

Benchmarking Performance Management Systems

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Abstract

The Balanced Scorecard and associated performance management approaches, has become a widely practiced and popular management reporting method in recent times. Moreover, enabling technology, which assists in the delivery and personalisation of corporate performance information, is having a deeper and more rapid impact than ever before. This paper presents a brief comparative benchmarking study of leading enterprise performance management systems. Also, the author discusses the merits of bespoke internet technology development and out-of-the-box portal functionalities. An analysis of key business drivers and implementation risks of such approaches is highlighted via a case study example, and concludes the paper.

Keywords: Performance Management, Information Management, Portal / Internet technology, Management Information Systems

1. Introduction

The concept of performance management, arose approximately ten years ago, in response to the oft-asked questions in many organisations : "How are we performing ? Are we investing in the right projects ? What is our cash flow ? What do our customers think of us ?". These rather innocuous questions, point to the very heart of an organisation and in essence, form the basis of the topic of performance management. The theme of all of these, and related, questions is to gather business critical information, which allows the organisation to link internal, external and growth indicators together, in order to provide a perspective on the nebulous concept of business performance. This paper seeks to assess different methods of IT solution to performance management in this regard, the discussion being structured as follows.

Some general knowledge of performance management and an understanding of balanced scorecard methods is assumed, but a brief overview will be given of the area in section 1.1. A comparison is also made against bespoke solutions offering similar functionalities, approaching the area of consideration from a internet technologies development viewpoint in section 2. The systems evaluated within the paper are leading enterprise solutions for performance management. Such Performance Management Systems (PeMS), have been rated in accordance with a generic benchmarking methodology, which is organisational sector-neutral and is described in sections 3 and 4. However, the results are framed with respect to implementing within consumer and / or industrial markets companies. Finally, the paper concludes by discussing the importance of the deployment technology is also discussed with respect to benefits and value-adding aspects of portal-based approaches, in section 5.

1.1 Overview of Balanced Scorecard and Performance Management Concepts

Many researchers and practitioners in management science, were long of the opinion that there should be a unifying framework which should provide a flexible management reporting method, akin to a "score card" of strategic, tactical and operational factors.

Kaplan and Norton (1992), were instrumental in refining and developing such a concept in the guise of the now well-known Balanced Scorecard. The premise of the concept, was to address the issue of how an organisation could provide both a strategic and an operational insight, into their business. At the heart of the method, the scorecard entails defining a number of perspectives which can be measured in some way, so as to provide both a means for historic analysis as well as forecasting, based upon the realisation of key factors which embody the organisation's business strategy.

The typical Kaplan and Norton perspectives which are regularly cited, are usually given as :

- Customer : how are we perceived by our customers (as of today)?

- Internal : what core competencies do we possess and what can be developed (from today) ?
- Growth : what is the capacity for the organisation to learn and grow (into the future) ?
- Financial : what is the impact of performance on shareholder value (in a historical sense) ?

As such, the balanced scorecard is a powerful tool for aligning the strategic intent within an organisation. This allows the visibility of managerial goals and objectives, from the CEO to middle management and inevitably, throughout the organisation. The reason for naming such a set of “scored” measures, as a *balanced* scorecard, is that factors which may be non-financial in nature, can be compared to purely figurative, quantitative data in order to assess the impact of an organisation’s strategic planning initiatives. In such a way, this tool can be used in several different manners, most notably as a:

- ***Operational Control tool*** : to view and act upon historic, and usually financial, factors (for example, profit per share),
- ***Strategic Planning tool*** : monitoring the strategic intent across all departments and divisions within an organisation (for example, for long term control),
- ***Management reporting tool (an MIS)*** : providing access to organisation-wide information in addition to quantitative financial reporting ; providing additional context and visibility to non-quantitative, qualitative measures such as employee empowerment (i.e. linking knowledge to performance metrics). This can even extend to a full knowledge management system, if the context of the reporting is required to be more in-depth and is required across multiple facets / roles of the organisation,
- ***Change Management facilitation tool*** : by leveraging organisation wide knowledge and information, using aspects of the previous 3 methods, strategic, tactical and operational issues on the management agenda can be made accessible, visible and be open to discussion and implementation.

In the case study example given in section 5, and the sections leading up to it, the reader will be able to note that the strength of performance management approaches lie within the strategic planning and change management domains cited above.

2. Implementing Scorecards within a Performance Management System

In terms of implementing the balanced scorecard concept, experience has shown that many of the implementation aspects can be utilised to provide managerial insight into the organisation. However, the organisational culture needs to be aligned to the approach. Typically, balanced scorecard approaches which are implemented in terms of a generalised performance management system, exist to facilitate the change management and organisational learning processes. Such internal initiatives are usually led by the CEO and senior management team, and hence any additional approaches to managerial control and visibility, must have sponsorship and stewardship from the highest levels in the organisation. Where this is the case, the organisation may be experiencing the effects of mergers and acquisition activity, and maybe also product portfolio diversity. Either of these, or other organisational culture effects, may cloud control, visibility and communication within the company. As such, some core steps that define steps to achieve such clarity, have been identified by researchers in this area, are shown in Table 1.

Take in Table 1

2.1 Methodologies for implementing performance management

At the heart of any balanced scorecard or performance management approach, there should be a fundamental strategic plan and business vision of the firm, which can be related to an implementable measurement and decision support tool. The most notable and trusted approach, apart from that of Kaplan and Norton, is the performance management 'manifesto' approach of Eccles (1991), which focusses on the 5 key areas of:

- ***Development of an Information Architecture*** : data, information, tools, processes, sources, stakeholders, accessibility, security, relevance, timeliness.
- ***Design of a technical solution to support the systems architecture*** : EIS, MIS, DSS, intranet, extranet, Knowledge Management (KM) system, balanced scorecard, performance management, business intelligence systems, Enterprise Resource Planning (ERP), internet technologies Component Based Development (CBD) technologies.
- ***Alignment of incentives / goals which feed the technical solution*** : realising importance and impact of the architecture and the solution in an operational sense, driven by senior management and the CEO.
- ***Application of external resources to develop the tool*** : industry standards, benchmarking (attaining best of breed solutions from different industry

sectors and implementing / adopting them as your own), regulatory pressures (e.g. SEC, FSA, GAAP, tax and localisation issues), professional services advice.

- ***Design of a process to control the performance management system*** : fluid, dynamic management and process structure in order to provide visibility, accountability and control of a performance management system.

As such the methodology for implementing performance management approaches can easily be based upon other similar management reporting and strategic approaches such as is shown in Figure 1 and Figure 2.

Take in Figure 1

Take in Figure 2

In executing a grounded methodological approach to performance management, it should always be remembered that the aim of the tool is to communicate the strategic goals of the organisation, and actively discuss those perspectives and measures which are relevant, timely and important to each aspect. Showing the current “as is” as well as providing insights into the future direction of the firm, each perspective needs to be discussed and communicated from senior managerial level onwards, in an iterative and evolutionary manner. At each stage, the measures and objectives for each perspective should be consolidated into relevant areas (through linking critical success factors (CSFs) and key performance indicators (KPIs) to the strategic intent of the organisation as shown in Figure 3).

Take in Figure 3

2.2 Implementing the perspectives, objectives and measures

In implementing all aspects of the scorecard, it should be remembered that the basis for the definition of the key factors and measures, is reliant upon the development of the strategic definition. In order to support the scorecard concept, there must be provisions made for defining management systems and processes which will aid the ownership, control and planning of the initiative. Coupled with this, is the requirement to build upon the vision and the key measures identified, using available tools and methods (otherwise known as systems development). Finally, upon implementing the scorecard concept there should be feedback into the organisation itself whereby experiences from identifying measures and factors, are fed back into the organisation itself as internal knowledge. This is shown in Figure 4.

