Realising the strategic impact of business intelligence tools

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REALISING THE STRATEGIC IMPACT OF BUSINESS INTELLIGENCE TOOLS.

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Abstract

Purpose

In this practice oriented article on the deployment and impact of business intelligence tools in industry suggests a balanced scorecard approach to performance management. More specifically, a suite of web 2.0 tools are used in the practice of business intelligence and their impact measured with a balanced scorecard.

Design/methodology/approach

The research proposition is that the effectiveness of business intelligence is indeed strategic and relates to its corporate performance. This claim is validated using a global IT consultancy firm's business intelligence unit as the lead case of an immersive field study. Research engagements with four other firms provide corroborative support.

Findings

The balanced scorecard approach to deriving targets and ascertaining outcomes was shown to be applicable to good practice. The converse is equally valid. That is, strategic performance management requires the use of business intelligence in order to

be sound. Therefore, tools such as web 2.0 and data analytics, must be outcome-driven with planned targets identified.

Practical implications

Business intelligence is a necessary activity for deriving improved performance. It aids in the identification of a firm's knowledge strengths as well as gaps with respect to its environment. The key message to executives is that Peter Drucker was right – we cannot manage what we do not measure!

Originality/value

The use of business intelligence as a strategic knowledge management technique is a composite of a host of web 2.0 tools. It does not stand in isolation from other initiatives for exploiting knowledge in order to drive performance.

Keywords - strategic knowledge management, effectiveness of knowledge systems, balanced scorecard, organizational performance measurement, market intelligence.

Type of Paper - Research

Brief Biographies

Ravi S. Sharma is faculty and Vironica Djiaw a recent graduate of the MSc (Knowledge Management) programme at the Nanyang Technological University, Singapore. They collaborated on this field study as part of the ongoing efforts at understanding and developing frameworks and tools for industrial knowledge management.

1. Introduction

Improving the productivity of knowledge workers is one of the most important challenges for companies that face the transition from the industrial economy to an economy based on information and knowledge (Drucker, 1999). Key to this transition for business is an understanding of the marketplace. However, most "business intelligence" efforts have failed to address this problem and have resulted in solutions for information management instead (cf. Bohn, 1994; Lee & Kim, 2001; Malhotra 1999; Wensley 2000). Organisations have also failed to realise the full potential of implemented business intelligence and other knowledge management tools to increase corporate performance (cf. Anantatmula & Kanungo, 2005; Eccles 1991; Geishecker & Rayner, 2001; Grembergen & Bruggen, 1997; Lee et al. 2005; Massey & Montoya-Weiss, 2002).

This study explores the effectiveness of business intelligence tools as enablers of knowledge sharing used by employees in the organisation. This is achieved through a case study of an information technology (IT) consulting firm's business intelligence (BI) unit in Singapore. The case is arguably a typical scenario of a knowledge-driven, process-oriented business organisation.

The study addresses two specific research questions. First, how can the balanced scorecard be implemented with business intelligence tools in order to manage corporate performance? Specifically, the research seeks to establish actionable attributes that in turn lead to greater understanding of the effectiveness of typical business intelligence tools. The premise is that effectiveness denotes the capability of being used to a purpose. Hence, we posit that an organisation will need to close the gap between execution and strategy with the help of a balanced scorecard in order to increase the effectiveness of existing business intelligence tools.

Second, how does corporate performance management that encompasses business intelligence, contribute to the success of the organisation? Could it perhaps lead to more scientific management since decisions are based on measurement and tracking? For this purpose, the research focuses on understanding the underlying relations between corporate performance management and business intelligence. In turn, these synergies define the contributions to organisational performance. It is intended that the results of our investigations will help in addressing the gap in the strategy and implementation of business intelligence tools and processes.

The remainder of the paper is organized as follows. The next section is a review of business intelligence, its link with performance management and the balanced scorecard approach, and a field research procedure for conducting a BSC investigation. In Section 3, a description of the context of the case and particularly, the use of some more-commonly used BI tools are given. Section 4 is a field analysis of how these BI tools were used in the IT firm that served as a case environment. It specifically explores the link between business intelligence and strategic performance management. The paper concludes with a recapitulation of key findings and implications for management.

2. Performance Management and the Balanced Scorecard

2.1 Review of Processes, Tools and Strategies

Business intelligence is a systematic process, by which knowledge needed for an organisation to compete effectively, is created, captured, shared and leveraged (Foo, Sharma and Chua, 2007). The source of such knowledge may be internal or external, individual or collective, historical or forecasted. Business intelligence hence consists of a dynamic and continuous set of processes and practices embedded in individuals as well as in groups and organisational structures. At any point in time, any part of a given organization may be engaged in several different aspects of business intelligence that attempts to constitute a 360 degree view of its business health status. Thus, it is not discrete, independent, and monolithic organisational phenomenon.

Effron (2004), asserts that given the definition of knowledge as "the fact or condition of knowing something with familiarity gained through experience or association", it is "impossible to acquire "knowledge" without either experiencing something yourself or interacting with someone else who has" (p. 40). The key to business intelligence is to capture and share such knowledge. Business intelligence is often confused with IT systems and processes. Unlike information, knowledge resides in the experiences of people in different contexts. As noted above, the aim of business intelligence in an organisation is to work within business processes that create, and transfer knowledge throughout the organisation. If knowledge is created and transferred via human experiences then these business processes must encompass an understanding of how people learn and transfer their knowledge (Effron, 2004).

According to Alavi and Leidner (2001), it is not the quantity of knowledge capital that is a strategic advantage but the organisation's ability to effectively apply the existing knowledge to create new knowledge. There are many studies that support business intelligence initiatives and their contribution in aligning organisational goals with objectives. One of them is from report based on a survey of 423 organisations

from Europe and the U.S (KPMG, 2000). In the survey, KPMG identified several expected business intelligence outcomes shown in Table 1.

Table 1: Business intelligence outcomes.

