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Balanced Scorecards: The Integration Point between Enterprise Information and Performance Monitoring

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ABSTRACT

A key challenge facing the pharmaceutical industry today is that strategies are rapidly evolving, but the tools for measuring and implementing those strategies have not kept pace. A number of pharmaceutical companies are exploring the use of a Balanced Scorecard as the backbone of integrated performance analysis in order to achieve the corporate vision. But defining an appropriate set of metrics and then making sense of enterprise-wide data to evaluate key performance indicators can be huge stumbling blocks. In order to overcome these stumbling blocks an approach that combines industry expertise and advanced business intelligence technology is essential. This paper will discuss an integrated scorecard environment developed jointly by PricewaterhouseCoopers LLP and SAS® that allows a pharmaceutical organization to

- Define, measure and execute the corporate strategy.
- Integrate, analyze and communicate the right information and make the right decisions.
- Quickly identify the root causes of potential problems and respond proactively.

That is based upon an Enterprise Information Architecture that has SAS Strategic Vision® at its core in order to provide:

- A metadata architecture that links the agreed upon strategies, objectives, measures and targets with the metrics/analytics
- An information delivery framework to measure and manage progress towards the strategic goals.

This paper will discuss a case study specific to the pharmaceutical industry. However the concepts and technology apply across industries.

INTRODUCTION

The balanced scorecard has recently re-emerged in many industries. The primary reason is the “executive suite” (CEO, COO, CFO, CIO, etc.) has come to realize that successfully leading a business today requires managing and fully leveraging information across the enterprise. It is no longer enough to manage discrete functions separately and hope the results of each will aggregate to meet corporate objectives. At the same time, traditional functional silos are collapsing as technologies like the Internet are making the boundaries between customers, suppliers, manufacturers and retailers more transparent and dynamic. Businesses are broadly internalizing the concept of designing operations from a “top-down,” goal-oriented process perspective rather than the traditional “bottom-up” functional approach.

Recognizing that the balanced scorecard concept has been around for several years and that some companies have implemented balanced scorecard applications with varying degrees of success, what is different about this next generation of balanced scorecard solutions?

The recognition that, in order to be effective, the measures and related accountability associated with balanced scorecards must cascade down from the executive level throughout the organization. In addition, any balanced scorecard implementation must combine both recognition of subject matter knowledge combined with a metadata systems architecture that facilitates change and growth in the scope of the scorecard.

Past balanced scorecard efforts oftentimes consisted of metrics that were aggregated, usually using spreadsheets, on stand-alone balanced scorecard applications that were not integrated with either the processes or the information being used to measure and manage the underlying business units and functions. As a result, these balanced scorecard implementations lacked the critical alignment, shared responsibility, and “cause and effect” relationships that are absolutely vital. They also lacked a solid metadata infrastructure.

The second fundamental difference is that companies are taking a more pragmatic approach toward implementing balanced scorecard solutions. They have recognized that it may not be necessary to implement every single balanced scorecard concept to get value from their efforts.

Previous balanced scorecard applications have failed or been abandoned, because companies attempted to implement a conceptually perfect solution only to find that they didn’t currently capture or store certain balanced scorecard measures (e.g., qualitative information). Companies today are taking an iterative approach, starting with those measures supported by information that they have stored in a data warehouse. Such an iterative approach is an essential component of many successful balanced scorecards.

