by the top management and the major initiatives developed to neutralize the perceived threats or exploit the envisaged opportunities;
- Design of the Balanced Scorecards being used in Atkins;
- Setting of stretch (two-year) targets for performance measures;
- Validation of the causal relationships between action plans and their expected outcome; and
Analysis and presentation of measurement data.

The interview questions were designed as open-ended questions. Open-ended questions were used because they encourage opinions by the respondent or interviewer, and their analysis is straightforward. Subjects participated in these individual structured interviews, which lasted approximately one hour. The interview records were kept for five years for traceability.

Resulting from the interview, the following recommendations were made to enhance the efficacy of the balanced scorecard:

- One or more measures relating to those end-to-end processes that are critical to satisfying customer needs are to be included.
- More lead indicators ought to be introduced into the balanced scorecard, and they should be linked to the strategic initiatives, such as development of a multi-skilled workforce.
- The appropriate measures for the Learning & Growth perspective such as employee satisfaction, employee loyalty and value added per employee should be added. Organization specific measures in this perspective should be considered through those strategic initiatives that relate to manpower development, knowledge management, and organizational learning.
- The Balanced Scorecard model is fine-tuned for the model establishment.

MODEL OF BSC IMPLEMENTATION AND OVERALL ORGANIZATIONAL PERFORMANCE

Model establishment

Kaplan et al. (1996) describes balanced performance measures as a set of hypotheses about cause and effect. The scorecard makes the relationships (hypotheses) among objectives (measures) in the four perspectives (five in the Atkins’ balanced scorecard) explicit so that they can be managed and validated. It should portray the cause and effect
relationships between outcome measures (i.e. in the financial perspective) and the performance drivers (i.e. in the customer, staff learning and growth and process perspectives). Ultimately, causal paths from all measures on a scorecard should be linked to financial objectives. As pointed out by Koo (1997), there are in fact a prioritise difficulties in hypothesizing the causal linkages in the development stage of a balance scorecard. Most people tend to use their common sense and past experience in assuming the linkage among the Balanced Scorecard measures. There is no systematic and structural approach to quantify the strengths of association among the Balanced Scorecard measures. As also indicated by Neely et al. (1995), there is a lack of empirical evidence on the causal linkage of the four perspectives of the Balanced Scorecard. In this research, structural equation modeling by means of Amos (Arbuckle, 1997) was employed in testing the organizational performance model. The objective of this study was two-fold: to test the effect of the Balanced Scorecard implementation on organizational performance in terms of Balanced Scorecard measures, and the causal relationship among the Balanced Scorecard five perspectives (process performance, risk management, staff learning and growth, customer satisfaction and financial performance).

In this research, the organizational performance model was hypothesized by combining all six constructs into one independent variable, which was used to test the effect of Balanced Scorecard implementation on organizational performance. The staff perceptions of the results of the Balanced Scorecard performance become five constructs, namely, process performance, risk management, staff learning and growth, customer satisfaction and financial performance.

**Hypotheses of BSC Implementation and Organizational Performance**

The balanced scorecard has become a holistic indicator of the organizational performance of the company. Hence, the five hypotheses among five constructs (five perspectives of the scorecard) demonstrate the impact of the Balanced Scorecard implementation to each construct of the organizational performance. They are:
Hypothesis P1: BSC implementation has a positive effect on process performance  
(Indicators P1, P2 and P3 of Table 11)

Hypothesis P2: BSC implementation has a positive effect on risk management  
(Indicators S1 and S2 of Table 11)

Hypothesis P3: BSC implementation has a positive effect on people learning and growth  
(Indicators E1, E2 and E3 of Table 11)

Hypothesis P4: BSC implementation has a positive effect on customer satisfaction  
(Indicators C1, C2 and C3 of Table 11)

Hypothesis P5: BSC implementation has a positive effect on finance performance  
(Indicators F1 of Table 11)

Hypotheses among Organizational Performance Constructs

The process in the BSC model is involved with the integration of various system requirements, such as safety and health and environmental requirements of the engineering services and the risk management as well as those requirements concerned with the core business to achieve business results. Hence, the following hypothesis is proposed:

