

# Managing Intellectual Capital through the Balanced Scorecard

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## Abstract

*Intellectual capital, the balanced scorecard and integrated performance management systems are tools which support the development and management of corporate strategy. This paper presents an approach used in implementing a web based data warehouse utilising Balanced Scorecards. It describes how “Stewarts” Ten principles for Managing Intellectual Capital enhance and assist with implementation of Kaplan and Norton’s Balanced Scorecard and support an organisations knowledge management strategy. This paper presents the reflections of an “outsider looking in”; one of the authors has participated in the development of the data warehousing system within his role as Technical Project Manager for an external organisation constructing the system.*

## Keywords

Knowledge Management, Intellectual Capital, Balanced Scorecard

## INTRODUCTION

Burton-Jones (1999) identifies the changing focus of Information Technology in the 1990’s and acknowledges that Knowledge Management “arrived” in 1995. In explaining the success of complex applications, such as the SAP Enterprise Resource Planning application R3, he argues that such products are based on the standardisation of so-called “best-practice” and that SAP customers believe the value of a “standard” exceeds the value of their own specific organisation experience and corporate knowledge. If this is the case, then where does the specific competitive advantage of the firm then reside? What differentiates a business if it uses applications that reflect the standardised business processes of a single, dominant ERP product? Perhaps the answer to the conundrum of differentiation lies in company strategy. If so, companies would need to link the strategic imperatives of their value chains to the drivers of economic value, such as productivity, quality and unit cost. This could explain why a large number of organisations have adopted the corresponding data warehouse product, “SAP Business Warehouse” (BW) and have also chosen to implement the Strategic Organisation Management Applications (SEM). These products deliver automated Balance Scorecards supported by Driver Trees. By utilising SAP’s standard business content, the product marketeers claim that businesses can have an interactive Balanced Scorecard up and running within 1 – 2 months.

If strategy is the remaining differentiation, the relatively long delay of 5 to 10 years in automating this relationship between ERP and the Balanced Scorecard (BSC) must be explained. Why has it taken so long to implement these integrated Warehouse Business Intelligence Systems? The most likely explanation is that a large number of performance measures on the BSC are “soft” measures. These are difficult to define and the establishment of a regime to automatically translate hard, “infomated” process and product metrics into these abstractions is not straightforward.

A possible solution is to be found in Stewart (1997), which sets out the prerequisites for managing knowledge effectively in an organisation. The objective of this paper is to illustrate the relationship between Stewart’s Ten Principles for Managing Intellectual Capital and the ‘Balanced Scorecard’ (Kaplan & Norton, 1992, 1996). This will illustrate how the Balance Scorecard can assist an Organisation’s Knowledge Management Strategy and how this translation can be expedited.

The paper defines the BSC and Intellectual Capital (IC). It then explores the relationship between the BSC and the Ten Principles through a case study Business Warehouse Project in which one author has been involved in over the last 18 months. Stewarts Ten Principles can be related to the problems experienced in this project and then used to assist the implementation of the BSC.

## THE CASE STUDY ORGANISATION

A Global Commodity Organisation (GCC) has been implementing a data warehousing system over a number of years. The system was intended to utilise a SAP BW data warehouse to complement the ERP system and implement a Web enabled Balanced Scorecard as the management-reporting layer. The first number of attempts had failed and the project was cancelled. In 2002 the project was restarted.

The GCC had classified itself as being data rich and information poor (KPMG, 2000) and had decided that it could improve the overall effectiveness of decision making by lifting the quality of information provided to managers and reducing the quantity of data. One aspect of the solution was a Web enabled Business Intelligence system. The primary researcher participated in the development of the data warehousing system in a technical capacity as Technical Project Manager for an external organisation engaged to construct the system.

Although no interviews were conducted, access was given access to “primary” sources of data in the form of reports (both internal and external), documentation available via the intranet as well as various organisation Reports. These primary sources were used in the research as well as various literary works. The names of the organisation and the system have been changed as the organisation, although happy to be involved in this research, does not wish to be publicly identified.