This paper will discuss an approach to implementing warehouse driven scorecards, to include:

1. The Value Proposition of the Balanced Scorecard
2. Overview and Architecture of Strategic Vision™
3. A Case Study - A Balanced Scorecard template solution for the Pharmaceutical Industry

THE VALUE PROPOSITION OF THE BALANCED SCORECARD

Traditionally, many organizations have relied upon traditional financial and accounting systems to understand the worth and value of their organization. Through the mid-1980’s, this type of approach was still being used, accepted and depended upon. However, times have changed…

In 1982, a study was conducted through a survey of S&P 500 companies that looked at the market capitalization of these organizations. The goal of the study was to uncover the true sources of value and worth in these organizations. There were two broad categories of value defined by the study: tangible and intangible assets. The results of the study revealed that 68% of the collective market capitalization of the organizations was attributed to tangible assets, leaving 32% in intangible assets. Conclusions drawn from the study led organizations to believe the existing asset valuation, management control and financial systems were adequate and dependable. Therefore, no justifiable evidence existed to change the way things were done, reported or analyzed. However, when the study was again conducted some

18 years later in 2000, the results were incredibly different. Where the value attributed to tangible assets had been 68% in 1982, the value was now a staggering 15%. And where the value of intangible assets was 32%, it was now 85%. The new study had startling ramifications.

Industrial-age organizations, using the similar financial and accounting systems still used today, operated and succeeded by combining and transforming tangible resources into products whose value exceeded the inputs. Profit margins measured how much value was created beyond the input costs. With tangible assets driving the majority of organizational value, coupled with the ease of measuring these assets, organizations relied upon them for managing daily and strategic business decisions.

With the drastic change in the value dynamics over the last 20 years, it was expected that organizations would also change the way they measure, plan and manage the daily and strategic operations of the organization. However, this is not the case as most organizations are still relying on the traditional financial systems, analyzing and managing the business using only financial measures of performance.

Many studies have found that traditional, financial measures of performance are most useful in times and conditions of relative certainty and low complexity. However, these very conditions are not representative of today's hyper-competitive and rapidly changing economic environment.

A reoccurring criticism of traditional (mainly financial) measures of performance is their tendency to cause decision-makers to make shortsighted, non-strategic decisions. Financial measures tend to place an enormous amount of focus on the current impacts of business decisions without a clear link established between short-term actions and long-term strategy. Also, managing the business through the use of traditional financial measures of performance may counteract knowledge-based strategies by treating the investments and enhancement of resources such as human capital and information technologies, which are critical to effecting and driving strategy, as current period expenditures. By expensing these improvements and investments of assets, the impact may have negative ramifications to existing strategies in the organization.

Additionally, for many employees at lower levels in the organization, many financial performance measures are too aggregated and too far removed from their immediate goals to provide useful or insightful guidance or feedback on their decisions and actions. These front-line employees need measures more appropriately and accurately related to outcomes they directly influence.

In response to the drastic change in value drivers and lack of emphasis on intangible assets, a new methodology and philosophy emerged…the Balanced Scorecard.

The Balanced Scorecard was introduced and popularized by Drs. Robert S. Kaplan and David P. Norton in 1992. The Balanced Scorecard is a strategic management framework that helps organizations align (financial and non-financial) measures with strategies in order to monitor progress, drive accountability, and prioritize & reveal improvement opportunities. Unlike traditional financial analysis (or bottom-line analysis), a Balanced Scorecard integrates four related-areas of activity that are critical to nearly all organizations (and all levels within organizations):

- Investing in learning, growth and innovation capability/potential
- Improving efficiency and productivity of internal business processes
- Providing and improving customer value
- Increasing financial value, success and sustainability.

Through the use and successful implementation of the Balanced Scorecard, organizations are provided a clear view of the health of the entire enterprise.

The Balanced Scorecard provides a new management framework to describe a strategy by linking intangible and tangible assets in value-creating activities. An integral component of the Balanced Scorecard is the Strategy Map: a logical architecture that defines a strategy by specifying the relationships among shareholders, customers, business processes, and competencies & capabilities. Strategy Maps provide the foundation for building Balanced Scorecards linked to an organization's strategies. Through the use of Strategy Maps, cause-and-effect linkages demonstrate how intangible assets get mobilized and combined with other assets, both intangible and tangible, to create value. Thus, creating customer value propositions and desired financial outcomes.