Hypothesis PA1: Process performance has a positive impact on risk management

A comprehensive study jointly conducted by the American Quality foundation and the accounting and consultant firm Ernst & Yong (1992) studied the performance management system efforts of more than 500 firms in the US, Canada, Germany and Japan. They found that, among other issues, process improvement methods have a significant impact on customer satisfaction. Thus, the following hypothesis is proposed.
Hypothesis PA2: Process performance has a positive impact on customer satisfaction

One of the very important features of the Balanced Scorecard design is the establishment of a team-based structure, which aligns all team efforts toward common goals. Providing clear goals and a structured process to achieving them will improve staff work satisfaction and commitment, which will in turn improve staff learning and growth and hence contribute to the business result of the organization. Anderson et al. (1995) suggested that employee satisfaction has a significant effect on customer satisfaction; it is the foundation for an organization to achieve organization excellence. Fitzgerald et al. (1991) found that employees’ perceptions and attitudes are positively related to customer satisfaction. The research conducted by Anderson et al. (1995) suggested that satisfied employees will improve efficiency and will also make extra efforts to ensure the success of their firm. Therefore, the following three hypotheses are proposed:

Hypothesis PA3: People learning & growth has a positive impact on process performance

Hypothesis PA4: People learning & growth has a positive impact on customer satisfaction

Hypothesis PA5: People learning & growth has a positive impact on financial performance

Numerous studies have shown that high level of customer satisfaction is strongly related to firm’s financial performance (Naumann and Giel, 1995). Rust and Zahorik (1993) suggested that customer satisfaction has a positive effect on customer retention and profit. They portrayed customer satisfaction as an important indicator of a firm’s financial health. Zairiet et al. (1994) suggest that customer satisfaction can lead to an increase in a firm’s market share and profits. Based on these empirical findings, the following hypothesis is proposed:

Hypothesis PA6: Customer satisfaction has a positive impact on financial performance
Brown (1998) indicated that risk management is one of the important issues in the engineering service. It can reduce incidents, and hence service interruption, and also improve competitiveness. Therefore, an additional hypothesis is proposed as follows:

**Hypothesis PA7:** Risk management has a positive impact on financial performance

**Hypothesis PA8:** Risk management has a positive impact on customer satisfaction

<table>
<thead>
<tr>
<th>Table 11</th>
</tr>
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<tbody>
<tr>
<td>THE BALANCED SCORECARD OF ATKINS</td>
</tr>
<tr>
<td><strong>Finance</strong></td>
</tr>
<tr>
<td>F1 Project profitability</td>
</tr>
<tr>
<td>F2 New revenues</td>
</tr>
</tbody>
</table>

Table 11 shows the factors of the five perspectives of the companywide performance management system. The five perspectives include finance, customer, process, people learning and growth, and risk. Finance includes project profitability and new revenues. For customer, value added partners and customer satisfaction index were considered, while under process, the considerations would be quality environmental safety system and quality improvement program. IT system, KPI system and TQM were the factors considered under people learning and growth, while risk management and risk control were under the risk perspective.
Formulation of the Theoretical Model

Based on the 13 hypotheses, a theoretical model of BSC implementation and overall organizational performance is developed, and is displayed in Figure 6.

By fitting the structure equation models employing AMOS (Arbuckle, 1997), the relationship among the Balanced Scorecard, process performance, staff learning and growth, risk management, customer satisfaction and financial performance are revealed as follows:

The two insignificant paths indicate that Balanced Scorecard implementation does not directly affect customer satisfaction and financial performance, but indirectly affects the customer satisfaction and financial performance through staff learning and growth, process and risk management (Figure 6). Deleting these two insignificant paths and
refitting the model, the following results were identified (columns 1 and 2 show the results of the proposed model, while 3 and 4 illustrate the revised one in table 8).