Take in Figure 4

3. Deploying Performance Management Systems : Buy vs. Build

In implementing and deploying a performance management system, the goal is to provide visibility and insight into the organisation's information and data. Information technology can help to deliver such information and management control, through accessing enterprise data via ERP, legacy and database systems, across local area and distributed networks. The scale and extent of the performance management system, will largely dictate the buy vs.build argument. In this context a number of factors need to be considered, namely :

- Criticality of performance management concepts to the strategic and operational goals of the organisation.
- Fit with change management and business improvement initiatives.
- Timescale and milestones for assessing business impact of performance metrics.
- Complexity and level of coupling between internal enterprise systems : data sources, formats, standards, connectivity and processes to maintain such source data systems.

Additionally, the advent of the Internet and the associated distributed and object technologies that have progressed and developed over the last few years, means that the implementation of such performance management systems, are literally knocking down traditional walls and barriers to information within organisations. Through the use of such enabling technology, silo mentalities which seek to limit knowledge sharing and collaboration, is steadily leading to a more flexible and natural exchange of information. This can potentially lead to a default, natural behavior of the organisation. Additionally, “wiring” of the extended enterprise becomes less complex, as common definitions about data, business processes and interpretation become increasingly commonplace.

This section provides an overview of the typical approaches to implementing balanced scorecard concepts using IT architectures in this regard (in section 3.1) and contrasts the off-the-shelf performance management solutions (discussed in sections 3.3 and 3.4), with bespoke development (discussed in section 3.2). For the purposes of brevity, it is assumed that the mapping of strategic and operational objectives, CSFs and KPIs will be carried out in parallel or in precedence to the sections that follow.

3.1 Generic IT architecture and methodology

As has been seen in preceding sections, the balanced scorecard concept is based upon the realisation of the organisation's strategic vision, related through 4 (or more) organisational perspectives. Furthermore, each perspective allows the organisation to gain insight into not only operational contexts (such as financial and customer data), but also the impact of strategic plans.

Any IT architecture, must be able to provide accessibility to each perspective and the ability to drill-down into context specific, i.e. business unit, detail as desired. In addition, any balanced scorecard system, should be robust and secure enough to provide such information to defined sets of users which mirror any organisation hierarchy and cultural issues. For example, it may not be prudent to allow team leaders within a business division to view scorecard details within another division, simply because measures and factors may easily be taken out of context.

However, where this is the case, the applications architecture should also provide relevancy, accuracy and timeliness of the information to the user as well. A general rule for the development of such systems, is that they link in some way to defined organisational data sources, processes and people. Hence, the IT systems development approach should be to first of all understand the scorecard developed by the business teams within the organisation. Following this, an attempt should be made to relate each measure and factor to defineable sources of data – this is in terms of not only any enterprise systems within which such data should exist, but also related ownership of the information and any associated processes attached to the maintenance of that information.

While these areas are being defined, the typical systems development lifecycle should also be in place in order to provide an information systems solution. This encompasses user modelling, data modelling, component selection, platform selection and project management. In designing IT / IS systems which provide cohesive performance management reporting, there are three main systems development approaches which can be taken in order to implement the scorecard, which are shown in Table 3 (courtesy of Olve, Roy and Wetter, 2000).

Take in Table 3

In approaching these implementation solutions, there are a number of associated, practical implementation paths that need to be taken. These steps essentially define the manner in which each of these solutions, can be developed and as such define the IT implementation methodology for developing full scale, performance management solutions. Figure 5 provides an overview of some components of a balanced scorecard IT architecture which needs to be considered. Hence, there needs to be a match between a given solution, and a set of processes for the evolution and scalability of that solution. These are briefly defined in the following sections.

Take in Figure 5

3.1.1 Data relationships and consolidation (Enterprise Data)

This phase of implementation should involve a large amount of data modelling and user profiling to be carried out in order to find out what data is required to be reported, where it resides and who has ownership of accessibility and any additional processes. Also in this phase, issues of accessibility, relevancy, frequency, and security of the information should also be addressed. The core of this phase, however, exists in defining the role of the business application that will access this consolidated information. Does the criticality and volume of data merit either an off-the-shelf packaged OLAP application or more bespoke development (as in the case of internet web development)? This stage is key in progressing the implementation status of the balanced scorecard as a whole.

3.1.2 Data shaping and forming (Modelling and Design)

The provision of further detail to the data model, involves defining actual data which relates to each scorecard measure and objective. This will typically involve the design and build of any database or data warehouse, and the subsequent extraction, clean up and migration of data from source systems into a standardised reporting format. Any security and user-specific issues such as access to business-sensitive information should also be addressed here.

3.1.3 Systems integration and control (Application Interface)

The final phase in any such IT implementation, should be to seek to integrate as many of the source data systems with the scorecard performance management application as possible. This is in terms of connectivity between the data warehouse / database, and existing enterprise systems (such as ERP, project management tools, financial applications and other legacy packages). Delivering fully integrated internal systems is a major task, and hence, this phase should only be embarked upon if either of the previous phases has shown that there is real and lasting business benefit to the organisation. In addition, a firm-wide systems integration approach should also be considered only as part of a wider business initiatives, such as merger integration and change management. Methods by which data and information integration is achieved, varies from invasive integration and manipulation with source data systems (such as using SQL database queries), through to non-invasive, publish / subscribe or "screen scraping" approaches which capture just the most appropriate available data. These methods are rapidly maturing and approaching state of the art. As such, these approaches are upheld by

technology known as Enterprise Application Integration (EAI), which is currently outside the scope of this paper (see Linthicum, 1999 ; Themistocleous, Irani and Sharif, 2000).

3.2 Bespoke development - Internet solutions

Internet technologies are not only used within packaged and sophisticated OLAP applications, but can be easily leveraged to be used for a bespoke solution. This approach is useful, when there are a limited number of measures to be accessed, along with a limited number of data sources, and / or where the effort involved in integrating a multitude of enterprise systems is too high. The flexibility and capability of internet and related technologies, means that a perspective on how and which performance information needs to be accessed, can be quickly achieved. For example, a simple database which may contain inter-related KPIs can be easily accessed through a web browser, which may be sited within an organisation's intranet and accessed through internet connectivity.

Such an approach is well suited to modelling and defining those KPIs and performance drivers in a short timeframe. More importantly, using rapid development approaches for such an implementation, can help in assessing the benefits a technology solution can offer, in delivering a performance management system. This is readily achieved through internet technologies and architectures, which can further help to formulate any IT related strategies or concepts. For example, an organisation may wish to enable a performance management system, from within its internet platform. As such, a reporting and information tool can be seen in the wider context of an integrated organisational information infrastructure.

This is particularly the case where an integrated packaged solution may be too costly, involve a high degree of systems integration or may also involve a large proportion of organisation-wide change management in order to define and structure performance information. However, it is still vitally important to define user case scenarios, so that a robust data model can be produced. This will be able to represent and hold the fundamental performance information. Modelling and obtaining the data model, is the primary objective of such an approach, so that if a fully integrated and operational performance management system is required in the future, the data model from this approach can be used as a basis for a more deeply integrated system.