■ Better decision making	■ Better customer handling
■ Faster response to key business issues	■ Improved employee skills
■ Improved productivity	■ Increased profits
■ Sharing best practices	■ Reduced costs
■ Increased market share	■ Creation of new business opportunities
■ Improved new product development	

A poll of executives from 80 large companies in the U.S., such as BP, Chemical Bank, Hewlett-Packard, and Kodak, revealed that 80% believed managing the knowledge capital of their organisation should be an essential or important part of business strategy (Takeuchi, 1998). Strategic goals and business requirements drive process requirements, which in turn determine knowledge requirements and business intelligence initiatives will be effective when they are aligned with the performance goals and requirements of a business, its processes, and its people (Massey and Montaya-Weiss, 2002). Davenport and Probst (2001) suggest that business intelligence is also about creating synergy in organisations and it will increase business performance by aligning individual goals with organisational goals. Hence the link between business intelligence and corporate performance management has been long held.

Typically, business intelligence outcomes are achieved through the business processes which are implemented with tools and information systems in order to empower the acquisition, integration, sharing, and dissemination of organisational knowledge (Bartlett, 1998; Sensiper, 1997). According to Ruggles (1997) and Wensley (2000), business intelligence tools could be categorised into four types of systems as shown in Table 2.

Table 2: Four categories of business intelligence systems.

KMS	Functions
1. Content Management Tools	integrate, classify, and codify knowledge from various sources
2. Knowledge Sharing Tools	support sharing knowledge between people or other agents
3. Knowledge Search and Retrieval Systems	knowledge discovery abilities
4. General KMSs	overall solution to the company's business intelligence needs

Generally, knowledge management systems refer to a class of information systems applied to managing organisational knowledge. These IT-based systems are developed to support and enhance the organisational processes of knowledge creation, storage and retrieval, transfer, and application. Many business intelligence initiatives also rely on IT as an important enabler. IT provides a number of tools that facilitate the free sharing of knowledge among co-workers and team members. On the other hand, not all business intelligence initiatives require an implementation of IT to make them successful (Davenport and Prusak 1998; Malhotra 1999; O'Dell and Grayson 1998). Conducting a desk-top analysis using Porter's five forces to describe an industry is an example where little or no IT but a high degree of market experience is needed. Therefore, it is important to consider the human and social factors at play in the implementation and use of business intelligence tools. Hence, business intelligence initiatives are executed by combining IT, organisational structures, and cognitive based strategies to raise the yield of existing knowledge and produce new knowledge.

In the highly competitive global marketplace, it is also important to realise that business intelligence plays a key role in business processes within the organisation. Business intelligence goes beyond the sharing of database or policies but it also involves employee's sharing and expertise. Business intelligence tools combine information technology and a knowledge sharing culture to create a central repository of intellectual assets, helping the various stakeholders in the company to effectively

discharge their roles and in achieving their strategic business goals. Hence, knowledge strategies can be a reflection of business objectives.

Many knowledge-based enterprises, and especially IT consulting firms, focus on the effective use of the intellectual assets within the organisation with the following objectives:

1. improve overall corporate performance
2. increase organisational competencies
3. increase the capability to form teams and develop communities
4. increase the effectiveness of managing intellectual assets
5. enable collaboration among employees, systems and enterprises

The effective use of the intellectual assets within the organisation approach, centers on enhancing strategic thinking within the organisation through a centralised knowledge platform which acts as a catalyst for innovative ideas. By creating a culture of knowledge sharing with an emphasis on learning, the firm will be able to reduce the development time to market new products and services, increase reusability, improve quality of the deliverables and manage costs better (Rao,, 2001, p.235). An instance of this is the typical IT consulting firm's approach to implementing an information application for clients where the efficient reuse of codified knowledge is essential. In such cases, it is clear that the customer benefits because the consultants can build a reliable, high-quality enterprise application faster and at a better price by using work plans, software codes, and solutions that have been fine-tuned and proven successful. A defining consideration in the use of business intelligence tools is the nature of competitive knowledge in two forms - codification and personalisation.

Codification emphasises the capability to create, store, share, and use organisation's explicitly documented knowledge. The strategy emphasises codifying and storing knowledge. Typically, explicit knowledge is easily codified using IT (Davenport, Long and Beers, 1998; Lee and Kim, 2001; Liebowitz and Wilcox, 1997; Swan, Newell and Robertson, 2000). Codified knowledge is more likely to be reused. The emphasis is on completely specified sets of rules about what to do under every possible set of circumstances (Bohn, 1994).

On the other hand, personalisation emphasises knowledge sharing via interpersonal interaction. The strategy utilises dialogue through social networks including occupational groups and teams (Swan, Newell and Robertson, 2000). It helps to share knowledge through communication via person-to-person (Hansen, Nohria and Tierney, 1999). This strategy attempts to acquire internal and opportunistic knowledge and share it informally (Jordan and Jones, 1997). Knowledge, mostly in its tacit form, can be obtained from experienced and skilled people. This strategy can be referred to as human strategy especially in the context of IT consulting.

However, several studies have different views on the guidelines for employing codification or personalisation. Some claim that organisations should pursue one strategy while using another to support it (Hansen, Nohria and Tierney, 1999). Others found that organisations that acquire and share knowledge by combining codification and personalisation strategies tend to be more profitable (Bierly and Chakrabarti, 1996). Yet others hold that there should be also a balance between explicit and tacit knowledge based strategy for encouraging the development of more innovative knowledge (Jordan and Jones, 1997). And another claim is that organisations that employ an aggressive strategy, which integrates codification strategy with personalisation strategy, tend to outperform those of less aggressive strategy (Zack, 1999). The net result is that both codification and personalization are necessary for business intelligence.

2.2 Corporate Performance Management

Corporate performance management adds value to the business by focusing on how an organisation develops, implements and monitors strategic plans (Eccles 1991). This strategic focus is kept throughout all business management processes. Corporate performance management is therefore about the execution of the strategic plan (Nickols 2003).

Corporate performance management takes a holistic approach to the implementation and monitoring of strategy. It combines business methodologies, business processes and systems with each category represented by the following:

1. Business methodologies – balanced scorecards and metrics that are specific measures used within strategic planning
2. Processes – procedures that align the right information and resources to strategic objectives
3. Systems – technology solutions that combine the business methodologies and business processes into a single management system.