As mentioned, in AMOS, relative chi square was adopted to evaluate the global fit. According to Carmines and McIver (1981), the relative chi square should be in the range of 2:1 and 3:1 for an acceptable model. However, Kline (1998) states that a relative chi square of 3 or less is acceptable. AMOS lists relative chi square as CMIN/DF (minimum sample discrepancy/degree of freedom). In this study, the relative chi square is 1.929 (CMIN = 82.976; DF = 43; DMIN/DF = 1.929). The relative chi square of this study confirms that the data fits the theoretical model of BSC implementation and overall organizational performance. The testing results and the final theoretical model of BSC implementation and overall organizational performance are illustrated in Figure 7

Figure 7
FINAL THEORETICAL MODEL OF BSC IMPLEMENTATION AND OVERALL ORGANIZATIONAL PERFORMANCE
Interpretation of Testing Results

From the results of testing the model of BSC implementation and overall performance, which is based on the survey results of 206 staff, it can be concluded that Balanced Scorecard implementation has positive effects on staff learning and growth, process performance and risk management. However, the Balanced Scorecard implementation does not have a direct impact on customer focus and finance performance but indirectly through staff, process and risk management to achieve them. Among the 13 hypotheses, 10 have been confirmed in this study, including all hypotheses of the cause and effect relationships of the balance scorecard, which is believed to be the first validation empirically.

SUMMARY OF FINDINGS

Various studies (Keengan et al., 1989; Zairi, 1994; Neely et al., 1995; and Frigo, 2001) highlight the importance of measuring financial and non-financial performance. Various measuring methodologies have been proposed by various researches including the well received balanced scorecard proposed by Kaplan and Norton (1992). According to the large scale survey conducted by IMA in 1999 and 2000, among four types of performance measuring methods, namely, traditional performance measures, the balanced scorecard, value-based management performance measures and hybrids, the Balanced Scorecard approach gained support at many companies. The survey results have indicated that the performance measure in four perspectives proposed by Kaplan and Norton (1992) provides a balanced view on external, internal financial and non-financial performance and has been well received in practice. Hence, Kaplan and Norton’s balanced scorecard approach has been adopted as a performance measurement method for the company. In addition to the four perspectives, namely, finance, customer, internal process, and learning and growth, risk has been added as the fifth prospective. The Balanced Scorecard of Atkins China Limited has been successfully established and implemented by using a case study approach. A critical review on implementation of the Balanced Scorecard in the organization has been conducted, and the result is satisfactory.
With the view of validating the effects of Balanced Scorecard system implementation on the overall organizational performance measured by Balanced Scorecard, and the cause and effect relationships among the five perspectives (i.e. staff learning and growth, process performance, risk management, customer satisfaction and financial performance), a theoretical model was hypothesized. The model was tested by structural equation modeling (AMOS) and results indicated that the data from 206 staff fit the model. Among the 13 hypotheses, 10 were positively significant at the 0.01 level. The two insignificant paths demonstrated that Balanced Scorecard implementation did not directly affect customer satisfaction and financial performance, but indirectly through staff learning and growth, process and risk management.

Data from 206 staff of the company were used to test the BSC theoretical model. The model was developed based on the common elements of the TQM. The initial model therefore was a more generic one. The results of the SEM test indicated that, contrary to what was hypothesized in the initial model, three hypotheses were not confirmed by data (leadership and strategic management have a positive effect on continuous improvement, people management has positive effect on information management and information management has a positive effect on customer focus). These findings are in line with the current practice of Balanced Scorecard implementation, as leadership and strategic management did not directly affect continuous improvement but rather through people within the organization. On the other hand, in the staff’s perception, staff are not directly managing information, the information system is designed and managed by functional departments, and information management does not provide customer information accessible by general staff.

To summarize the findings, the study was able to answer the general problem and the specific problems posed in Chapter 1 with the following findings:

1. The Balanced Scorecard by Kaplan and Norton is the appropriate performance management system that can be used to improve the company’s performance.