3.3 Portal approaches

The support of better informed decision making is critical to organisations working in a dynamic globalised business environment. The ability to co-ordinate multiple data sources and into one place, organised using a knowledge management taxonomy and supporting the decision making process, is an attractive proposition. The term portal is used for systems that provide a single point of access for information that is aggregated

from a multitude of sources : web content, database / datawarehouse fields, enterprise applications. Portals are capable of providing inter-related and customised information from different data sources without compromising the quality of the information as perceived by the end user.

This aggregation of content as well as process can extend in a wide manner across the organisation, such as shown in Figure 6.

Take in Figure 6

Nearly all portal systems are web based, with the exception of Microsoft Digital Dashboard, which is based upon Exchange server technology. Portals generally fall into the categories given in Table 4.

Take in Table 4

The last 18 months have seen a great deal of development in the software used to develop and deploy such portals (Blount, 2000 ; Phifer, 2000 ; Smith, 1999). Companies such as Plumtree, Broadvision and Epicentre have released and enhanced software that provides integrated access to data systems, documents and eCommerce functionality, in the same manner as those performance management systems discussed in section 3.4.

Many products provide strong support for standard data warehouse reports whilst also providing interfaces to ERP and CRM systems (such as Plumtree, Brio and Siebel). Other solutions allow information integration to aggregate web and database content, in a personalised manner to the user. A successful portal must provide so-called "sticky" content. That is to say, it must provide as much information as possible to the user so that they want to use the portal as much as possible. Portal software and the information provided by users of the system must come to rely upon it to meet more and more of their information and operational needs.

3.4 Package Applications

Many package applications exist which can facilitate in the development and implementation of balanced scorecard concepts. The majority of such tools are based upon data mining and data warehousing technologies, and as such, can also be generally classified as being business intelligence tools also. In this respect, such applications are well known to be useful in allowing end users to drill-down and across multiple datasets within a database, in order to provide context sensitive information, using Online

Analytical Processing (OLAP) technologies.

On this basis, there may need to be a high level of integration between enterprise source systems and processes, in order to aggregate and filter this information. Generally, this would also involve the integration of other source systems as well, such as legacy and ERP output. As such, some performance management packaged applications, are produced by ERP vendors such as Oracle and Peoplesoft, which are part of a wider suite of applications. Other application platforms, such as those provided by Gentia and Business Objects, are derived from bespoke performance management / quality management packages, which can be skewed towards high level financial management reporting. As such, Table 5 shows the key differences, requirements and aspects of each approach.

Take in Table 5

1. PeMS Benchmark Evaluation - Methodology and Results

The approach taken in conducting the benchmarking study of performance management systems, was to evaluate the analysed products, based upon a number of measurable / quantifiable criteria. Predominantly, these areas fall into the categories of extent of reporting functionality ; flexibility and usage of underlying technologies ; and cost / ROI. The group of applications chosen, reflected the current state of the art in management information reporting systems. As such, the packages were picked based upon merit and a pre-selection review of solutions which were most popular in the MIS market.

In carrying out the assessments, approximately 20 specific questions were designed to elucidate aspects of user friendliness and operability; speed of execution; tailorability to specific organisational reporting structures (deep and flat hierarchies); overall look and feel ; complexity of installation and integration with data source systems. The normalised results of the assessment of the packaged PeMS solutions are shown in Table 6.

Take in Table 6

Take in Figure 6, 7, 8, 9

The data from this research is ranked according to a Likert scale ranging from 1 to 12, where 1 is defined as being ranked "best in class" and 12 is defined as being "worst in

class". In both of these cases, the business benefit of such systems is gained through the combined integration of data sources and processes across the organisation, which may require extensive analysis and modelling.

However, the degree of effort required to implement such a solution would only be limited to the extent to which the performance management system would need to be integrated into the organisation's other systems.

As can be seen from Table 6, as well as Figures 6, 7, 8 and 9, there is no single performance management enterprise system which is best in class across all areas. However, it appears that packages from CorVu are best for reporting functionality, Business Objects best for the level of technical integration capability, and MIS best in terms of overall cost and ROI. It should be noted that the closer the individual value is to the centre of the graph, the better that vendor's solution is rated.

In terms of averaged values of the 3 measured aspects in Table 6, Figure 9 shows that Intellicube's OnVision product has, statistically, the best evaluation score of all the packages reviewed, closely followed by Cognos, CorVu, Business Objects and Microsoft. Comparison of this evaluation with the market leading packages, confirms that in implementing such an approach, either CorVu, Business Objects and Gentia should still be considered as the performance management system of choice. These packages are typically viewed as being highly tailorable and configurable performance management solutions.

Vendors who have been evaluated with average values, such as PeopleSoft, Microstrategy, SAS, Gentia, MIS and Oracle are generally those vendors who have had a sustained interest in providing business intelligence solutions. Finally, vendors with above average values such as Hyperion and SAP, can be said to belong to those class of vendors which typically support large-scale enterprise solutions (i.e. are ERP-based).

Broadly speaking, most of the packages reviewed have similar characteristics, which leads to the almost even distribution of points around the centre of the graph. The only exceptions to this are those packages which are based more upon modularised components such as those offerings from Hyperion, Oracle, PeopleSoft and SAP. As such, whilst ERP-based packages can be said to have a high degree of out-of-the-box functionality, specific performance management / reporting applications fare better overall in terms of reporting capability and overall cost (though this is not the case with packages such as Gentia's RBSC). Where enterprises already have integrated or semi-integrated enterprise systems, such as in the case of an existing ERP implementation, it may be therefore better to implement a performance reporting module on top of existing modules (as in the case of SAP, Oracle and PeopleSoft).

5. Aligning business value drivers and risks

Clearly such technologies and management reporting concepts are crucial to organisations wishing to maintain a firm perspective on their internal performance and how they deliver value to their shareholders. However, in doing so, the alignment of such approaches to business value drivers and the associated risks of deployment, are crucial. This section attempts to highlight these areas in more detail, through discussion of a case study.

5.1 Case study example

Company X is a leading manufacturer and innovator in the high technology manufacturing industry, supplying technology platforms for global aerospace customers. A growth division in the company, Division Y, realised that in order to sustain their market position and bring products to their customers quicker, with better quality service also, required an holistic approach to evaluating their operational business. Division Y was already adept and proficient in financial accounting and reporting to the group level. However, it lacked insight into the business at divisional level, to provide it with answers about its relationship to customers and a method by which to understand factors inhibiting programme performance. Therefore the concept of introducing a high level set of performance metrics to capture these and other factor, was eagerly received by the CEO and board. It was understood that in order to deliver such metrics would require a more sophisticated reporting and delivery infrastructure than current ad-hoc spreadsheet and database query reporting (which normally took a long time to prepare).

A key aspect of the project was to understand the depth of information and processes already available and channel the business requirements into providing a prototype bespoke portal solution, based upon internet technologies. In doing so, it was found that Company X had many source IT systems, applications and data sources which fed into the quarterly accounting reports, and in themselves were not consistent across the organisation. Coupled with this, was the fact that Division Y had undergone a series of mergers and acquisitions in the recent past and was carrying out a continuing audit of their IS infrastructure. This view of the IS infrastructure was akin to a sea of "information spaghetti", from which the data required to drive the performance management system, would have to be gleaned.

The construction of the metrics was approached so as to deliver insight at divisional and sub-divisional level. However, the organisation was more concerned on focussing on the route to the definitions, than linking KPIs, CSFs and the strategic intent of the business together. This was a major contributor to the slow progress of the project. Due to a lack of agreement on the board level metrics scorecard, till late in the project, the delivery of the performance information was therefore also compromised. During the course of discussions with the company, a web based intranet portal concept was initially agreed. This would provide a simple connection to a back-end database containing the metrics, all of which would be designed and developed using rapid

application development (RAD) bespoke internet technologies (in this case ASP, ADO and HTML).