Corporate performance management differs from other approaches to performance management in that it leverages both technology and best business practices to help management answer the key questions around the formulation and implementation of strategy with a bird's eye view of the operating environment.

Corporate performance management enables a closed-loop process which comprises four inter-related phases: 1) strategies and objectives, 2) derived targets and metrics, 3) execution of strategic plans, and 4) measurement and analysis (Kurtzman, 1997; Veth 2006). It starts with an understanding of where the organisation is today, where it wants to go to, what targets should be set, and how resources should be allocated to achieve these targets. Once plans have been set, the system monitors the implementation of those plans, highlights exceptions, and provides insights as to why they occurred. The system hence supports the evaluation of alternatives from which decisions can be made and closes the loop by leading back to the decision on where the organisation wants to go (Lee & Kim, 2001; Zikmud 1997).

Corporate performance management at best enables management to communicate and drive strategy through the entire organisation in a way that helps management act and make decisions that support the strategic objectives and targets. It helps the organisation to focus on key issues and critical data, rather than on all the data and events that are possible. As Paladina (2007) puts it: it delivers the right information to the right people at the right time in the right context. The nexus between business intelligence and corporate performance management is clear and simple.

2.3 The Balanced Scorecard (BSC)

The balanced scorecard, first developed by Kaplan and Norton (1996), is a tool that tracks the execution of an organisation's vision. It does more than just measure performance. It is a management system that focuses the efforts of people, throughout the organisation, toward achieving strategic objectives. It gives feedback on current performance and targets future performance. Put in another way, the balanced scorecard converts an organisation's vision and strategy into a comprehensive set of performance and action measures that provides the basis for a strategic measurement and management system. It is a still popular approach to measuring an organisation's performance, and one that has been widely adopted in business intelligence (Geishecker & Rayner, 2001; Grembergen & Bruggen, 1997).

In summary, the balanced scorecard complements financial measures of past performance with measures of the drivers of future performance. The objectives and measures of the scorecard are derived from an organisation's vision and strategy. The objectives and measures view organisational performance from the four perspectives of: financial, customer, internal business process, and learning and growth. These four perspectives and their accompanying objectives, measures, targets and initiatives provide the framework for using the balanced scorecard[1].

In addition to the well-known financial perspective, the customer perspective includes measures relating to the identification of target groups for the organisation's products in addition to marketing-focused measures of customer satisfaction and retention. The internal business process draws heavily from the concept of the value chain. Kaplan and Norton had indeed included all the processes relating to the realisation of products and services to satisfy customer needs. Finally, the learning and growth perspective includes all measures relating to employees and systems that the company has in place to facilitate learning and knowledge diffusion.

The balanced scorecard expands the set of business unit objectives beyond summary financial measures. Executives can now measure how their business units create value for current and future customers and how they must enhance internal

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[1] A more detailed description of this may be found in:
http://www.balancedscorecard.org/BSCResources/AbouttheBalancedScorecard/tabid/55/Default.aspx
)

capabilities and the investment in people, systems, and procedures necessary to improve future performance. The balanced scorecard thus captures the critical value-creation activities created by skilled, motivated organisational knowledge. While retaining, via the financial perspective, an interest in short-term performance, the balanced scorecard clearly reveals the value drivers for superior long-term financial and competitive performance (Wensley 2000; Zikmud 1997).

However, the idea of monitoring non-financial measures is not new (Eccles, 1991). In the early 1990s, many organisations were already measuring cycle times, quality rates, customer satisfaction, market shares: all of which are non-financial. The new concept however, was to encourage the systematic measurement of these quantities, and to link all these measures in a coherent system. A similar suggestion emerged in France in the 1950s and 1960s, and coalesced into a tool known as *La Tableau de Bord*. But the literature on the Tableau however was never translated, and thus did not catch on across the Atlantic (cf. Epstein and Manzoni, 1998).

The advantage of a measurement system in business intelligence terms is that it directly links growth, learning, customer capital, economic value-added and other knowledge assets to process performance, which in turn linked with overall organisational performance. In contrast to traditional accounting measures, the balanced scorecard organises its measurement system in four perspectives. The financial perspective includes traditional accounting measures. Research has suggested the adoption of different measures for different parts of the company, sacrificing comparability to fit with the Strategic Business Units strategy (Massey & Montoya-Weiss, 2002). Hence, tools that support a balanced scorecard must measure and monitor the knowledge assets of various parts of the organization.

2.4 Strategies and Measurement

Nickols (2003) suggested that the primary focus of strategy is about getting it right and doing it right. On the one hand, an organisation has to pick the right course of action. On the other hand, once chosen, the organisation has to execute it effectively (and know that it has!). If organisation's strategy and its execution are both flawed, or even if only one of the two was sound, the chances of success are zero. Only when the

strategy and its execution are sound will the organisation stand a good chance of success in meeting objectives and targets.

According to Zack (1999), an organisation having unique access to valuable resources is in a way creating competitive advantage. But in some cases, this may not be possible, or competitors may imitate or develop substitutes for those resources. Organisations having superior business intelligence, however, are able to coordinate and combine their traditional resources and capabilities in new and distinctive ways, providing more value for their customers than can their competitors. That is, by having superior intellectual resources, an organisation can understand how to exploit and develop its traditional resources better than competitors through the use of business intelligence tools. Therefore, knowledge can be considered the most important strategic resource. The ability to acquire, integrate, store, share and apply it becomes the most important capability for building and sustaining competitive advantage. The broadest value proposition, then, for engaging in business intelligence is that it can enhance the organisation's fundamental ability to compete.

To achieve success in business intelligence initiatives, an organisation is required to close the gap between the execution and strategy of implementing business objectives. A firm that adopts this process can expect to outperform its competitors (Paladino 2007). This situation is further compounded by the fact that, in most organisations, the strategic plan is normally devised by the upper management while the execution takes place at the lower level, steered by the executives at tactical level (Kurtzman, 1997). Therefore, this paper presupposes that in addressing the gap between execution and strategy, better corporate performance with the help of implementing a balanced scorecard, will be the result.