2. To facilitate the implementation of the new system model, which is the Balanced Scorecard, the following system implementation initiatives should be developed:
a. Leadership and Strategic Management
b. People Management
c. Process Management
d. Information Management
e. Continuous Improvement
f. Customer Focus
g. Organizational Performance

3. The findings reveal the following effects of the new system model:
   a. The new performance management system can improve the organizational effectiveness and efficiency.
   b. By means of the five perspectives of the Balanced Scorecard, it can strive for the continuous improvement of culture and staff development.

4. On Atkins business performance, the data gathered revealed the following effects in the implementation of the new system:
   a. Leadership and strategic management have a positive effect on continuous improvement;
   b. People management have a positive effect on information management;
   c. Information management has a positive effect on customer focus;
   d. Customer focus has a positive effect on organizational performance;
   e. Financial result: a comparison between Rail Department with a performance management system vs Civil and Structure Departments without a performance management system, the projects of Rail Department have profit margin of 10% vs Civil and Structure Departments have profit margin of 3%;

The Balanced Scorecard management system can drive a positive effect on organizational performance.
CHAPTER 5
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

SUMMARY

An extensive literature review was conducted on the recent development and research on the Balanced Scorecard. The review results were indicated enormous development of the Performance Management System. This approach should have a specialized performance model to fit the Atkins’ need to address its burning issues. These issues include the market demand for cost reduction, the anticipated surge of manpower, and inefficiency of the existing management system, as discussed in Chapter 1.

The study began with an extensive literature review of the Balanced Scorecard and other performance management systems such as management by objectives, TQM. Thus, the concept of Balanced Scorecard system was adopted. The new management system concept was based on Atkins’ own business process. Based on this concept, an initial BSC model was developed. To facilitate the implementation of this model, 49 implementation initiatives were developed and the particular characteristics of the Atkins (e.g., the requirements of integrating existing management systems, the focus of risk management as an important strategic direction, and the use of intranet technology to facilitate system implementation). The action learning and action research methods were adopted to implement this new system throughout the organization.

In order to reach the research objectives and answer the research questions, a question survey covering all the departments were conducted. Two hundred and six questionnaires were returned, with a response rate of 23%. The information obtained from the questionnaire survey was mainly used to test the hypothesized model, i.e. BSC model. The objective of formulating the model was to confirm, empirically, that the BSC model is valid for Atkins and that its application had a positive effect on organizational performance. The measurement instrument was empirically evaluated using the data from 206 returned questionnaires. Reliability analysis (internal consistency), item analysis, and validity analysis (construct analysis) were used for instrument evaluation. The analyses concluded that the instrument was reliable and valid.
The data obtained using the instrument can be used to test the theoretical models hypothesized in this study. The 49 implementation initiatives, which were reduced to 31 items after factor analysis, were used to measure the Balanced Scorecard and its implementation.

The structure equation modeling software, AMOS version 3.6 (Arbuckle, 1997) was employed for data analysis. The ration test (which is the chi square) was adopted to evaluate the global model fit, which is the statistical measure of goodness-of-fit available in a structure equation model (Byrne, 1998). The AMOS provides the critical ratio (CR) to identify whether the estimated path coefficients are significant or not. Most hypotheses of the two theoretical models were confirmed by the data indicating that the model was valid for the implementation and its implementation had a positive effect on the organizational performance. Some hypotheses were not confirmed, as explained in Chapter 4. This non-confirmation does not imply that these constructs are unimportant or useless. Further investigation to identify the problems in practice is being conducted with the aim of implementing them more effectively.

In order to validate the effects of Balanced Scorecard implementation on the overall organizational performance measured by Balanced Scorecard, and the cause and effect relationships among the five perspectives (i.e. staff learning and growth, process performance, risk management, customer satisfaction and financial performance), a theoretical model was hypothesized. Structural equation modeling (AMOS version 3.6) has tested the model and results indicated that among 13 hypotheses, 10 were positive and significant at the 0.01 level. The two insignificant paths demonstrated that Balanced Scorecard implementation did not directly affect the customer satisfaction and financial performance, but indirectly through staff learning and growth, process and risk management.