This was in order to provide a quick win to the organisation at a fraction of the effort and cost of completely integrating source ERP and legacy systems, which was clearly a massive undertaking considering the size and extent of the information architectures presented. Because of a certain level of silo mentality within the divisional group, and a familiarity with spreadsheet and paper-based reporting formats, this new approach to delivery was viewed and received with increasing caution by members of the board. It was later found that there were many reasons for this reaction, not least of which was based upon the culture of the organisation and its hesitancy against tactical and strategic change. Moreover, a reason given by some directors, pointed to the sheer complexity of identifying data which could usefully represent the metrics, and difficulty in allocating adequate resources to extract the data.

After a series of workshops and meetings to re-affirm sponsorship to the metric definitions and methods for delivering them, a hybrid solution was agreed. This consisted of nominating a divisional performance "czar" and administrator, who would collate relevant metrics on a periodic basis, into a spreadsheet, which would be published directly to the local intranet management web pages. Through agreeing the metrics and understanding the method for delivery of the performance information, divisional management quickly understood that their core objectives for running the business would have to focus on customer relationships, and internal efficiencies. This was in stark contrast to the highly finance and learning-focussed data that the board were used to reviewing (these two areas were generally core competencies of the organisation anyway).

Although the designed metric scorecard was not necessarily a failure, there are some important lessons to be learned from this experience as shown in Table 7.

Take in Table 7

The key underlying theme of these factors is the lack of understanding of the importance attached to delivering performance management concepts. Company X (and therefore Division Y), simply did not realise that the most important part of the whole process, involved reaching an agreement on the metrics early, in order to have adequate time to design an appropriate metric delivery mechanism (a portal approach). Furthermore, the benefits of leveraging state of the art technologies were not fully realised, even though Company X was initiating multiple leading-edge innovations in other parts of the organisation. As a result, the benefits that could have been achieved by adopting and following the fundamental aspects of balanced scorecard and performance management theory, were sadly not achieved in full.

5.2 Value drivers

From the case study in the preceding section, it is apparent that there was a lack of a general understanding about the value-adding aspects of corporate performance management approaches. Many drivers for change as well as value creation exist, which many organisations are attempting to leverage, in order to maximise the benefits of corporate performance. Some example drivers and trends are shown in Table 8, characterised by the authors' experience in dealing with organisation in the high technology manufacturing, process, aerospace and petroleum industries.

Take in Table 8

In particular, where performance management is concerned, these key value drivers are surprisingly limited to those shown in Figure 10. As such, the benefits of enabling and delivering a performance management system, can be broken down into 4 clear areas :

- Visibility :
 - Navigation of performance related information, across operating divisions and supporting units is made increasingly possible,
 - Ability to recognise inter-relationships between operational and strategic measures can be achieved,
 - “Closed loop” reporting : information will become relateable to responsibility.
- Timeliness :
 - Aid to timely decision making : at group and division level,
 - Programme and project level processes can be made increasingly visible (by exception and / or milestone reporting).
- Quality :
 - A common understanding of performance data definitions through the business analysis task (personalisation of data),
 - Errors inherent in reporting consolidation will be accountable by a performance audit trail.
- Processes :
 - A common method of reporting will aid in the decision making process : frequency of reporting, input and collection methods,
 - A group and division-wide understanding of source systems that can support business value growth and the delivery of strategic intent, can be achieved.

5.3 Risk Management

In order to minimise risk and maximise the benefit of performance information, there needs to be an identification of fit with related organisational processes, strategy and general company-wide initiatives, as shown in Figure 10. Achieving this aim, will help to consolidate internal reporting and accountability requirements. Furthermore, using technology to deliver this information should provide insight into more than finance-focussed information. Reporting should be rich in content (highly detailed and navigable) and also be able to provide insight into the organisation. This would be through consolidating indirect information on the business. This can be achieved via focussing on contributory views on areas such as procurement, resource management and programme management.

Finally, the internal organisation must engender change in order to deliver, via strong leadership and sponsorship from the board of directors and the CEO / CFO. There must be visible change through the implementation of the performance management system, not simply additional reporting information. This should be such so as to enable the performance information to "live" and show contributory and inter-related business measures clearly. To achieve this, the content must also be personalised, customisable and value-adding by providing access to functionalities such as : drill-downs, data ownership by individuals, business unit and project. Some of these and other issues are highlighted in Table 9.

Take in Table 9

6. Conclusions

The paper has discussed and shown that performance management systems are crucial to the on-going development of a holistic management and decision-making activity, within companies wishing to operate as world class organisations. A comparative study was provided, discussing three common approaches to automated balanced scorecard and performance management, namely, bespoke internet portal development, portal suites and packaged enterprise solutions. Of the packaged enterprise solutions looked at, offerings from CorVu were judged to be best for reporting, Business Objects for technical integration capability, and MIS in terms of cost / ROI. On a statistically averaged basis, the offering from Intellivision proved to be the best overall. For those organisations who already have ERP-centric architectures, solutions from the leading ERP vendors are more appropriate (i.e. SAP, PeopleSoft, Oracle).

In approaching a bespoke development approach, it was noted that the level of tailorability and fit to the organisation can be appreciably higher than that of packaged enterprise solutions. However, this does require a rigorous but flexible design and development lifecycle, which should utilise soft systems modelling approaches in order

to harness decision and process workflows accurately. Portal technology was also investigated, and in terms of the performance management systems discussed previously, acts as the fundamental delivery concept behind such management information systems.

Finally, the paper concluded with a discussion on the potential business value drivers and risks an organisation may take when encountering such an approach. These corporate systems, exhibit similar implementation obstacles and opportunities to the ERP and dot-com fads of the recent past, such as lack of clear sponsorship ; identification of requirements, and an appreciation of the underlying enabling technologies. In summary, there are additional factors which should be taken into consideration in order to deliver a performance management system :

- A correct and accurate understanding of performance management concepts should be gained by the management team before embarking upon such an approach - which should also include the realisation of a PeM 'manifesto' to implement these ideas;
- Management and co-ordinating support teams, should show a vision for achieving rapid results and build enthusiasm for core performance management concepts across the operating business, where possible;
- There should be a focus on delivering a “proof of concept” demonstrator in the initial stages of the specification– the demonstrator should embody visible, identifiable performance measures that relate to the operating business;
- Identify quick wins through gathering information from diverse sources (process, data and definition) and hold a view on the integrity and accuracy of information can be harnessed.
- Implementation should focus on delivering defined deliverables : business requirements, data model / structure for performance metrics, and a suggested implementable solution (e.g. ERP modules, portal suites or bespoke technology development) ;

The benefits of increased visibility of operating organisation information, which can be personalised and delivered to many types of information and decision-making stakeholders, far outweighs any technical implementation issues which may exist.

Disclaimer

The statements and opinions in this paper are in all respects, those of the author and do not represent the views of UBS Warburg or of UBS A.G.