## RESEARCH QUESTION

Given the problem of gaining strategic advantage from standardised ERP products, and their ability to deliver only ‘hard’ measures, the research challenge becomes to find a method for converting those measures into meaningful pictures of organisational knowledge health and performance. The research question therefore is:

“Can balanced scorecards derived from automated performance management systems be used to reflect organisational Knowledge and measure intellectual capital?”

## THE BALANCED SCORECARD

The Balanced Scorecard of Kaplan and Norton (Kaplan & Norton, 1992) is both a strategic approach and a performance management system that allows organisations to translate an organisation's vision and strategy into tactical and operational management reality. It works from four perspectives (or quadrants):

1. Financial;
2. Customer;
3. Business process; and
4. Learning and growth.

This is illustrated in Figure 1, below and described in the following sections.

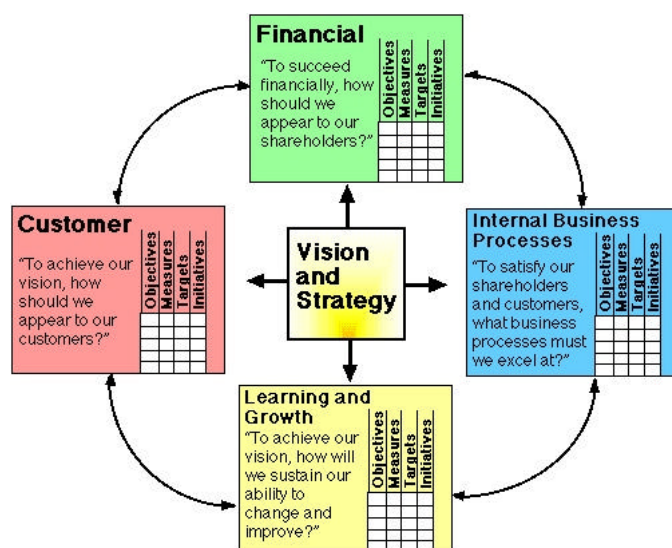


Figure 1: Balance Scorecard simplified (Kaplan & Norton, 2003)

## **Finance**

The Finance Measures are the “hard” metrics which measure the commercial indicators such as cash-flow, profitability, profit per sale and so on. These are easily identified, calculated and dispensed but there are often issues with the timeliness and frequency of the data. Experience with the GCC has shown that only at the end of each month could the “numbers” be reported correctly. With consolidation between company subsidiaries this process could take until at least the middle of the following month. For the GCC, timely and accurate funding data is a high priority, and managers will do whatever necessary to provide it.

The emphasis on financials (and perhaps the fact that they can be calculated at all) leads to the "unbalanced" situation with regard to other perspectives. In the GCC case, they include additional financial-related data, such as production in this category. Although ostensibly an unequivocal metric, production tonnages from a mine can be “soft” as the amount mined usually differs from that shipped at the port. This highlights the difficulties of obtaining even a simple measure, e.g. Cost per production unit.

## **Customer**

There is an increasing realisation of the importance of customer focus and customer satisfaction in any business (Banker, Potter, & Srinivasan, 2000; Hax, 1999; Kaplan & Norton, 1992; Pine II & Gilmore, 1998; Porter, 1980). If customers are not satisfied, they seek other suppliers who will meet their needs. The GCC manages their customers from both the external and internal view. The measures are the same but have some form of variance. They are based on commodity volumes consigned including quality. Poor performance from this perspective is therefore a lead indicator of possible future decline, even though the current financial measures may look good.

## **Business process**

Business process refers to those work activities that constitute the value chain of the organisation. Metrics provide insight to managers on how efficiently and effectively the business is performing. According to Kaplan and Norton (1992), the key issue is the correlation between this set of metrics and the “mission” of the organisation. These metrics have to be carefully designed by those who know the internal mission-oriented and support processes.

The GCC typically used production qualities in its process, i.e. production units created, production units processed, production units transported, production units stocked and production units consigned to customers..