More specifically, a balanced scorecard may be implemented as a measurement for business intelligence tools which involves processes, people and technology. This spawns two fundamental research questions:

1. How can the balanced scorecard be implemented with business intelligence tools to optimise corporate performance?

2. How does corporate performance management that encompasses business intelligence contribute to the success of the organization in terms of effectiveness?
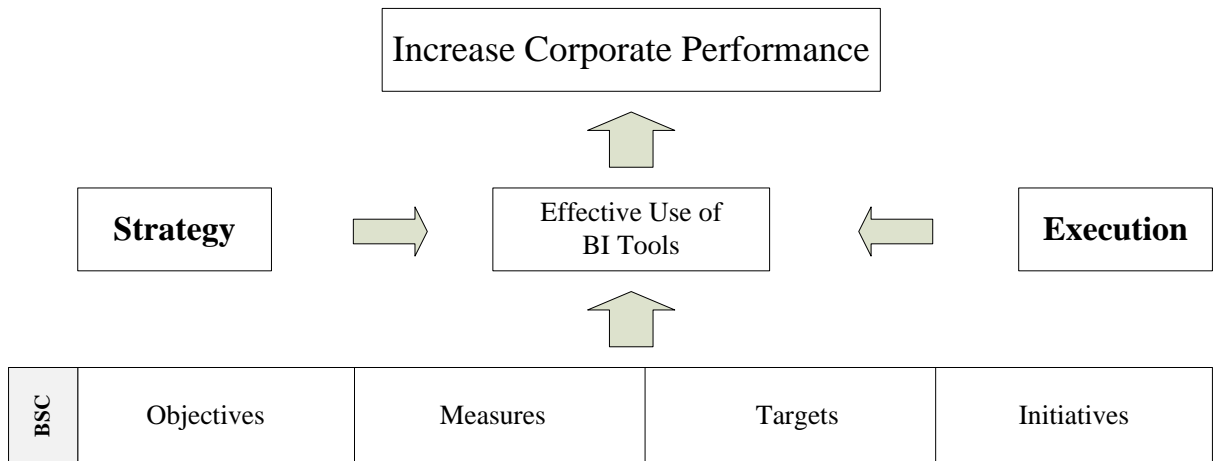
Figure 1: Corporate performance management framework.

The framework shown in Figure 1 illustrates the context of the research questions. In other words, we take the synergistic view that just as BI is necessary for the measurement of key BSC performance metrics, corporate performance management must be guided in a sound and valid manner in which key competitive measurements are derived.

To increase business performance, the gap between strategy and execution need to be closed through the effectiveness of business intelligence tools. This involves the mapping of each business intelligence tool into the balanced scorecard. The organisation must be aligned around a clear and concise strategy for competing effectively. The strategy is what feeds the balanced scorecard. Therefore a strategic plan needs to be constructed which includes the identification of the specific objectives that inform what to do with the business intelligence tools and a set of targets to convey what is expected. Measurements are established for each strategic objective of the business intelligence tools in the areas identified. The measurement criteria provide the targets which can then be used to measure the level of success in achieving them.

The theoretical reasoning that is used in the research goes as follows. Business intelligence drives the establishment of a balanced scorecard for corporate performance. Such an approach requires the prior establishment of corporate objectives, targets, initiatives and measures that define the success of an organisation's strategic vision. Targets are set for each measurement. Measurement alone is not good sufficient. Organisation must drive behavioural changes if the strategy is expected to be executed. This requires establishing a target for each measurement within the balanced scorecard. Targets are designed to stretch and push the organisation in meeting its strategic objectives. The initiatives are designed and launched to achieve the targets set for each business intelligence tool. Finally, the organisation needs to close the loop and put specific initiatives in place to make the vision happen. This will bring success to the execution of the strategy which will increase the corporate performance.

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│                    Step 1:                       │◄┄┄┄┄┄┄┐
│ Assessment of organisation's knowledge management│       ┆
│                    tools                         │       ┆
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│                    Step 2:                       │       ┆
│   Development of knowledge management strategies │       ┆
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│                    Step 3:                       │       ┆
│ Decomposition of knowledge management strategies │       ┆
│   into smaller components, called "Objectives"   │       ┆
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│                    Step 4:                       │       ┆
│ "Measures" and "Targets" are developed to track  │       ┆
│    both strategic and operational progress       │       ┆
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│                    Step 5:                       │       ┆
│ "Initiatives" are identified that need to be     │       ┆
│ implemented to ensure knowledge management       │       ┆
│ strategies are successful                        │       ┆
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┌─────────────────────────────────────────────────┐    Quarterly
│                    Step 6:                       │    evaluation
│ Cascading the balanced scorecard throughout the  │    and revision
│ organisation to business and support units, and  │    of balanced
│ ultimately to teams and individuals              │    scorecard
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│                    Step 7:                       │       ┆
│ Evaluating the success of chosen knowledge       │┄┄┄┄┄┄┘
│ management strategies                            │
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Figure 2: Seven steps to creating the balanced scorecard.