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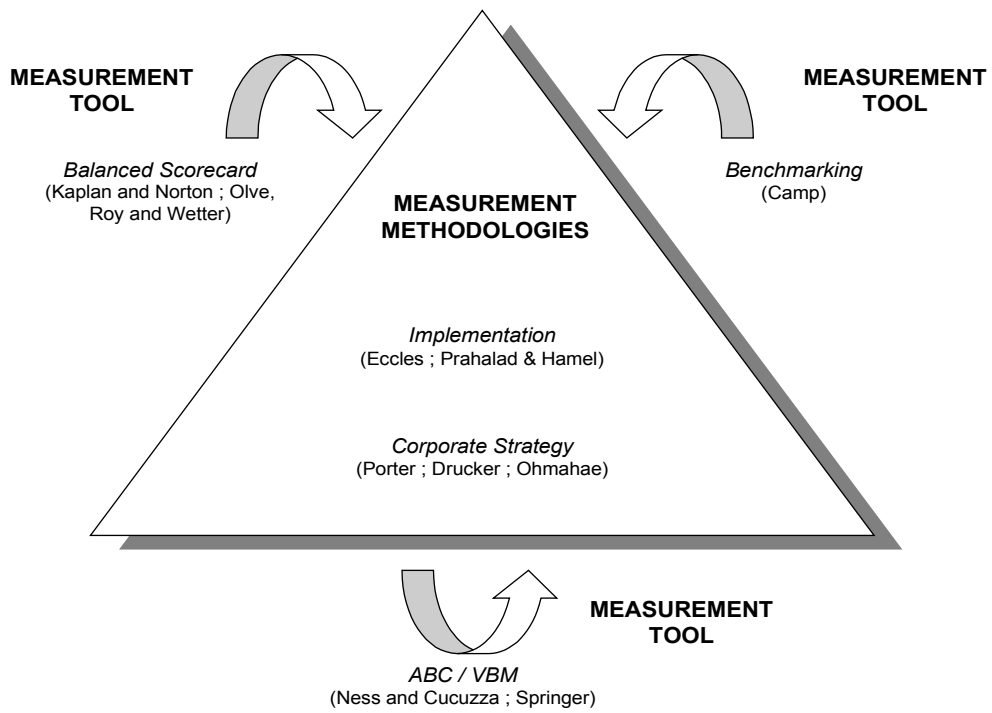


Figure 1. Performance Management methodologies, tools and concepts

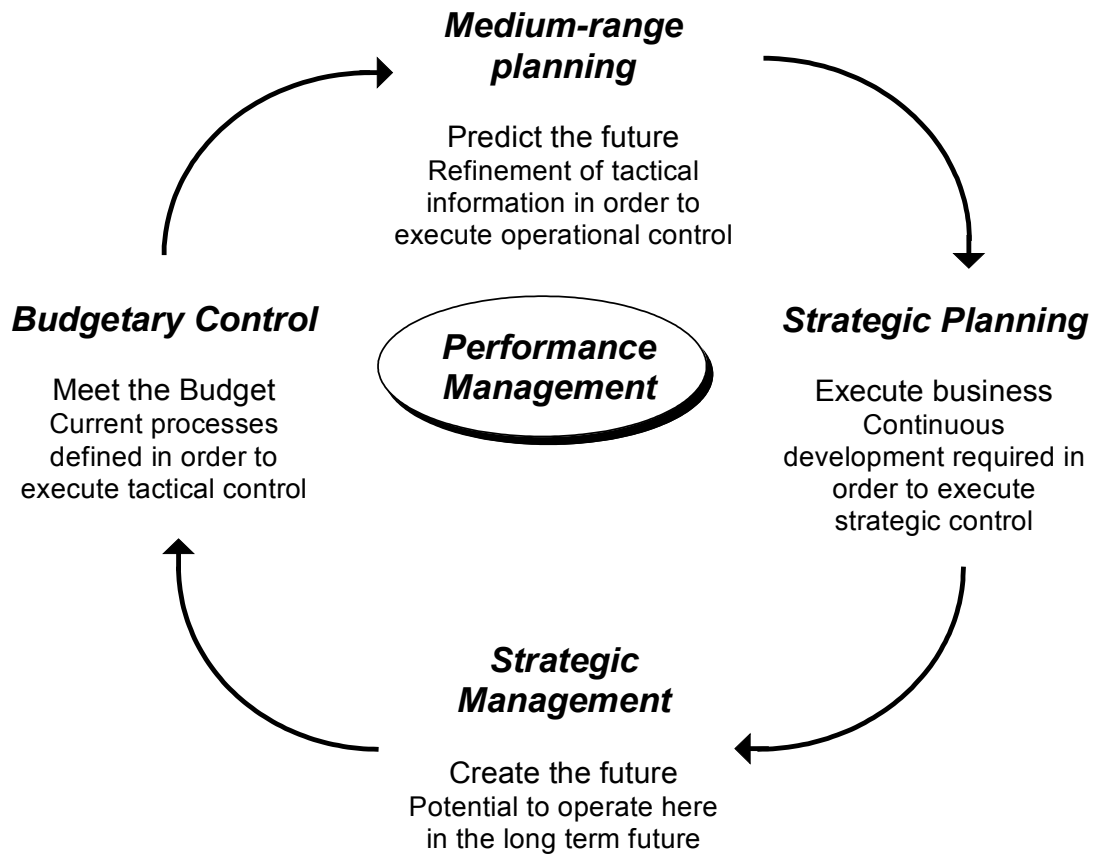


Figure 2. Performance management within the strategic planning lifecycle (adapted from Glueck, 1980)