## **Learning and growth**

The GCC has renamed this quadrant “Communities”. Typical measurements are the number of employees, injuries and absenteeism.

Kaplan and Norton (1992) include employee training and corporate cultural attitudes related to both individual and corporate self-improvement for the organisation.

To summarise, the Balanced Scorecard produced by Kaplan and Norton (1992) is designed to:

- ? Communicate to Senior Managers the key success factors for future profitability,
- ? Avoid sub optimisation on a single measure: “How bad things happen to good measures”,
- ? Focus on a limited set of measures: Escape from the “kill another tree” syndrome, which represents the tonnes of paper wasted on useless reports.

Kaplan and Norton state that learning and growth or the innovation and improvement quadrant are intended to drive the improvement in the other quadrants. They quote measures like “Rate of Improvement Index” and “Staff Attitude Survey”. But in today’s new economy (Accenture, 2003; Bond, Dulaney, & Lenz, 2000; Drucker, 1999; Edvinsson, 1996; Finglettin, 1999; Sahlman, 1999; Stark, 2001; Sveiby, 2001b; Walters & Buchanan, 2001) the key competitive advantage is knowledge. So what is knowledge and if it is so important why doesn’t knowledge appear in Kaplan’s and Norton fourth quadrant?

## **KNOWLEDGE MANAGEMENT**

To understand the difficulty one needs to review the different definitions for Knowledge Management. Some are displayed below.

“In the simplest terms it means exactly that: management of knowledge.” (Tiwana, 1999)

“Knowledge management has been defined as the development and operation of organisational methods, procedures, and information systems that are used to collect and share the knowledge and experience of the members of the organisation, as well as to elaborate and disseminate external knowledge, and to bring this knowledge to bear on problems and opportunities.”(Zwass, 1998)

“Knowledge is a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knowers. In organisations, it often becomes embedded not only in documents or repositories but also in organisational routines, processes, practices, and norms.” (Davenport & Prusak, 1998)

These definitions vary greatly. The more detailed the definition, the more it seems to omit and the more all encompassing the definition, the more vague its meaning (Liam Fahey and Larry Prusak in (Davenport & Prusak, 1998). Hackett (2000) explains this through managers’ reluctance to differentiate between data, information and knowledge. He believes there is a lack of education, training, or organisational experience for managers that prepares them for this philosophical examination.

The working definition used by GCC is:

“Knowledge management is about connecting people to people with information, converting information to knowledge and disseminating knowledge” (GCC, 2002)

The GCC adopted this definition because it encompassed connecting people. They believe that they cannot manage knowledge – they can only provide an environment in which the motivation and capability of people to create and share knowledge is optimised. The GCC believes knowledge is about people and that processes and technology are facilitators.

In a survey, KPMG identified a substantial number of organisations either executing or considering KM projects (KPMG, 1998). Nearly 75% of those surveyed were looking to KM to serve an "extremely significant" or "significant" role in improving competitive advantage, marketing and customer focus. Gartner's Hype Cycle for Knowledge Management ( Figure 2 ) shows that KM is just reaching its peak of inflated expectations (Gartner Group, 2003a). The Hype Cycle offers an overview of relative maturity of technologies in a certain domain. They provide not only a scorecard to separate hype from reality, but also models that help organisations decide when they should adopt a new technology (Gartner Group, 2003b).