Due to the Balanced Scorecard explicitly focusing on linkages among business decisions, processes and outcomes, it is intended and often used to guide strategy development, implementation, and communication as well as provide a reliable feedback mechanism for management control and performance evaluation of the workforce.

Organizations that plan to manage performance through measurement should consider using measures that motivate behavior, leading to continuous improvement in key areas such competition, customer satisfaction, flexibility, productivity, process improvement, workforce satisfaction and other key areas. The performance measurement system should reflect identified cause-and-effect linkages between operational behavior and strategic outcomes. As organizations identify new strategic objectives, a need for new performance measures that encourage and track new actions and behaviors may surface. Therefore, a set of more diverse performance measures may evolve that reflect the diversity of management business decisions, activities and efforts.

In their book, The Strategy-Focused Organization, authors Kaplan and Norton discuss how several factors prevent the financial measurements – used in traditional, industrial-age, management control systems – from measuring these [intangible] assets and linking them to value creation:

- **Value is Indirect.**
  Improvements in intangible assets affect financial outcomes through chains of cause-and-effect relationships involving 2-3 intermediate stages. For example:
  - Investments in employee training lead to improvements in service quality
  - Better service quality leads to increased customer satisfaction
  - Higher customer satisfaction can lead to increased customer loyalty
  - Increased customer loyalty generates increased revenues and margins

- **Value is Contextual.**
  The values of intangible assets depend on organizational context and strategy. They cannot be valued separately from the organizational processes that transform them into customer and financial outcomes. The value depends critically on the context – the organization, the strategy, the other complementary assets – in which the intangible assets are deployed.

- **Value is Potential**.
  Tangible assets, such as raw material, buildings, land and equipment can be valued separately based on historical actual cost or using other valuation methods such as market value, replacement value and traditional financial accounting methods. Industrial-age companies succeeded by combining and transforming these tangible resources into products whose value exceeded the inputs. Profit margins measured how much value was created beyond the input costs.

- **Assets are Bundled**
  (Intangible assets seldom have value in and of themselves). Investing in only one of these capabilities or assets, or even all but one, can cause the value not to be realized. The value comes from creating the entire set of assets along with a strategy that links them together.

The emergence of open standards has been one of the key enabling technologies that has allowed the concept of Balanced Scorecards to gain in popularity.

SYSTEMS THINKING

The concept of systems thinking was originally developed by Jay Forrester and popularized by Peter Senge's book, The Fifth Discipline, is another driver behind the success of Balanced Scorecard efforts. Systems Thinking, simply put, is a way to understand different perspectives on how a system works and to capture that understanding using cause-and-effect, or influence, diagrams.

A system is a collection of parts that interact with each other to function as a whole. Our body's organs and skeleton, for instance, are collections of things. If you put them together, you have a system. To be effective, a doctor must understand how to treat a human body as a system rather than as a collection of distinct parts. Similarly, a manager must view a business as an integrated system rather than as several unrelated processes.

The Strategy Map can be seen as a *Systems Thinking* perspective of a Balanced Scorecard.

Thus, the Balanced Scorecard has continued to gain popularity over the last decade in many organizations across all industries due to the fact that it has combined these very powerful concepts.

A driving factor for the more recent re-emergence in its use in the marketplace is that executives are realizing that in order to successfully drive an organization towards success in today's economy, managing and fully leveraging information, technology and talent across the enterprise is critical. It is no longer adequate to manage discrete functions separately with hopes that each of these silos will aggregate to meet stakeholder objectives. This reality is reinforced and supported by the emergence of open standards. It is because of such standards that the traditional functional silos are finally beginning to collapse as technologies like the Internet are making the distance between customers, suppliers, manufacturers, and retailers more transparent and dynamic. Businesses are broadly internalizing the concept of designing operations from a "top-down," goal-oriented process perspective, rather than the traditional "bottom-up" functional approach.