Based on a synthesis of the research literature (cf. Anantatmula & Kanungo, 2005; Epstein & Manzoni, 1998; Geishecker & Rayner, 2001; Grembergen & Bruggen, 1997; Grembergen 2000; Kurtzman 1997; Lee et al. 2005; Massey & Montoya-Weiss, 2002; Paladino 2007) we developed a seven step procedure to create a balanced scorecard. This is shown in Figure 3. Note that business intelligence, being a subset of knowledge management, is closely tied to the flow of knowledge and the exploitation of both internal and external knowledge as an outcome. Hence, it should not be a surprise that in the sequence of procedures for creating a balanced scorecard outlined in Figure 2, much attention is being paid to KM tools per se with respect to strategy, objectives, targets and outcomes. It is intended that the balanced scorecard approach reveal gaps in the alignment of an organisation's business intelligence strategy to execution.
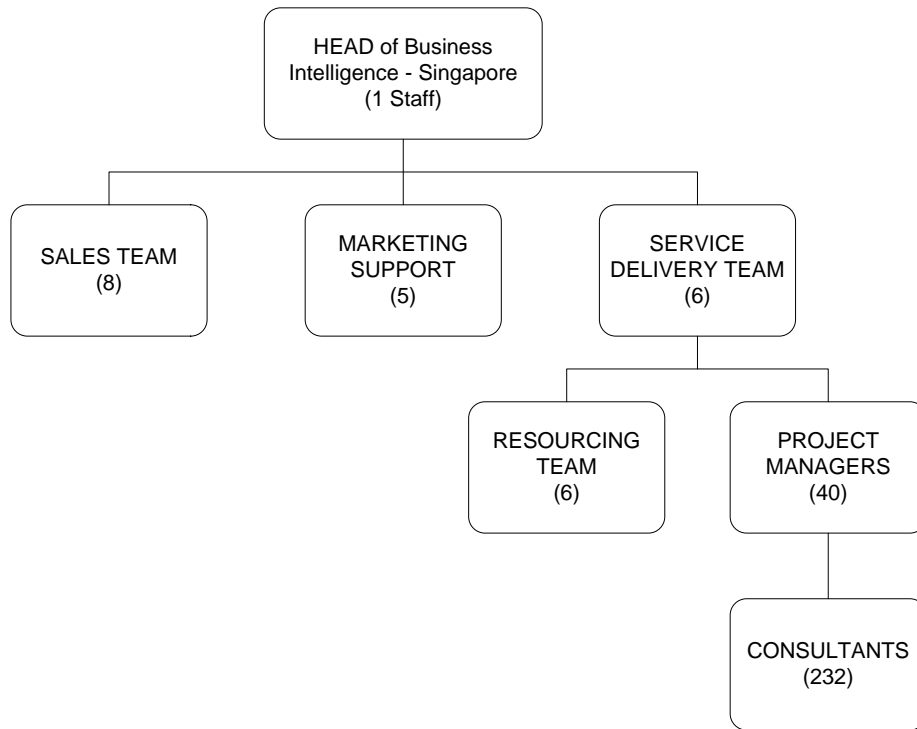
3. The Case of an IT Consulting Firm

The subject of the case research is an IT consulting firm which offers consulting and information technology (IT) services worldwide. We selected the business intelligence group based in Singapore as the unit of analysis for both convenience[2] as well as sophistication. The firm's business intelligence unit has the mandate to help consumer oriented organisations efficiently and effectively utilise enterprise data to gain strategic and tactical advantage over its competitors. The unit was established in 1997 with strength of 288 employees. Headquartered in Singapore with subsidiaries in Malaysia and India, the business intelligence unit has a strong brand reputation as a niche consulting player in the Asia-Pacific region with strong domain expertise in financial services and telecommunications verticals and strong consulting skills in all aspects of business intelligence. Its list of clients include Fortune 500 companies in the Asia-Pacific, North America and Europe.

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[2] It is disclosed here that one of the authors served as an executive intern in the firm during the course of this research and obtained management approval to conduct this study provided anonymity was maintained.

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                   │   TEAM   │          │ MANAGERS │
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Figure 3: Organisation of Business Intelligence Unit.

Figure 3 shows the structure and strength of the business intelligence unit. The IT consulting firm started internal KM initiatives to address the pain-areas of its project managers and presales teams by filling the current information and knowledge gaps in 2001. These KM initiatives were specifically targeted for enhancing the communication among Project Management and Presales activities. In 2004, these KM initiatives had spread its wings and shares information among all its employees. By focusing on employees' pattern of working and their business priorities, the company had launched a series of KM tools which later evolved to a service line for clients.

Whether for itself or clients, the firm soon realized that all organisational knowledge could be utlised for competitive advantage. The management thinking at the company was to use KM to leverage existing resources with appropriate tools and methods to increase corporate performance. Naturally, there was specific interest in using KM tools for the purpose of business intelligence for the firm as well as its clients. The expectation from clients of the IT consulting firm was one of *physician, heal thyself*. The firm therefore deployed nine fundamental tools for its knowledge work and to the practice of business intelligence. Through the skilful utilization of the tools (often in combination) a 360 degree perspective of knowledge relating to finance,

internal process, the customer and growth could be derived. And as would be expected for such a 360-degree knowledge mining exercise, these tools were utilized across codification vs personalization, individual vs group, internal vs external, historical vs forecast data. Brief descriptions of these nine tools are given in the sidebar.

SIDEBAR ON KM TOOLS FOR BI

1. Webinar (Web Seminar)
A *webinar* is a presentation, lecture, workshop or seminar that is transmitted over the Web. A key feature of a Webinar is its interactive elements - the ability to give, receive and discuss information. The online seminars allow participants to ask the instructor questions and get answers in real time. The internal or external instructor will be able to conduct polls and ask questions. Webinars offer exceptional convenience and are very cost-effective especially when travel is not required to attend such events. The firm deems this a critical personalization tool for collective knowledge sharing and diffusion.

2. e-Learning
e-Learning provides consultants opportunities to learn and upgrade their knowledge online in an anytime, anywhere manner. It is part of corporate education where the medium of instruction is the enterprise knowledge portal. E-learning is used interchangeably in a wide variety of contexts. In the organisation, it is the preferred strategy to use the organisation network to deliver specific training courses to consultants and cleints. This tool is a key aspect of growth and learning within the firm's consultants.

3. e-Buddy
e-buddy is an online application concerning human resource management that connects an employee with the human resource department. The application covers human resource processes and thus, knowledge workers are able to track their personal human resource matters such as expatriate arrangement, career advancement opportunities. On top of this, it also performs as a recruitment tool to attract new talents through referral or recommendations from existing employees using their social capital.

4. e-Library
e-Library provides consultants with efficient access to high-quality information to support their learning, research and analysis needs. Recognising the unique challenges of a consultant or client acquiring knowledge, the e-Library is integrated with work requirements to provide seamless, single-sign-on access anytime, anywhere. In addition to templates, deliverables, best practices and how-to guides, the library collection comprises of full-text journals, white papers and books on a broad range of subjects.

The e-Library is the most significant source of codified, collective knowledge in the firm from internal as well as external resources.