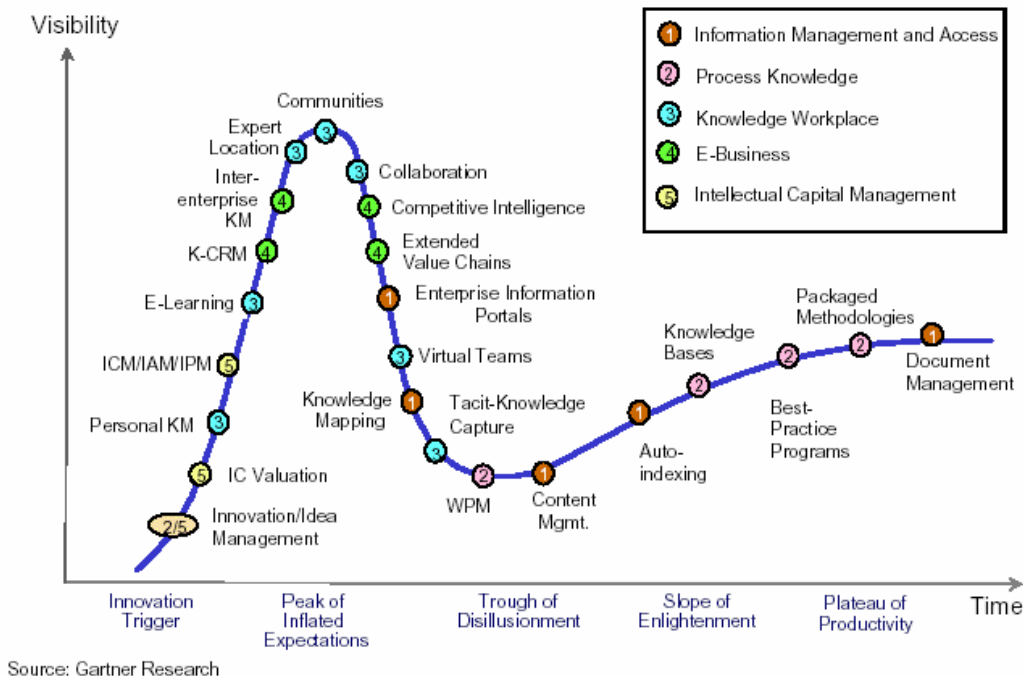


Figure 2: Gartner’s Hype Cycle for Knowledge Management (Gartner Group, 2003a)

What is of interest is that the GCC has all these tools but their “stated published” definition of Knowledge Management is about connecting people to people with information, converting information to knowledge and disseminating knowledge. The following sections will demonstrate how using the concept of Intellectual Capital can assist in developing measures for the automation of performance management systems within the BSC.

## INTELLECTUAL CAPITAL

In a history of intellectual capital, Sullivan (2000) states the term first appeared in 1975. Stewart tracked the first use of the term "Intellectual Capital" to GR Feiwel's "The Intellectual Capital of Michael Kalecki" (1975), in which he attributed the term to John Kenneth Galbraith, who in a letter to the economist Michael Kalecki in 1969 wrote:

"I wonder if you realize how much those of us in the world around have owed to the intellectual capital you have provided over these past decades."

Sveiby (1998) quotes Stewart, in his article Brain Power - How Intellectual Capital Is Becoming America's Most Valuable Asset (June 1991), as bringing IC firmly into the management agenda. Sveiby suggests that Tom Stewart defines IC in his article as:

"the sum of everything everybody in your organisation knows that gives you a competitive edge in the market place."

Stewart indicates that IC was first proposed by John Galbraith in 1969. During the intervening thirty years, a multitude of theories of intellectual capital have emerged (Roos, Roos, Dragonetti, & Edvinsson, 1997). Each of these suggests how to describe and measure the problem of the hidden value of knowledge and information in an organisation, which they argue are the means to sustain competitive advantage. Stewart's definition of IC is:

"Intellectual capital is intellectual material -- knowledge, information, intellectual property, experience -- that can be put to use to create wealth" (Stewart, 1999)

As IC developed as a concept (Stewart, 1997), Stewart realised that measurement directly supports management: indeed, it may be prerequisite. IC is concerned with how better to measure and therefore manage knowledge and the other intangibles in the organisation (Roos et al., 1997).

One of the first attempts to capture the invisible part of the organisation is Itami's theory (Itami & Roehl, 1991) of "invisible assets", which were informational in their nature. However, IC is not information based: it is knowledge based. Knowledge is a personal, subjective process emerging from previous experiences and current events (people connecting to people), while information is an objective statement about the environment (Roos et al., 1997).