Although the Balanced Scorecard concept was introduced almost a decade ago, with companies having adopted the methodology with varying degrees of success, many commonalities have emerged among the successful implementations. Two of the most common reasons for success include:

- Recognition that in order to be effective, it is critical that measures and related accountability associated with Balanced Scorecards, cascades down from the executive level throughout the organization. This concept suggests that every individual's performance is properly aligned with one or more strategic objectives or performance measures.

- Past balanced scorecard efforts oftentimes consisted of metrics that were aggregated, utilizing personal productivity tools on stand-alone Balanced Scorecard initiatives that were not integrated with either the business processes or the information being used to measure and manage the underlying business units and functions. As result, many of these Balanced Scorecard implementations lacked the critical alignment, shared responsibility, and "cause & effect" relationships that are absolutely critical.

Companies are taking a more pragmatic approach towards the implementation of the Balanced Scorecard. Successful companies have recognized that it may not be necessary to implement every single Balanced Scorecard concept in order to receive tangible value from their efforts. A lot of value can be realized by building on small successes, publicizing the ROI, gaining momentum and then charging forward.

Many Balanced Scorecard implementations have failed or been abandoned because organizations attempted to implement the methodology only to find they did not capture or store certain identified Balanced Scorecard measures. Companies today are taking more of an iterative approach; starting with those measures supported by information they do have and is stored in an accessible central data repository (i.e. data warehouse). And at the same time, putting processes in place to begin capturing the additional performance measures that will be included over time.

According to Kaplan and Norton, there are five key principles imperative to the success of building a Strategy-Focused Organizations through the use of a Balanced Scorecard:

- Translate the strategy into operational terms
- Align the organization to the strategy
- Make strategy everyone's job
- Make strategy a continual process
- Mobilize change through strong, effective leadership

A range of organizations in the private, public, and nonprofit sectors have deployed these principles to achieve breakthrough, sustainable performance improvements through the successful implementation and use of the Balanced Scorecard. Organizations such as: Mobil, CIGNA, City of Charlotte, Duke Children's Hospital, Nova Scotia Power and Sears, Roebuck and Company.

Kaplan and Norton state the need for change as follows: "In this era of knowledge workers, strategy must be executed at all levels of the organization. People must change their behaviors and adopt new values and goals. The key to this transformation is putting strategy at the center of the management process. Strategy cannot be executed if it cannot be understood, however, and it cannot be understood if it cannot be described. If we are going to create a management process to implement strategy, we must first construct a reliable and consistent framework for describing strategy. No generally accepted framework existed, however, for describing information-age strategies. In today's knowledge economy, sustainable value is created from developing intangible assets, such as the skills, talent and knowledge of the workforce, the information technology that

supports the workforce and links the firm to its customers and suppliers, and the organizational climate that encourages innovation, problem-solving, and improvement. Each contributing to value creation."

OVERVIEW AND ARCHITECTURE OF STRATEGIC VISION

Strategic Vision from SAS, is an integrated solution that translates strategic goals into metrics. Strategic Vision captures performance management strategy – whether it is the Balanced Scorecard, Six Sigma, Baldrige, TQM, EFQM, or other performance management philosophy. Strategic Vision can be used to take an organization to the next step. It helps integrate, distribute and analyze information enterprise-wide to make the right strategic business decisions. It provides simple, clear indicators of performance that help identify the critical cause-and-effect linkages of your strategy. By focusing on a holistic view of the business, one can identify the true sources of business value, failure or best practice that lead to future improvements and successes.

Strategic Vision allows an organization to...

- Track, measure and execute the corporate strategy
- Simplify communications company-wide in order to act quickly and efficiently
- Tap the collective knowledge of employees and unleash each person's potential
- Receive or surface valuable information from other SAS offerings like Customer Relationship Management, Supplier Relationship Management, Total Financial Management, Risk Management, Information Technology and Management, and Human Capital Management in order to deliver an integrated Strategic Performance Management solution.