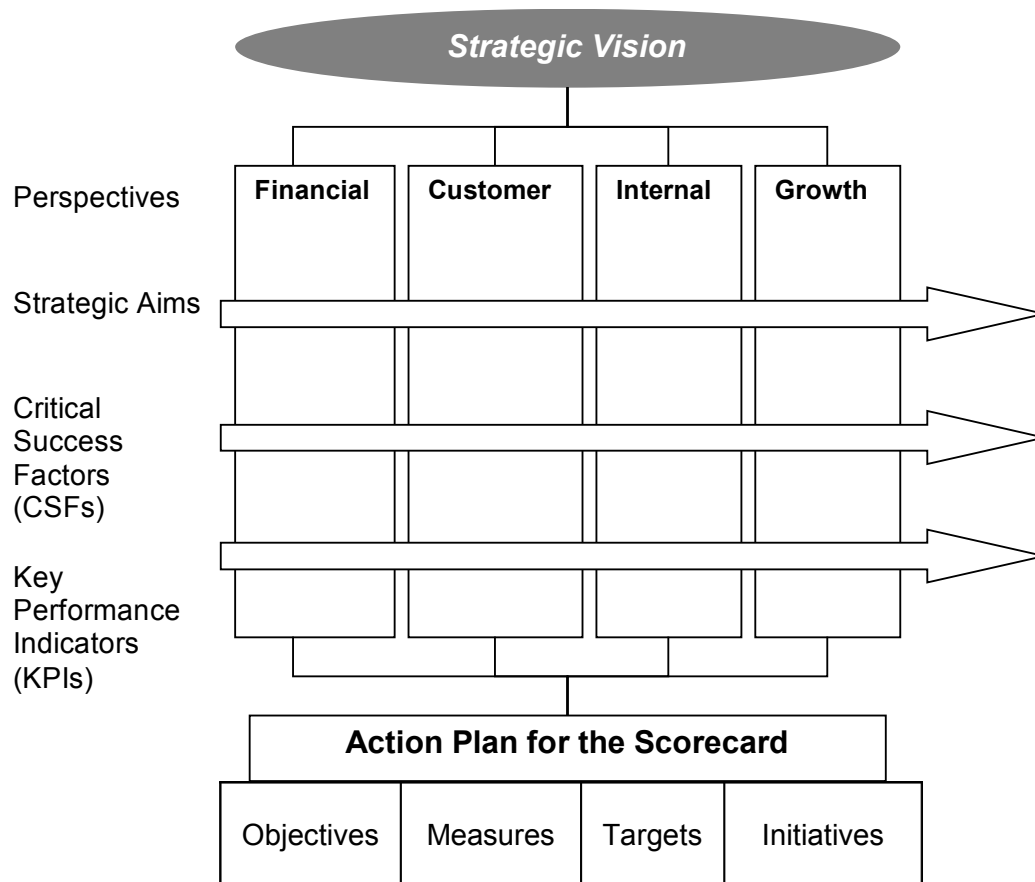


Figure 3. Building the Scorecard detail

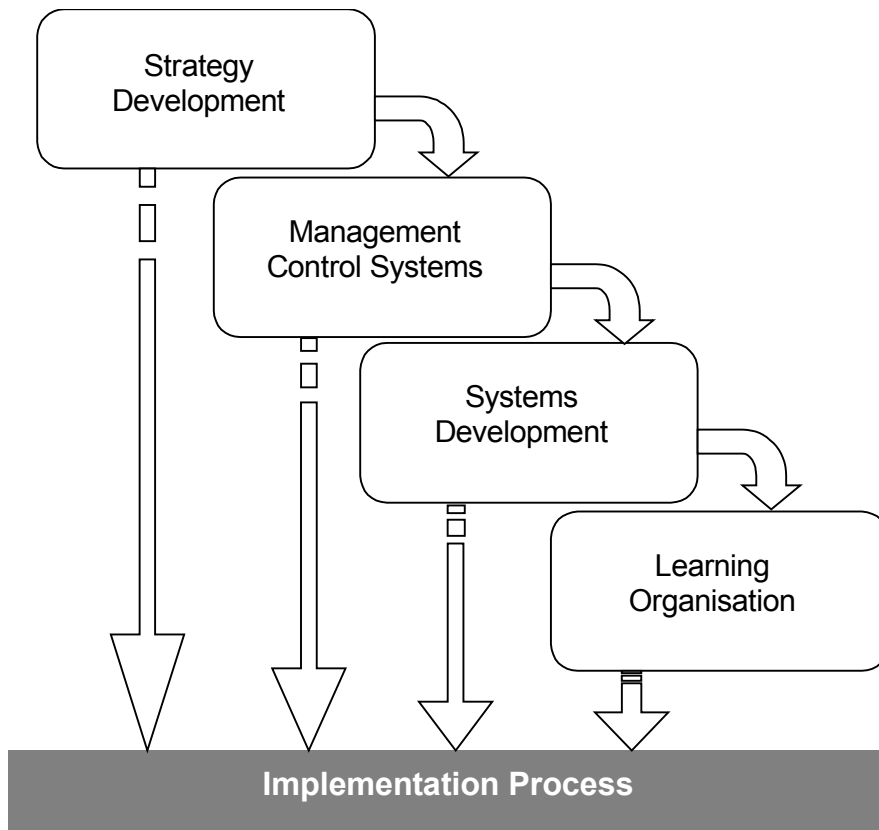


Figure 4. The Balanced Scorecard implementation process

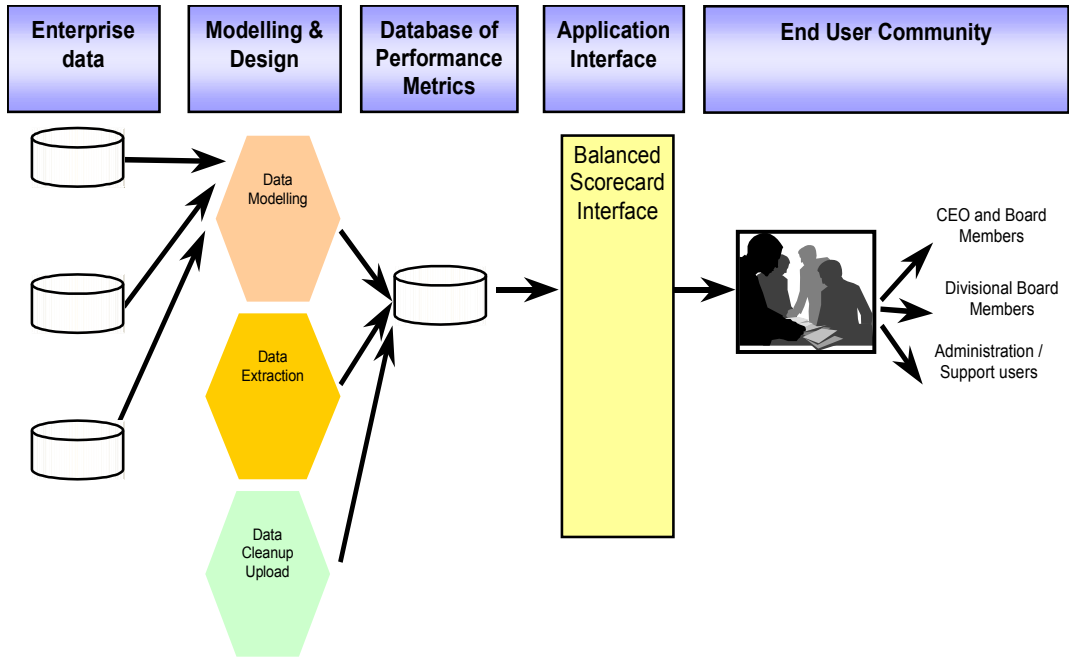


Figure 5. High-level balanced scorecard architecture

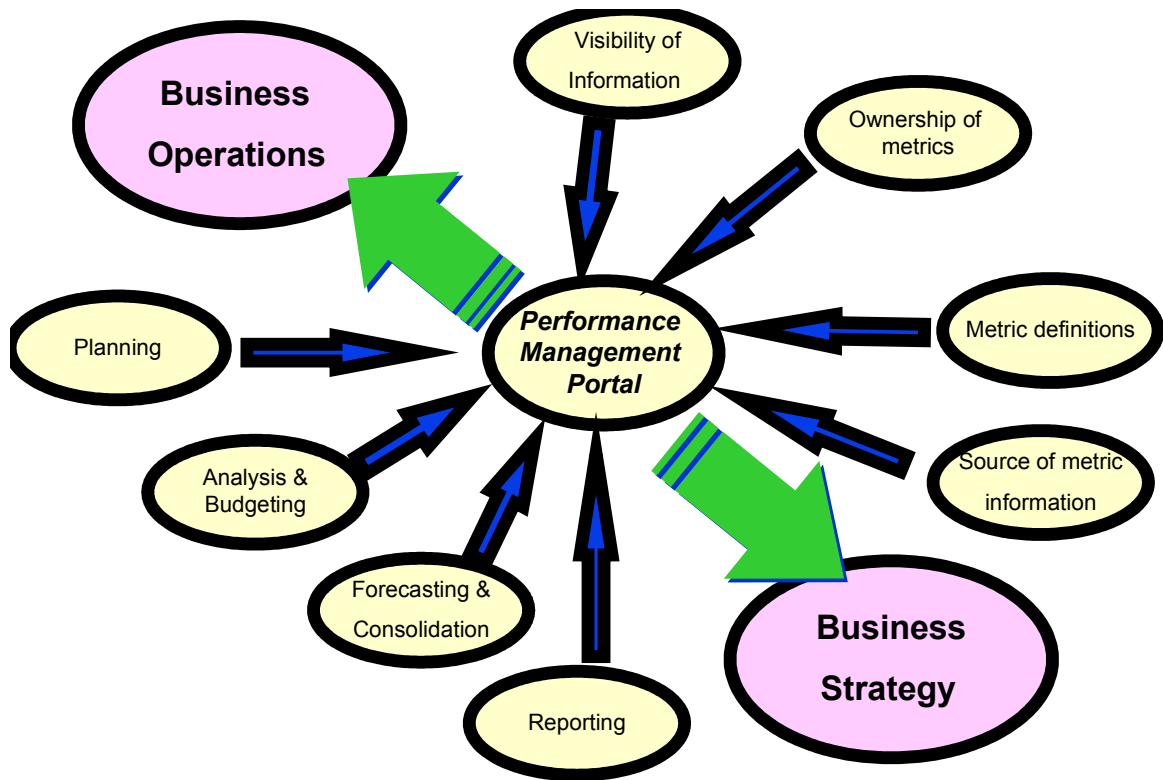


Figure 6. Portal-based performance management delivery

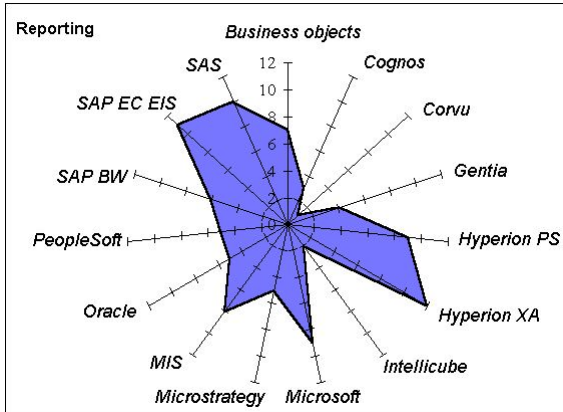


Figure 7. Reporting Evaluation

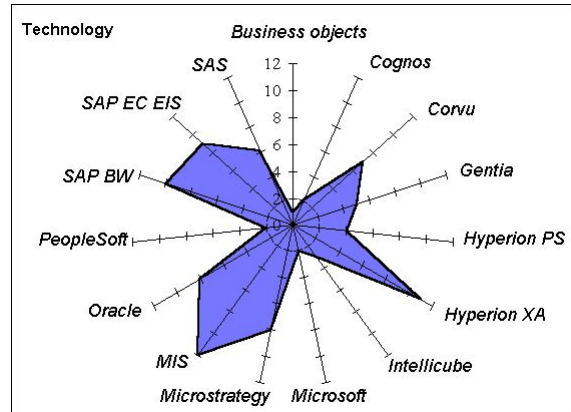


Figure 8. Technology Evaluation

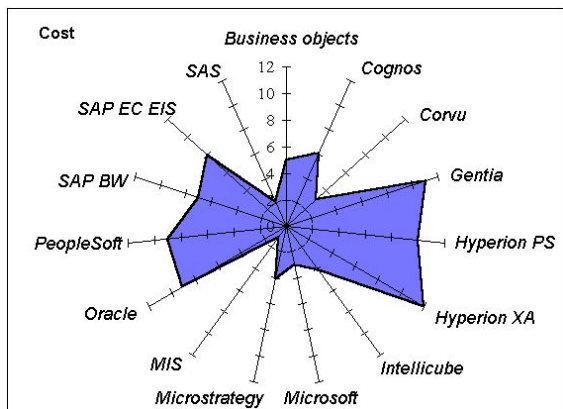


Figure 9. Cost / ROI Evaluation

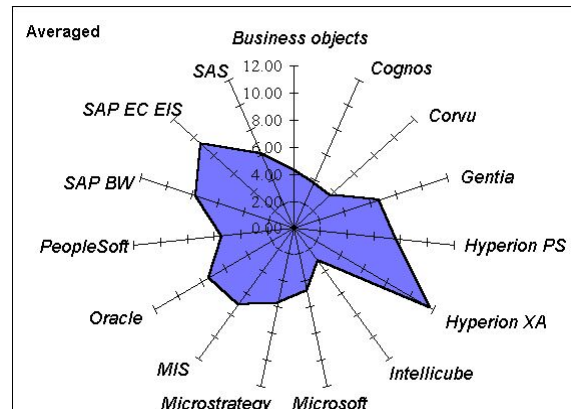


Figure 10. Evaluation by averaged value

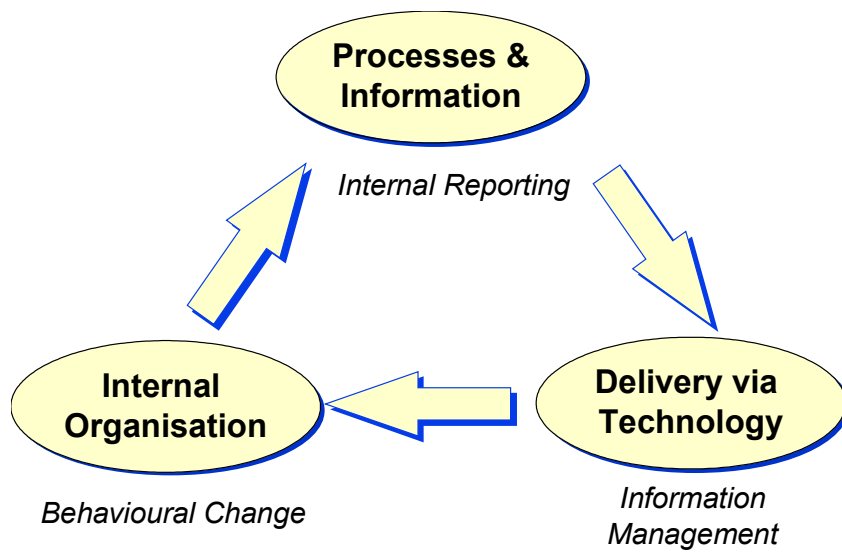


Figure 11. Mapping business value drivers to organisational characteristics

Table 1. Implementation steps for the Balanced Scorecard process

<i>Balanced Scorecard Implementation Steps</i>	
1 Clarify the business vision	1 Define industry, company and its role
2 Communicate to middle management	2 Establish organisation vision and strategy
3 Develop business unit scorecards	3 Establish key perspectives
4 Eliminate nonstrategic investments	4 Formulate strategic goals for each perspective
5 Launch corporate change process	5 Identify critical success factors (CSFs)
6 Review business critical scorecards	6 Develop measures, causes and effects (KPIs)
7 Refine vision	7 Establish top level scorecard
8 Communicate scorecard to the organisation	8 Breakdown scorecard by organisational business unit