Measurement of IC is still lagging. This is illustrated by the discrepancy between book value and market value, which requires the notion of intellectual capital in order to make sense. For example, Ericsson has been estimated to be worth approximately 80 percent more than the value of its assets, meaning that modern day accounting captures only 20 percent of Ericsson's market value (adjusted shareholders equity) (LoÈvingsson, Dell'Orto, & Baladi, 2000).

Figure 3 below shows a model of IC presented in Petty & Guthrie (2000) .

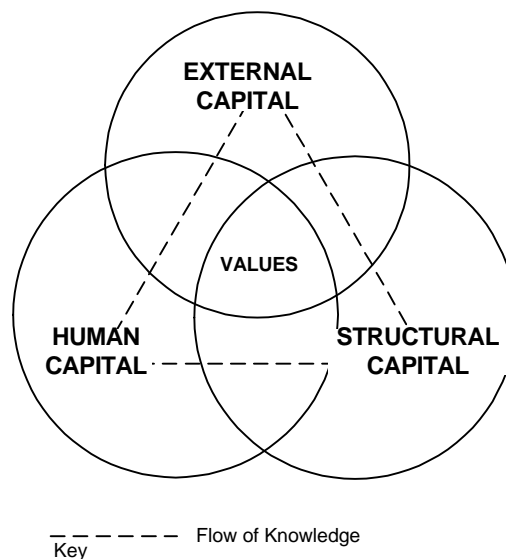


Figure 3: Popular Model of Intellectual Capital (Allee, 1999)

The model is important as it classifies Intellectual Capital into what one might call sub-domains of intellectual capital:

- ? Structural Capital: the tangible assets of a company, including desks, computers, offices etc and tangible 'intangible' assets, such as documentation, processes, computer source code, Intellectual Property (patents, trademarks) and data warehouses as well as the physical network through which data flows.
- ? Human: The combined value of the knowledge, experience and goodwill of employees.
- ? External: Also known as “Relationship or Customer Capital”, is the combined value of the goodwill or trust that a company has built with its customers and suppliers, as well as its 'Mind-Share'.

Some models include capital separately (Cavendish et al., 1999) but most include the traditional Financial Capital in Structural Capital. The separation is important as this helps understand the relationship to the BSC.

### **Stewart's 10 principles of Intellectual Capital**

Stewart's 10 principles of Intellectual Capital (1997) seek to highlight the difference between knowledge and non-knowledge work. For example, where the division of labour and monitoring may have been appropriate for optimising physical work, knowledge work requires explicit recognition of motivational and social dimensions. If Stewart is right, then a comprehensive knowledge management programme should attempt to cover the ten principles. And any programme, if it is to be managed successfully, must be measured. The ten principles for managing intellectual capital and examples of how the GCC is using them are listed in Table 1, below. Each principle is also linked to a dimension of the balanced scorecard.

Table 1: Ten Principles for Managing IC (Stewart, 1997) and the corresponding GCC actions