5. IT Service Desk

This is an online support 24x7 which provides solution to IT related problems. Users may search and retrieve possible solutions from the knowledge base which is available on the web. If they are unable to get an immediate solution, a ticket will be given for a new technical issue being raised. The database contains a collection of solutions to technical problems as is the case with Microsoft msdn. It enables users to retrieve information from one place and increase the quality of information which is helpful to another who faces the same technical problem.

6. Blog

This is a corporate blog that is published and used by the organisation. The advantage of the blog is that the posts and comments are easy to reach and follow due to centralised hosting, and generally structured conversation threads. The organisation's blog is an internal one that is generally accessed through the organisation's intranet which any employee can view. These blogs are often used in lieu of meetings and e-mail discussions, and can be especially useful when the employees involved are in different locations, or have conflicting schedules. Blogs encourage the personalization of employee participation, free discussion of issues, collective intelligence, and direct communication between various layers of an organisation.

7. Technical Forum

The purpose of the technical forum is to increase internal technical competency. Such a Technical Forum is a web based discussion group to provide ideas, consultation, and solution of technical related problems. Consultants and clients will have a chance to interact with other members in the forum to learn and broaden their knowledge and shared their view when they encounter a problem from multiple perspectives. They may initiate discussions and post technical related issues on web. Lastly, they are able to seek advice from others in the forum for solutions to technical problem that they are facing, or they can also suggest and share their technical experience to others.

8. Collaboration World

The Collaboration World is a software platform designed to help consultants involved in a common task and achieve their goals through groupware or workgroup support systems. Collaborative management tools facilitate and manage group activities. Examples of such activities include: electronic calendars - schedule events and automatically notify, and remind group members; project management systems - schedule, track, and chart the steps in a project as it is being completed; workflow systems - collaborative management of tasks and documents within a knowledge-based business process; extranet systems - collect, organise, manage and share information associated with the delivery of a project; online spreadsheets - collaborate and share structured data and information.

9. Mentoring

Mentoring is an online personal development and empowerment tool. It is an effective way of helping people to progress in their careers. It is a partnership between two people (mentor and mentee) normally working in a similar field or sharing similar experiences online. The mentor helps the mentee to find the right direction and develops solutions to career issues. Mentoring is a significant contributor to individual growth and development.

In principle, the effectiveness of business intelligence tools must be guided by an organisation's goals and bottom-line results. If business intelligence tools do not contribute to an organisation's business and performance, top management would not support further investments of time and resources for such initiatives in the near future. Thus, using the balanced scorecard approach, it makes sense to relate these research findings to bottom line results by implementing a scorecard that translates its business intelligence strategy into a set of objectives and measures. The result of such an exercise is shown in Table 3. This table was derived using the procedures prescribed in Figure 3 by the authors (one of whom interned at the firm for a 6-month period and was able to directly observe and analyse the impact of BI tools on corporate performance).

Interviews and workshops with key executives and lead users as well as a user survey of tool effectiveness for various problem scenarios were conducted over this period. As the study was not meant as action research, the researchers took great care to remain unobtrusive and used numerous sources of secondary data from the corporate finance and IT departments. The scorecard was then used to communicate objectives, targets and outcomes to executives, consultants and even clients as the situation warranted. It was clearly understood by all stakeholders that the firm or client is best served if knowledge workers aligned their day-to-day activities to accomplish objectives and to find new, innovative, and often cross-functional and cross-unit opportunities for contributing to business intelligence objectives.

Table 3 is hence a summary of our analysis using the balanced scorecard approach. A closed examination of the firm and its BI consulting for major clients allowed the recommendation of a comprehensive and continuing communication process (based on the balanced scorecard) to ensure that key actors understood the business intelligence initiatives. In other words, since objectives and targets were derived from BSC perspectives and thus aligned to strategy, the measures of BI were matched with targets as corporate performance was also tracked. In addition,

management could review the balanced scorecard quarterly and update it to reflect new opportunities and competitive conditions. It was also found that with the updated strategic information, management was able to formulate their business intelligence plans and targets for the upcoming year, including decisions about new business intelligence initiatives and capital spending.

Table 3: Summary BSC for IT consulting firm under study.

BI Tools	Objectives	Target	Initiatives	Measures
1. Webinar (Web Seminar)	(i) Deliver advance knowledge and innovative knowledge	(i) Achieve 100 WEBINAR events per week	(i) Conduct (online) Web Seminars by inviting partners, customers and vendors to share their knowledge	(i) Number of WEBINAR events rated "Effective"
	(ii) Increase internal communication in organisation	(ii) Achieve an attendance rate of 90% per WEBINAR event		(ii) Number of participants per WEBINAR event
	(iii) Combine the consulting and implementation expertise with partners' product capabilities to provide real value for customers.	(iii) Achieve 40% of WEBINAR events to be conducted by Guest Lecturers	(ii) Initiate a regular technical meeting with the market players to share their technical knowledge, skill and best practice.	(iii) Number of subject matter experts invited from the industry and innovation centres
	(iv) Alliances between the market leaders and the niche technology vendors in data warehousing, business intelligence and performance management.			

BI Tools	Objectives	Target	Initiatives	Measures
2. e-Learning	Increase internal competency	(i) Lead time reduction by 25%	Provide e-learning for employee to enhance their knowledge and getting 80% of the employee to obtain professional certification	(i) Number of e-learning sessions per day
		(ii) Increase revenue contribution of more US$ 20 million		(ii) Number of e-learning hours per employees
				(iii) Number of Consultants who hold Internal and Professional Certifications
		(iii) Increase the average learning hour for employee to 8 hours per week		
		(iv) Increase the productivity of new hires by 10%		

BI Tools	Objectives	Target	Initiatives	Measures
3. e-Buddy and B-Channel	Search new talents	Increase the number of new hires by 15%	Introduce e-buddy and e-channel programmes through internal networks	Number of referrals
4. e-Library	Increase internal competency	(i) Increase the published paper by 15% (ii) Achieve 100% certification for the employees	(i) Distribute internal magazine and journal through e-library (ii) Encourage consultants to contribute to thought leadership (iii) Encourage consultants to participate in internal and professional certification	(i) Number of publications by external media (ii) Number of associates who contribute to writing articles and thought leadership
5. IT Service Desk	(i) Reduce Cycle Time	Increase cost effectiveness	Provide online technical support 24x7	Time spent to resolve problems and issues