9 Establish (personal) scorecard objectives	9 Formulate goals
10 Update long range plan and budget	10 Develop action plan
11 Conduct monthly and quarterly reviews	11 Implement and assess impact of scorecard on strategic vision and operations
12 Conduct annual strategy review	
13 Link personal scorecards to organisational scorecard	
Kaplan and Norton (1992)	Olve, Roy and Wetter (2000)

Table 2. Appropriate IT implementation solutions (adapted from Olve, Roy and Wetter, 2000)

	Interactive Management Reporting	Best of Breed EIS	Integrated Performance Management
Technology	Stand Alone, limited content	Strongly coupled, loosely integrated	Strongly coupled, strongly integrated
Functionality	Tailorable, Customisable	Collaborative communication, OLAP / datawarehousing capabilities	Heavy ERP basis, reporting infrastructure
Approach	Communications intensive, personalisation, single view of the data	Multi-dimensional data structure and data mining philosophy	Build upon reporting infrastructure and information management concepts
Fundamental Requirements			
<ul style="list-style-type: none"> • Application is robust and scaleable • Intuitive and user friendly interface (drill-down capability) : Personalised content • Provide data history and audit trail • Complies and integrates with other enterprise systems • Provides security and viewing standards at application and data (database) levels • Capable of delivering an optimised performance management model • Capability to import / export performance data • Capability to leverage data management and optimisation tools 			