Stewart 10 Principles for Managing IC	GCC Actions (Examples)	How it can support the BSC?	IC Sub Category
1. Organisations don't own human and external capital. Organisations must recognise the shared nature of these assets that an organisation can manage and profit from these assets.	<ul style="list-style-type: none"> <li>? Implementation or Award and Organisation Bargaining agreements</li> <li>? Executive Incentive Plans</li> <li>? Equity Based Plans</li> <li>? Innovation Awards Scheme</li> <li>? Joint Ventures</li> <li>?</li> </ul>	? The Knowledge sharing characteristics	<ul style="list-style-type: none"> <li>? Human Capital</li> <li>? External Capital</li> </ul>
2. To create human capital it can use, an organisation needs to foster teamwork, communities of practice, and other social forms of learning.	<ul style="list-style-type: none"> <li>? Communities of Practice (COP)</li> <li>? Virtual Teams</li> <li>? Intranet</li> <li>? Operating Excellence Groups</li> </ul>	? Measures defined by COP	? Human Capital
3. Organisational wealth is created around skills and talents that are proprietary and scarce. To manage and develop human capital, organisations must recognise that people with talent are assets to invest in. Others should be managed closely with little or no investment.	<ul style="list-style-type: none"> <li>? Registering skills and qualifications for each employee</li> <li>? Employee Incentive Schemes</li> <li>? Safety Management</li> </ul>	<ul style="list-style-type: none"> <li>? Safety Management</li> <li>?</li> </ul>	? Human Capital
4. Structural assets (those intangible assets the organisation owns) are the easiest to manage but those that customers are not really interested in or care least about.	<ul style="list-style-type: none"> <li>? Un-mined Ore quantities by quality (Stock)</li> <li>?</li> </ul>	? Stock levels (by process)	? Structural Capital
5. Move from collecting knowledge for "just in case" scenarios to having information that customer's need ready to hand, and that they might need within a reasonable time.	<ul style="list-style-type: none"> <li>? Review of Measures to</li> <li>? Defining a Balanced Scorecard and using "driver trees" to define critical drivers of those measures</li> <li>? Defining production process measures (e.g. Cycle Time, Gross Loading Rate)</li> <li>? Quality of Commodity by Source</li> <li>?</li> </ul>	? Classifying data into the four categories.	<ul style="list-style-type: none"> <li>? Human Capital</li> <li>? External Capital</li> <li>? Structural Capital</li> </ul>

Stewart 10 Principles for Managing IC	GCC Actions (Examples)	How it can support the BSC?	IC Sub Category
6. Information and knowledge can and should substitute for expensive physical and financial assets.	? Outsourcing of the primary mining function. Retain Planning, value adding (Production) and selling	? Measure contract management ? Compare contracts ? Determine measures to measure process towards outsourcing	? Structural Capital
7. Knowledge work is custom work, where mass produced solutions won't yield high profits.	? Enhance planning tools and determine metrics for managing contractors	? Determine Knowledge Management Strategy ? Train staff in Business Intelligence tools ? Introduce Document Management System	? Human Capital ? Structural Capital
8. Every organisation should reanalyse the value chain of the industry that it participates in to see what information is most crucial.	? Defining a Balanced Scorecard and using "driver trees" to define critical drivers of those measures ? Creating an Operating Excellence group with defined targets.	? Determine performance measures other than "hard" financial measures. Three other categories or quadrants used for some "soft" measures.	? Human Capital ? External Capital ? Structural Capital
9. Focus on the flow of information in the business process not the flow of materials (i.e. follow the intangible economy)	? Introducing the Balanced Scorecard with the three "soft" quadrants. ? BSC's are departmentalised with individual Production, Logistics and Marketing BSC's.	? Levelling of BSC's ? Linking Driver trees to Performance Measures.	? Human Capital ? External Capital ? Structural Capital
10. Human, structural and customer capital work together. It is not enough to invest in people, systems and customer separately. They can support or detract from each other.	? Integrated BSC with levelling to separate BSC's for each department.	? Integrate view of Tangibles and Intangibles in one report.	? Human Capital ? External Capital ? Structural Capital



Table 1 illustrates the relationship between the Balanced Scorecard, Knowledge Management and IC in practicable terms. From this relationship and practical examples a theoretical model is proposed.

## PROPOSED MODEL

Arora (2002) developed the KM index that covers all four perspectives of the balanced Scorecard. This index should be reviewed every three to four years depending upon the change in overall strategy of the organisation, the knowledge strategy and the maturity of the KM system. Based upon this, Intellectual Capital can be depicted as a three-way relationship. This is illustrated in Figure 4, below.