With the view to provide further evidence on the effects on Balanced Scorecard implementation on organizational performance and the business results, a triangulation approach was adopted. The objective of the triangulation approach was to search for consistency of findings from the different data. To this end, the actual performance data were obtained for the following analyses:
1. Longitudinal comparison analyses of the organizational performance of the company before and after Balanced Scorecard implementation;

2. Cross-sectional analysis to verify the company’s performance with the other departments;

3. Analysis of actual business results upon Balanced Scorecard implementation.

A facilitator, Quality Manager, is appointed for the implementation of the Balanced Scorecard, who is independent of the duty of the new performance management system’s designer.

**CONCLUSIONS**

This study concluded that, in order to meet the challenges of the 21st century, an organization should develop a performance management system based on its core business processes, with flexibility of integrating all diversified requirements of ever-increasing management standards. This leads to the establishment of a performance management system model with its implementation initiatives based on the Balanced Scorecard approach.

Several conclusions obtained from testing the hypothesized model were:

1. Leadership and strategic management had positive effects on people management and process management;

2. Leadership and strategic management did not have a direct positive effect on continuous improvement;

3. People management had positive effects on information management and customer focus;

4. People management did not have a direct positive effect on information management;

5. Process management had a positive effect on information management and continuous improvement;
6. Information management had a positive effect on continuous improvement but did not have a direct positive effect on customer focus;

7. Continuous improvement had a positive effect on customer focus; and

8. Customer focus had a positive effect on organizational performance.

Though the data fit the model quite well, it is important to view this study in the context of its limitation. First, data used to test the model came from 206 staff throughout the organization. Strictly speaking, the generalization is limited. Secondly, organizational performance data were obtained from the same group of staff, so the data might have been biased to the management side and hence the research results. The research findings have some practical implications. In this study, some hypotheses were not confirmed by the survey data. This disconfirmation does not imply that these constructs are unimportant, and further investigation is being conducted to identify the problem areas of these constructs and implement them more effectively. For example, management is publishing the top ten strategic issues and staff members are encouraged to form improvement teams to achieve them.

Regarding BSC Model,

1. People learning and growth perspective had strong effects on internal business process perspective;

2. Internal business process perspective had strong effects on customer perspective;

3. Customer perspective had strong effects on financial perspective;

4. People learning and growth perspective had strong effects on customer perspective;

5. Risk perspective had strong effects on financial perspective; and

6. Internal business process perspective had strong effects on financial perspective.

Balanced Scorecard developed in this study helped Atkins to focus management attention on their core businesses while coping with the requirements of quality, health and safety, environment, TQM and other management concerns. The study showed that, while Balanced Scorecard and organizational performance models may be suitable for implementation in most organizations for managing diverse scope of businesses, it
needs to be fine-tuned to meet the individual organizational needs in order to ensure that the system fits the specific organization structure, culture and industry sector.

The test result concluded that:

1. Balanced Scorecard implementation had a positive impact on staff learning and growth, process and risk management, but did not have a direct impact on customer focus and financial performance;
2. Staff learning and growth had a positive impact on process performance, customer satisfaction and financial results;
3. Process performance had a positive impact on risk management and customer satisfaction;
4. Risk management had a positive impact on customer satisfaction and financial performance; and
5. Customer satisfaction had a positive impact on financial performance.

Based on the extensive literature review, backed up by the evaluation of data gathered, it can be concluded that:

1. The Balanced Scorecard can replace the existing management system. The defined concept of Balanced Scorecard was used throughout this study, which laid a solid foundation for conducting this research.
2. The findings revealed a set of system implementation initiatives and it was therefore concluded that the Balanced Scorecard can be implemented through the systems implementation initiatives developed.
3. Based on the data collected from the respondents and the actual organizational performance on the implementation of the Balanced Scorecard, there are effects on organizational performance on the use of the new system model.
4. By comparing the business results of the company for the four years (2008-2011), there have been effects of the new system implementation on Atkins business performance, i.e. the profits were increased (refer Appendix 4).
Regarding the objectives of the study, for the three research questions:

1. What kind of system implementation initiatives should be developed in order to facilitate the implementation of the new system model?
2. What are the effects of the new system model on organizational performance?
3. What are the effects of the new system implementation on Atkins’ business performance?