BI Tools	Objectives	Target	Initiatives	Measures
6. Blog	(i) Increase innovation and creativity	Increase number of innovative ideas	(i) Encourage consultants to contribute new ideas	(i) Number of Blog Postings (ii) Number of new ideas contributed
	(ii) Generate new idea to improve business processes		(ii) Provide Blog for associates to share their thoughts and aspirations through informal interaction	
7. Technical Forum	(i) Reduce Cycle Time	Increase number of projects with zero defect (bugs) by 30%	Using reusable components in project development	(i) Number of "bugs" detected per project
	(ii) Less time from design to full production			(ii) Number of rework hours
	(iii) Innovate at a faster rate			
	(iv) Reduce rework			
	(v) Reduce defect			

BI Tools	Objectives	Target	Initiatives	Measures
8. Collaboration World	(i) Generate more revenue (ii) Increase industry recognition (iii) Increase brand recognition and better service orientation	(i) Become the top 3 IT consulting firm in the world (ii) Increase best practice accolades by 20% (iii) Achieve employee index delight by 4.5	Encourage consultants to contribute ideas with reward and incentive schemes	(i) Number of testimonials received (ii) Number of innovation awards received (iv) Number of awards and achievements received
9. Mentoring	(i) Nurture promising associates to be new leaders (ii) Provide excellent project delivery and solution for clients	Increase number of managers who participate in mentoring programmes	(i) Promote leadership programmes through mentoring	(i) Number of leaders nurtured and promoted

4. Recap of Key Findings

This study is an effort to identify the effectiveness of business intelligence tools in an IT consulting firm. The concept of business intelligence initiatives and their resultant effect on corporate performance are of paramount importance in managing corporate performance (Davenport et al. 1998). In so doing, organisations can leverage business intelligence tools effectively and transform their core competencies into a competitive advantage. Since implementing business intelligence tools as part of their KM strategy, the IT firm had met half the target for increasing clients' corporate performance.

It was a major finding that despite the use of the balanced score card as a service offering, the firm lacked a measurement system to manage and guide the effective use of business intelligence tools internally. Apparently the physician preferred other means of healing. As well, it was telling that only 2 out of 9 business intelligence tools - webinars and e-Learning - were widely used by professional staff at the firm. Anecdotally, consultants acknowledged that while they were able to benefit from the business intelligence outcomes, they had little confidence that business intelligence tools would help increase their work efficiency.

Based on these and other findings, it was recommended that the firm closes the gap between the execution and strategy of implementing business intelligence tools. This study further suggests a balanced scorecard to align strategy and execution to increase the effectiveness of business intelligence tools. This would involve the mapping of each business intelligence tool into the balanced scorecard. The organisation must be aligned around a clear and concise strategy for business intelligence per se and only thereafter can the utilisation of business intelligence tools be made effective. In other words, the strategy is what feeds the balanced scorecard. Therefore a strategic plan needs to be constructed which includes the identification of the specific objectives that tell professionals in the firm what to do with the business intelligence tools and a set of targets to convey what is expected. Measurements must be established for each strategic objective of business intelligence tools in the areas identified. The measurement criteria provide the targets which can then be used to determine the level of success in achieving them.

Hence, the organisation that adopts this process through a balanced scorecard may be expected to increase its corporate performance and hopefully to outperform its competitors. However, as a limitation of the study, we concede that replicating it in other geographic regions and business sectors would add to the validity of its findings. As well, longitudinal, action research could be performed to test if corporate performance indeed increases with the adoption of the recommendations derived from balance scorecards.

Our research using the balanced score card and benchmarking also revealed that the firm had less favorable competitive advantage in the following:

- Internal processes such as knowledge transfer, knowledge sharing and knowledge reusability
- Internal competency such as technical skills and industry knowledge
- Recruitment of new talents
- Longer than competitors' project cycle time
- Generation of new and innovative ideas to improve work processes
- Projects with zero defect (bugs)
- Nurturing of new leaders (through internal promotions)

The study gives reason to conclude that a fuller implementation of the balanced scorecard and benchmarking (including bench-learning) will guide the effective use of the business intelligence tool suite to manage the above situations. This, we conjecture, will increase the corporate performance of the IT consulting firm. Drucker was right! Be it business intelligence or knowledge management per se, we cannot manage what we do not measure. Conversely, we must measure what we intend to manage. Lord Kelvin famously stated: "I often say that when you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meager and unsatisfactory kind;" (PLA, vol. 1, "Electrical Units of Measurement", 1883-05-03).

This article is intended to demonstrate the use of a balance score card approach to the measurement and monitoring of a class of such KM tools. As Takeuchi (1998) implied,

practitioners and executives must go beyond accepting the logic of the "wisdom of the commons" to establishing the validity of executing a knowledge strategy with such tools and processes by first identifying and then monitoring targets and outcomes. We conclude that the practice of business intelligence is better served in such a manner.

References

Alavi, M., & Leidner, D.E. (2001). Knowledge management and knowledge management systems: conceptual foundations and research issues. *MIS Quarterly* Vol. 25 (1), pp. 107-136.

Alvesson, M., & Kaarreman, D. (2001). Odd couple: Making sense of the curious concept of knowledge management. *Journal of Management Studies* Vol. 38 (7), pp.995-1018.

Anantatmula, V., & Kanungo, S. (2005). Establishing and structuring criteria for measuring knowledge management efforts, Proceedings of the 38th Hawaii International Conference on System Sciences (HICSS-38), New York: IEEE Press.

Bierly, P., & Chakrabarti, A. (1996). Generic knowledge strategies in the U.S. pharmaceutical industry. *Strategic Management Journal* Vol. 17 (4), pp.123–135.

Bohn, R. (1994). Measuring and managing technological knowledge. *Sloan Management Review* Vol. 36 (1), pp. 61–73.

C. Bartlett (1998). *McKinsey & Company: Managing knowledge and learning, Case 9-396–357*. Cambridge: Harvard Business School Press.