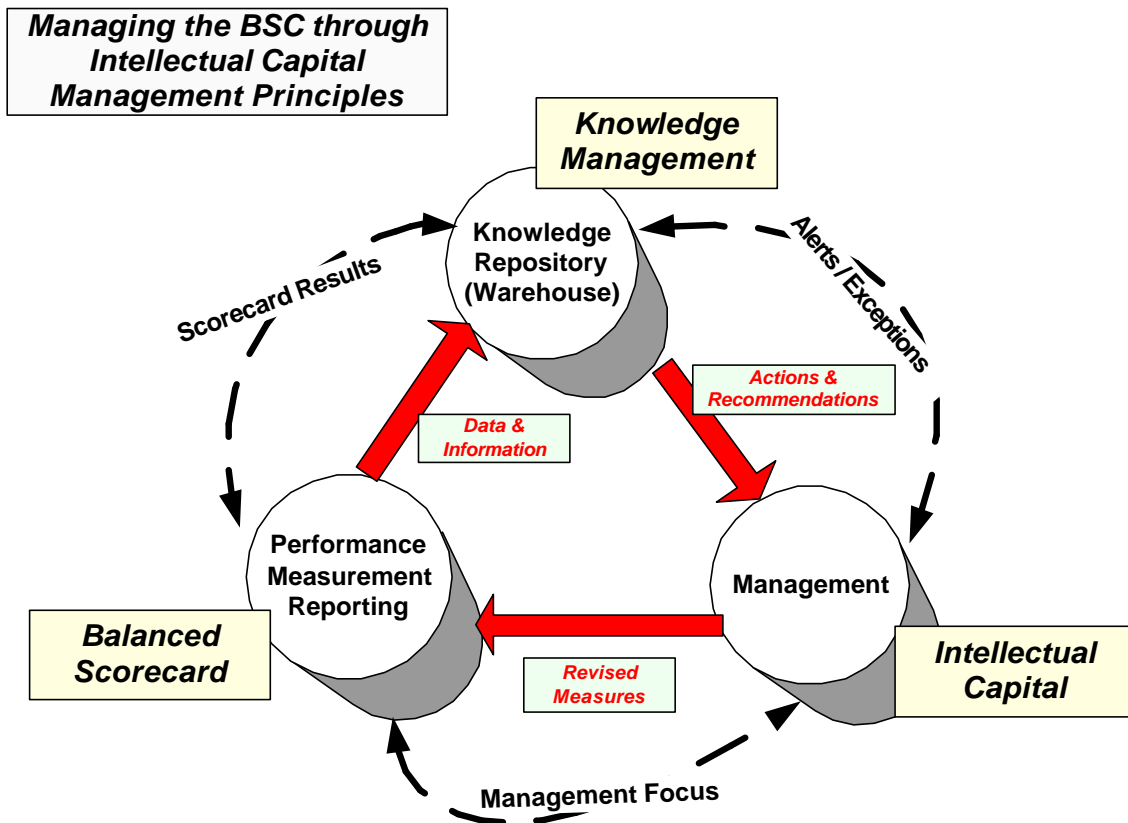


Figure 4: Proposed KM, IC BSC Model

Knowledge Management is represented by the Knowledge Repository (or Warehouse), Intellectual Capital by Management and the Balanced Scorecard by Performance Measurement Reporting. Data flows are represented by broad Arrows.

As illustrated in the model above, the BSC can be used as a mechanism to store and report performance data, usually in a repository. In a SAP ERP business this is usually a SAP Business Warehouse or BW system. Through the management of these performance measures, alerts and exceptions can be defined to allow value by managing only by exception.. By comparing each performance cycle to previous ones (or to other external sources), the measures start to have their own intrinsic value. Managers then focus on these valuable measures and they are refined to provide more jewels. The management focus then refines the performance measures contained in the BSC. Reporting and storage of the measures then creates more knowledge and so the cycle continues. Over time this knowledge and IC is just as important as any other piece of Capital.

Scenarios, taken from the GCC. enable the model to be examined.

Scenario 1: Cost per production unit (start at Performance Measure (BSC))

By setting performance measures, data and information (measures about measures e.g. Production units produced compared with total cost of production gives us Cost per Production unit) is obtained which is stored into the Knowledge repository or Warehouse. This in turn has intelligent alerts in the warehouse that trigger a message to Management advising a tolerance is outside the defined boundaries. Management then go to the balance scorecard to review the measure.