The research questions are answered according to this study.

1. A new performance management system based on the Balanced Scorecard has been developed and implemented.
2. The effects of the new system model on organizational performance are in the improvement of the financial results.
3. The effects of the new system implementation on Atkins’s business performance are significantly improved for the financial results.

LIMITATION OF THE STUDY

This study is by no means perfect. Three primary limitations apply to this study.

The first limitation of this study, I sent out 895 questionnaires to our staff, and the returned quantity was 206. The response rate of the in-house questionnaire was 23%, i.e. the non-response rate was 77%, which possibly leads to a non-respondent bias which was the limitation of the study.

It is recommended to seek for additional study of the Balanced Scorecard in field settings in an effort to further understand how the program affects organizational performance with a higher response rate.

The second limitation, the current findings may suffer from the limitations posed by the research setting of one case company. Thus, the conclusion may not be generalizable to other companies. Conducting studies that include more sample companies and test the
effect of Balanced Scorecard on company competitiveness and customer satisfaction in a larger scope would be helpful.

The third limitation, the timeframe for observing differences in organizational performance is only in three years. It is possible that over a longer period of time, discernable differences in performance could be observed. Using a long timeframe would allow for determining whether this difference is temporary or permanent. Further research should focus not on whether the Balanced Scorecard causes an improvement in financial performance, but also the amount of time before results are discernable and the circumstances affecting the length of time before results are observed.

**RECOMMENDATIONS**

Based on the findings and conclusions, the following general recommendations are formulated:

1. Balanced Scorecard System is not only effective in the accounting or banking industry but also in engineering consultancy companies like Atkins China Limited. It is therefore recommended to use the Balanced Scorecard System to improve the performance of the organization’s effectiveness and efficiency.

2. The Balanced Scorecard System is recommended for implementation throughout the organization. This is to ensure that the maximum organizational performance goal can be achieved.

**RECOMMENDATION OF RESEARCH OPPORTUNITIES**

In an exploratory study such as this, recommendation for future research would address the issues generated from this study. Based on these findings, future research may start from a relatively high level of knowledge.

Firstly, replication of this study in other commercial companies of other industries should be helpful in re-examination of the validity of its findings, which may help to
generalize the Balanced Scorecard concept. Further empirical studies using cross-company or cross-industry should be helpful to validating models proposed by this study. Secondly, longitudinal studies would be very valuable in studying the time dimensions of the Balanced Scorecard implementation on organizational effectiveness. Thirdly, a comprehensive review and in-depth case study should be conducted in the Business Units to gain insight into using the Balanced Scorecard and organizational performance model in practice. Fourthly, empirical study of the impact of Balanced Scorecard on organizational performance, and the cause and effect relationship should be conducted based on the actual performance data (when sufficient data are cumulated). Finally, the influence of the external environment could be studied in order to explore how the external environment affects the organization’s Balanced Scorecard implementation.


Li, Hang-Yuen. (2002). The implementation of Balanced Scorecard in a Hong Kong banking services company. Post-graduate thesis, Hong Kong Polytechnic University.


Appendix 1

Questionnaire on Importance and Implementation

Please tick (√) the appropriate number and letter, ranging from 1 (No system) to 5 (Fully implemented) respectively, that best describes your opinion or judgment of the importance and implementation of the initiatives as shown on pages 2 to 7 of this questionnaire.