Table 3. Portal technology characteristics

<i>Enterprise Information Portals (EIP)</i>	<i>E-Commerce Portals (eCP)</i>	<i>Extranet Information Portals (XIP)</i>
<p>Provide information and services to employees within an organisational intranet (e.g. employee self-service).</p>	<p>Provide access to e-commerce functionality, such as product purchasing and purchase tracking, on the public internet (e.g. Yahoo).</p>	<p>Similar to EIPs, but designed to provide information to outside of the enterprise, such as digital exchanges and marketplaces (e.g. Petrocosm, MyAircraft.com)</p>
<ul style="list-style-type: none"> • <i>Personalisation</i>: content delivered via the web must be selectable by the user, and the search functions used to filter the content must be configured to the needs of the individual. • <i>Contextual information</i>: most decisions taken will use a variety of information types : structured data as created by operational systems, unstructured / unfiltered data often the output of an analytic system, and soft data made up of documents and other sources of text. • <i>Rich content</i>: knowledge as well as information and data must be available via a taxonomy, or context for searching the knowledge, with an agreed definition of terminology, content and accessibility. • <i>Community of interest</i> : One of the richest sources of information on a portal is supplied by other users of the system. Allow the creation of content by users (appropriately controlled and monitored). 		

Table 4. Cross-evaluation of packaged Performance Management applications

	Enterprise Data	Modelling	PeM Data	Delivery	End-user Interface	Benefits	Limitations	Example IT solution
Internet Solutions (Interactive Management Reporting)	Legacy Data	Data modelling	Bespoke database instance	Web Server	Web Application	Personalisation, accessibility, quick, cheap, visibility	Data Integrity, business rules and strategy definition	Microsoft Digital Dashboard, Business Objects
Portal Approach (Best of Breed MIS)		Data Extraction				Understand value drivers, stakeholders, visibility of strategy, quick deployment	Integration can be complex, ROI, time	Business Objects, Micro-strategy, Gentia, SAS, Corvu
Enterprise Package Applications (Integrated Performance Management)		Data Clean-up	Enterprise database instance	Application Server and Web Server	Enterprise application interface (Win32, Forms, Web app)	Single set of tools and environment consistency, tailorability	Define KPIs, change management issues, training, cost	Oracle, SAP, PeopleSoft
Scope	Personalisation, accessibility, quick, cheap, visibility	Data integrity, business rules and strategy definition	Understand value drivers, stakeholders, visibility of strategy, quick deployment		Integration can be complex, ROI, time	Single set of tools and environment, tailorability	Define KPIs, change management issues, training, cost	

Table 5. Evaluation of packaged performance management applications

<i>Vendor</i>	<i>Application</i>	<i>Aspect</i>				
		Reporting	Technology	Cost / ROI	Sum	Avg
Business Objects	Business Objects	7.00	1.00	5.00	13.00	4.33
Cognos	BI Tool	3.00	2.00	6.00	11.00	3.67
CorVu	CorVu	1.00	7.00	3.00	11.00	3.67
Gentia	RBSC	4.00	5.00	11.00	20.00	6.67
Hyperion	Performance Scorecard	9.00	4.00	10.00	23.00	7.67
Intellcube	OnVision	2.00	3.00	4.00	9.00	3.00
Microsoft	Digital Dashboard	9.00	2.00	3.00	14.00	4.67
Micro-strategy	Micro-strategy	5.00	8.00	4.00	17.00	5.67
MIS	Deltaminer 3.8	8.00	12.00	1.00	21.00	7.00
Oracle	Express Objects	5.00	8.00	9.00	22.00	7.33
PeopleSoft	EPM	5.00	2.00	9.00	16.00	5.33
SAP	EC-EIS 4.0	11.00	9.00	8.00	23.00	7.67
SAP	BW 1.2	6.00	10.00	7.00	28.00	9.33
SAS Institute	SAS	10.00	6.00	2.00	18.00	6.00

Table 6. Key factors affecting the delivery of a divisional web-based scorecard concept

- Information and infrastructure "spaghetti" (complexity of the IT/IS infrastructure).
- Cultural silo mentality within operating divisions and groups - lack of cross-fertilisation of ideas and effective collaboration and resourcing.
- Sponsorship and leadership was patchy and unclear
- Metrics not defined as part of a generic performance management "manifesto".
- Decisive agreement on performance metrics occurred late in the project (no link to CSFs and KPIs, which reflected the strategic intent of the business).
- Buy-in to the delivery mechanism (IT enabling technology) was cautious and benefits could not be understood and realised in time.
- Focus on the internal and financial measures, initially hindered analysis of customer and growth metrics.

Table 7. Performance Management Value drivers

<i>Driver for change</i>	<i>IT/IS Trend</i>	<i>Organisational Trend</i>
<ul style="list-style-type: none"> • Supply chain optimization • Increase in development of demand-driven systems (JIT) • Product focus - emphasis on core competencies to defend against international competition • Need to reduce costs to remain competitive • Integration of the customer in the value chain - (interactive fulfillment systems) • The need for speed - customers demanding better, faster service at a lower price 	<ul style="list-style-type: none"> • Integrated ERP and financial systems • Automated systems for scheduling, logistics, order management • Data mining to determine best fit to market • Customer management interface to internal systems - blurring of distinction between back-office and front-office applications • Fast and accessible access for external customers via internet technologies • Embedded information and services in products - reduced reliance on paper • Mobile and remote computing used to automate and empower remote personnel 	<ul style="list-style-type: none"> • Shared services and outsourcing of IT utility services (data center, communications, applications maintenance) • Reliance on integrated packages for ERP, HR and financials • Overall reduction in IT head count in the short term • Migration to client/server and distributed computing - restructuring of the IS organization • Retraining to encompass the role of the individual and their specific knowledge requirements (personalised information)

Table 8. Performance Management delivery risks

<i>Phase</i>	<i>Description</i>	<i>Risk</i>	<i>Cause / Dependency</i>	<i>Impact</i>	<i>Priority</i>
Definition of Strategic framework and metrics	Identification, reconfirmation and agreement of strategic performance metrics	Disparity and inhomogeneous nature of agreement on metrics can cause confusion and delay in agreement – will have a severe and detrimental effect on the finalised design of the data model and functionality.	Mergers and acquisitions activity, silo organisational structure (Business Requirements phase)	Reporting and formatting look and feel (site design and use-case modelling)	High
Data model / Process and Value chain Taxonomy	Completion of detailed design (data model)	Dependent upon the output from the business requirements phase may have delaying effect on the design and delivery (completion of detailed design)	Lack of sight of IT benefits (Business Requirements phase)	Effects data sourcing tasks, database design and population	High
Data sourcing and Integration	Identification, sourcing and extraction of the required data from source systems, processes and people	Sourcing data from enterprise systems (where achievable), and identifying bottlenecks with any manual processes, workarounds and data reconciliation activities (spreadsheets and / or paper reports), will take time. Time to source the correct data related to the defined performance metrics will be directly proportional to the complexity of the metric definition, and the robustness and integrity of the data items themselves.	Lack of IS audit, value, location and disparity of IT systems (Business Requirements phase)	Database population and final delivery of performance management information	High / Medium
Deployment	Development and deployment of the performance management solution (via enabling technology)	IT resources have to be identified and allocated to assist in the design and delivery (resources to assist in the development and support of content and functionality, with an emphasis on re-using application components from the business as appropriate).	Effective resource management and skilled staff (Identification of IT resources in the business)	Effects delivery of the metric information	Low