### Scenario 2: Production units shipped (start at Warehouse (Knowledge repository))

Data is loaded into the warehouse (knowledge repository) via an automated real time interface. This is reported as Production units Shipped. Management receive the information and then set targets or budgets based on the data in the Balanced Scorecard. The scorecard allows management to compare the data to the strategic goals of the organisation and record the budgets in the Knowledge repository.

### Scenario 3: Review of Education levels (start at Management (IC))

A review of a specific skill has determined that there needs to be more people in the GCC with a particular qualification. A target is set and placed in the BSC. Educational data about employees is stored in the data warehouse (knowledge repository) and reported monthly to management.

The dotted line in the Figure 4, above, represents the flow of knowledge or Intellectual Capital as the primary vehicle between all three theories. Scorecard results with alerts and exceptions allow a more intense form of management focus that supports the strategy and goals defined in the Balanced Scorecard.

As can be seen the three can be integrally entwined to provide an environment of support in these days of tough economic realism. The model, by its design, supports knowledge creation (Allee, 1999; Nonaka, 1991; Sveiby, 2001a). The logic in the model also describes how people develop new measures for knowledge sharing, as well as metrics for increases in external, internal or human capital.

The GCC has invested extensive resources, time and effort in the support of its BSC but in fact they are actually improving the management of their organisational knowledge environment as well. The ability to access the BSC by all staff over the Internet supports practical knowledge management using intellectual capital (Damsgaard & Scheepers, 2001).

Other organisations though may have limited thinking around the knowledge based organisation, viewing knowledge, as proposed in the model, people will tend to focus on processes which in turn will act as a catalyst for knowledge creation and sharing across the organisation. As stated by Allee (1999), "this is based on the belief that enhancing the flow of knowledge will lead to greater organisation value."

## LEARNINGS TO DATE

Although only in the early stages of implementation of an automated BSC at the GCC, the company's experience has shown some shortcomings and some benefits. The key learning points to date are:

- ? The organisation has no time to spend in developing and implementing the BSC. They are too busy "doing the business of business".
- ? Training has to be short and to the point (LoÈvingsson et al., 2000). The training needs to be functional about how to use the information contained but also about influences and how the employee can influence the result.
- ? Having the BSC intranet based (web enabled) (LoÈvingsson et al., 2000) allows easy access and follow up.
- ? The levelling of the BSC (LoÈvingsson et al., 2000) allows separate departments to manage "their patch" while understanding the impact on the organisations strategic goals.

These lessons require further investigation and discussion that will be the subject of future research, These shortcomings may not have occurred if Stewart's Principles for Managing IC (Stewart, 1997) had been previously known by the GCC.

## CONCLUSION:

The BSC supports the 10 principles of managing IC by displaying how well (actuals) and how far an organisation has gone (history) and indicates where one needs to be (targets). The BSC provides good navigational aids that clearly illustrate the current management position in all terms, not just financial (Roos et al., 1997).

The model supports the view that a BSC can be used as a mechanism to store and manage knowledge and through the management of this knowledge, a business can measure its performance by giving that knowledge a value. This in turn gets management focus which refines the performance measures contained in the scorecard which then creates more knowledge and so the cycle continues. Over time this IC is just as important as any other piece of Capital.

IC supports the knowledge management strategy of an organisation through the BSC. IC can supplement an organisation's management process and Stewart's Ten Management principles for IC assist in managing all the quadrants of the BSC as well as linking these measures to a deeper understanding of the properties of organisational knowledge. (Table 1)

Knowledge management is a long-term strategy. The BSC helps the organisation to align its management processes and focuses the entire organisation to implement it but by using Stewart's Ten Principals for managing IC, management can focus on a proper performance measuring system that takes into account IC.

IC can provide a framework for managing the implementation of KM and the BSC while allowing dynamic improvements and feedback changes in the knowledge management strategy while still catering for changes in organisational strategy, competitiveness and innovation.

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