<table>
<thead>
<tr>
<th>Level of Implementation</th>
<th>Detailed Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 No system</td>
<td>No systematic effort or approach shown at all</td>
</tr>
<tr>
<td>2 Unsatisfactory</td>
<td>Effort made with poor results</td>
</tr>
<tr>
<td>3 Partially satisfactory</td>
<td>Planned arrangement with good results sometimes achieved</td>
</tr>
<tr>
<td>4 Satisfactory</td>
<td>Planned arrangement with good results achieved most of the time</td>
</tr>
<tr>
<td>5 Fully implemented</td>
<td>Well-planned arrangement; consistent excellent results achieved; continuous improvement always emphasized</td>
</tr>
</tbody>
</table>

Remarks:
1 No systematic effort or approach shown at all
2 Effort made with poor results
3 Planned arrangement with good results sometimes achieved
4 Planned arrangement with good results achieved most of the time
5 Well-planned arrangement; consistent excellent results achieved; continuous improvement always emphasized
## Survey on Implementation of the Balanced Scorecard management system

### increased level of IMPLEMENTATION

<table>
<thead>
<tr>
<th>No system</th>
<th>Fully implemented</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
</table>

#### 1. Leadership and Strategic Planning

1. Management shows support for effective implementation of Balanced Scorecard System.

2. 'Top-down' and 'bottom-up' communication channels are established.

3. Social accountability and local community involvement are achieved.

4. Process for formulation and deployment of strategies is in place.

5. Business strategies are communicated to and understood by staff.

6. Monitoring, review and reporting of Departmental Balanced Scorecard and other performance are made.

7. Teams are aligned towards divisional objectives.

8. Objectives are deployed to each level to ensure individual contribution to achievement.
2. **People Management**

2.1 Flexibility exists for staff deployment through multi-skilling.  

2.2 Feedback is provided to staff on their performance.  

2.3 Training is provided to ensure staff competence is adequate for current and future needs, and to meet statutory requirements.  

2.4 Job responsibilities are documented and periodically reviewed.  

2.5 Staff become increasingly empowered to act and take responsibility for making decisions and changes.  

2.6 Staff are motivated to support and participate in Work Improvement Teams and process improvement activities.  

2.7 Quality Leaders are equipped with adequate know-how and skills to fulfill their roles.  

2.8 Relevant staff are provided with suitable personal protective equipment and clothing for protection against risks to safety and health.  

2.9 Incentive schemes and promotion programmes are organized to enhance safety, quality and environmental awareness.
### 3. Customer Focus

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1 Customer needs and expectations are understood and translated into corresponding service requirements or System Performance Standards.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>3.2 Two-way customer communication (including complaints) is in place for continuous improvement in service.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>3.3 Station masters have hands-on information relating to latest customer preference and performance of competitors at station level.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>3.4 Service features and their relative importance to customers are determined and proactively managed.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>
### 4. Information Management

<table>
<thead>
<tr>
<th>No system</th>
<th>Fully implemented</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 4.1 Operations documents are effectively maintained, easily and readily retrieved from ACN.

#### 4.2 Web-based documents are updated in a timely and effective manner.

#### 4.3 Operations documents in ACN are made in readable style and format.

#### 4.4 Practices are in place to ensure information contained in operations documents has appropriate level of details.

#### 4.5 Records are adequately maintained to support effective and efficient control of daily operation.

#### 4.6 External benchmark information is effectively used to initiate improvement actions.

#### 4.7 Departmental Balanced Scorecard results are analyzed and utilized to drive improvement.

#### 4.8 Information on supplier/contractor performance is maintained to facilitate effective supplier/contractor management.

#### 4.9 Practices are in place for protection of critical data and important documents in case of major business disruptions.

#### 4.10 Accident/incident information is analyzed to formulate preventive measures.

#### 4.11 Practices are in place to guard against release of confidential information to unauthorized parties.
5. **Process Management**

5.1 Staff-initiated programs (e.g. Staff Suggestion Scheme, Work Improvement Teams and Quality Leader Program) help to generate process improvement initiatives.

5.2 Changes are assessed, prioritized and co-ordinated.

5.3 Statutory and regulatory requirements are proactively managed.

5.4 Core processes are managed and optimized for the organization.

5.5 Pieces of equipment are properly identified and managed according to maintenance plans and replacement programs.

5.6 System is in place to ensure suppliers/contractors are aware of and comply with stated safety, quality, environmental and contractual requirements.

5.7 Procedures for identification and control of Safety Critical Items/Systems are in place.

5.8 Emergency procedures (covering contingency plans, equipment required, persons responsible, etc.) are established for specific situations.