Davenport, T. H., Long, D., & Beers, M. C. (1998). Successful knowledge management projects. *Sloan Management Review* Vol. 30 (2), pp. 43–57.

Davenport, T. H., & Prusak, L. (1998). *Working knowledge.* Boston: Harvard Business School Press.

Davenport, T. H., & Probst, G. (2001). *Knowledge management case book – Siemens best practice.* Germany: MCD Verlag and Wiley & Sons.

Drucker, P. F. (1999). Knowledge worker productivity: The Biggest challenge. *California Management Review* Vol. 1 (2), pp. 79-94.

Eccles, R.G. (1991). The performance measurement manifesto. *Harvard Business Review* Vol. 69 (1), pp. 131-137.

Effron, M. S., (2004). Knowledge management involves neither knowledge nor management. In M. Goldsmith, H. Morgan & A. J. Ogg (Eds.), *Leading organizational learning: harnessing the power of knowledge* (1st Ed) pp. 39-49. San Francisco: Jossey-Bass.

Epstein, M.J., & Manzoni, J.F., (1998). Implementing corporate strategy: from tableaux de bord to balanced scorecards. *European Management Journal* Vol.16 (2), pp.190–203.

Foo, S., Sharma, R., & Chua, A. (2007). *Knowledge Management Tools and Techniques.* Singapore: Prentice Hall.

Gartner Research, (2008). *Press Releases 2008*. Retrieved October 4, 2008, from: http://www.gartner.com/it/page.jsp?id=597910.

Geishecker, L. & Rayner, N., (2001). Corporate performance management: BI Collides with ERP. *Gartner Research*. Retrieved July 20, 2008, from: http://www.gartner.com/resources/103300/103324/corporate_performance_manage_10333 24.pdf

Grembergen, W. V., (2000). The balanced scorecard and IT governance. *IT Governance Institute*. Retrieved July 15, 2008 from: http://www.itgi.org/template_ITGI.cfm?template=/ContentManagement/ContentDisplay. cfm&ContentID=33582.

Grembergen, W.V., & Bruggen, R.V., (1997). Measuring and improving corporate information technology through the balanced scorecard technique. *IT Governance Institute*. Retrieved July 15, 2008 from: http://www.ensino.uevora.pt/tmp/cursos/MOSI/sist_e_tec/balScorecard.doc.

Hansen, M., Nohria, N., & Tierney, T. (1999). What's your strategy for managing knowledge?. *Harvard Business Review* Vol. 77 (2), pp. 106–116.

Jordan, J., & Jones, P. (1997). Assessing your company's knowledge management style. *Long Range Planning* Vol. 30 (3), pp. 392–398.

Kaplan, R.S. , & Norton, D.P. (1996). *The Balanced scorecard: Translating strategy into action*. Boston: Harvard Business School Press.

KPMG International (2000). *Knowledge Management research report 2000.* UK: KPMG Consulting. Retrieved July 20, 2008 from: http://www.providersedge.com/docs/km_articles/KPMG_KM_Research_Report_2000.pd f

Kurtzman, J. (1997). Is your company off course? Now you can find out why like the control panel of a spaceship, a new measurement tool called corporate scorecard can help you navigate through a hostile universe. *Fortune Magazine*, pp. 128–130.

Lee, J., & Kim, Y. (2001). A stage model of organizational business intelligence: A latent content analysis. *Expert Systems with Applications* Vol. 20 (4), pp. 299–311.

Lee, K.C., Lee, S., & Kang, I.W. (2005). KMPI: measuring knowledge management performance. *Information & Management* Vol. 42 (8),pp. 469–482.

Liebowitz, J., & Wilcox, L. C. (1997). *Knowledge management and its integrative elements*. Boca Raton: CRC Press.

Malhotra, Y. (1999). Beyond hi-tech hidebound knowledge management: strategic information systems for the new world of business. *BRINT Research Institute*. Retrieved July 10, 2008, from: http://www.brint.org/IMtoKM.pdf.

Massey, A.P., & Montoya-Weiss, M. (2002). A Performance environment perspective of knowledge management. Proceedings of the 36th Hawaii International Conference on System Sciences *(*HICSS-36)*,* New York: IEEE Press.

Nickols, F. (2003). Strategy is execution, *Distance Consulting*. Retrieved July 1, 2008 from: http://home.att.net/~discon/strategy_is_execution.pdf .

O'Dell, C., & Grayson, C. J. (1998). If only we knew what we know: identification and transfer of internal best practices. *California Management Review,* Vol. 40(3), pp. 154-174.

Paladino, B. (2007). *Five key principles of corporate performance management.* New Jersey: John Wiley & Sons.

Rao, M. (2003). *Leading with knowledge: knowledge management practices in global infotech companies*. New Delhi: Tata McGraw-Hill.

R. Ruggles. (1997). *Business intelligence tools*. Oxford: Butterworth-Heinemann.

Sensiper, S. (1997). *AMS Knowledge centers case N9-697-06.* Boston: Harvard Business School.

Swan, J., Newell, S., & Robertson, M. (2000). Limits of IT-driven knowledge management for interactive innovation processes: Towards a community-based approach. Proceedings of the 33th Hawaii International Conference on System Sciences *(*HICSS-33)*.* New York: IEEE Press.

Takeuchi, H. (1998). Beyond knowledge management: Lesson from Japan. *Sveiby Knowledge Associates*. Retrieved July 15, 2008, from: http://www.sveiby.com/Portals/0/articles/LessonsJapan.htm.

Veth, G. (2006). Map, model and move your key strategic processes. *DMReview.com*. Retrieved July 1, 2008, from: http://www.dmreview.com/issues/20061001/1064625-1.html

Wensley, A.K.P. (2000). Tools for business intelligence, in Chauvel, D., Despres, C. (Eds), *Proceedings of the BPRC 2000 Conference on business intelligence: Concepts and controversies*. University of Warwick: Butterworth-Heinemann.

Zack, M. H. (1999). Developing a knowledge strategy. *California Management Review* Vol. 41 (3), 125–145.

Zikmund, W. G. (1997). *Business Research Methods*, Fort Worth: The Dryden Press.