5.9 All accidents and incidents are reported and investigated according to defined procedures.

5.10 Documents (i.e. procedures and work instructions) related to safety, quality and environmental requirements are in place and implemented accordingly.
6. **Continuous Improvement**

6.1 Corrective and preventive measures are in place to reduce/eliminate recurrence of incidents or potential incidents.

6.2 Adequate and effective control is maintained to ensure outsourced works (including design, operation and maintenance works) meet defined requirements.

6.3 Safety inspections are conducted as planned and improvement actions closed out.

6.4 Benchmarking or other best practice tools are used.

6.5 Improvement plans are regularly monitored and reviewed.

6.6 Audits are planned and carried out to ensure system compliance and integrity.

6.7 Management reviews of BSC Management System at planned intervals are conducted to ensure its continuing suitability, adequacy and effectiveness.
Survey on Implementation of the Balanced Scorecard management system

Overall Assessment: Considering the implementation level of the above-mentioned initiatives as a whole, please mark (X) the % of their overall contribution to each of the following divisional performance:

<table>
<thead>
<tr>
<th>Divisional Performance</th>
<th>No contribution</th>
<th>0%</th>
<th>20%</th>
<th>40%</th>
<th>60%</th>
<th>80%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk Performance</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Financial Performance</td>
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<tr>
<td>Customer Satisfaction</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Process Efficiency &amp; Effectiveness</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>People Learning &amp; Growth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please suggest or elaborate on areas, if any, for continuous improvement of the system.

_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________

We would appreciate it greatly if you would tell us something about your profile for our survey analysis.

Department / Section:__________________________________________

Staff Category: □ Managerial Staff
               □ Professional Engineer
               □ Engineer and Below
               □ Secretarial / Clerical Staff

Year(s) of Service:
□ Above 10 years
□ 7-9 years
□ 4-8 years
□ 1-4 years
□ Less than 1 year

Date of completing / returning this questionnaire: ____________________________

============================================ THANK YOU ===========================
Appendix 2

Strategy Map

Financial perspective

Return on Equity

New Revenue

Project Profitability

Customer perspective

Value-added Partners

Customer-satisfaction index

Internal business process

Quality, Environmental, Safety system

Quality Improvement program
Appendix 3

KPI

Financial Perspective

1. Projects shall be profitable.

2. New client increase.

Customer Perspective

3. Client satisfaction level
   a. For levels measured by company client satisfaction surveys, 90% of client satisfaction surveys shall reach ‘Satisfied’ level or above.
   b. For levels measured by government’s performance assessments, 90% of assessments are to reach the score of 45 or above.

4. Upon receipt of queries/instructions/comments from the client and government bodies/external authorities, they shall be responded within two weeks.

Internal Business Process

5. Services delivery to program
   For study or design projects
   Submissions of project deliverables shall be in accordance with the program agreed by the client. NO LATE submission is allowed unless prior consent is given by the client.

6. Number of non-conformities identified in each of the company-wide internal QSE audits and the external QSE audits held by the certification body
   a. Number of non-conformities per project shall not be more than two.
   b. Number of non-conformities for QSE, IT, HR and Admin, Information Departments shall not be more than two.
People Learning and Growth
7. Business Plan review and improvement.

8. For each office, average monthly retention rate for new staff shall be above or equal to 85%.

9. Number of server breakdowns occurring in each office shall not be more than four times per year.

Risk Perspective


11. Project Risk review and control monthly.
Appendix 4
Appendix 5

Interview Protocol Project
Interviewer: _________________
Interviewee: ____________________ Date: _______________
Position of interviewee: _______________
(Briefly describe the project)

Questions:
1. What are our company’s vision and mission?

2. Do you understand your departmental / divisional annual strategic plan (or objectives)? Please give two.

3. How do you know whether the annual strategic plan (objectives) is achieved or not?

4. What are the critical success factors to ensure the strategic plan (objectives) to be achieved? Give three factors.

5. What kind of suggestions you would like to improve the Performance Management System?

Note.

(Thank you for the individual who is participating in this interview.)