Strategic Vision brings many key benefits to the market:

- **Show results in days not weeks**
  Strategic Vision is innovative and intuitive. Through interactive drag-and-drop creation, it enables business users to model corporate ideas generated through workgroups or brainstorming sessions. Entering the information during this phase expedites the creation of a prototype of the end solution.

- **Identify and review problem indicators**
  If a business unit in the corporate hierarchy fails to meet the threshold for a given measure, a flag appears at the organizational level. Thus, aggregating data for a corporate view of performance does not lead to unnoticed failures lower down the hierarchy.

- **Collaborate and Communicate**
  Strategic Vision provides an environment for automating the collection and distribution of knowledge, both data and text. Use to track ideas, decisions and actions to record the corporate journey or knowledge.

- **Manage Disparate Data**
  Access multiple data sources, on multiple platforms, from a single environment.

- **Maximize Network Performabnce**
  80% of users merely require a simple "heads-up" on strategic performance. Rather than consuming valuable compute server resources within the organization, Strategic Vision publishes the key information as static web pages, with performance and organizational logic built or hyper-linked in as default. That means that the other 20% (the power users), can make maximum use of compute server resources available for analytic depth, speeding up response times and reducing network traffic.

In terms of solution architecture, the Strategic Vision solution is comprised of three functional and technological components:

- Map,
- Compass and
- Knowledge Base.

STRATEGIC VISION MAP

… design and construct the scorecard

A design tool that enables business users to model their chosen management framework, document the strategy, organize the structure and plan the resultant output cascaded through SV Compass. SV Map provides a fast track for rapid prototyping. When used interactively in strategy workgroups or brainstorming sessions, it dramatically reduces the cycle time of concept to prototype.

- Windows-based front-end for designing scorecard frameworks
- Templates that support the preferred strategic performance methodology
- Ability to define hierarchies and views
- Ability to document the methodology and results

STRATEGIC VISION COMPASS

… view and monitor the scorecard

A communication tool that allows the user to interact, share results, and capture the corporate personality. A web-based interface with powerful strategy maps, tables, charts, graphs and textual commentary. For the ultimate in personalization, users can utilize the power of a customized user portal. This allows the user to specify which information and reports should be received, to set personal alert thresholds and choose how to receive reports or alerts - whether via e-mail, Web, mobile phone, or personal digital assistant.

- Clear, familiar browser/web-based interface
- Combines numerical and textual content
- Provides easy-to-understand status indicators for a strategic "heads-up"
- Access to current results below, above or on target, as well as historical trends.

STRATEGIC VISION KNOWLEDGEBASE

… connect the scorecard to data

Designed to capture, store and exploit corporate knowledge and 'group memory'. Provides IT professionals with the tools to setup communication channels, simplify, organize and audit every byte of information that flows through the enterprise, at whatever pace the business requires, including:

- XML Conversion programs and tools for ETL process (access to ERP, DBMS, etc.)
- Administration and Metadata Documentation
- Collaboration, Knowledge and Comment Management
- Links to supporting reports, documentation and underlying applications

Since it is built upon the SAS System, Strategic Vision can leverage existing SAS technologies for greater analytical power. From Neural Networks to OLAP to Economic Time Series, the SAS System brings enormous decision-making power to organizations. See Figure 1 for a diagram that shows the process flow for Strategic Vision from the creation of the strategic management framework in Map to the publishing of scorecards in

Compass and finally to the automation of the operational data sources to the scorecards in the Knowledgebase

A CASE STUDY - A BALANCED SCORECARD TEMPLATE SOLUTION FOR THE PHARMACEUTICAL INDUSTRY

PricewaterhouseCoopers and SAS have collaborated to build a template solution for the Pharmaceutical industry that combines PWC's domain expertise in Enterprise Performance Management, and the Pharmaceutical Industry in particular with SAS technology, including Strategic Vision and SAS' Information Delivery Architecture.

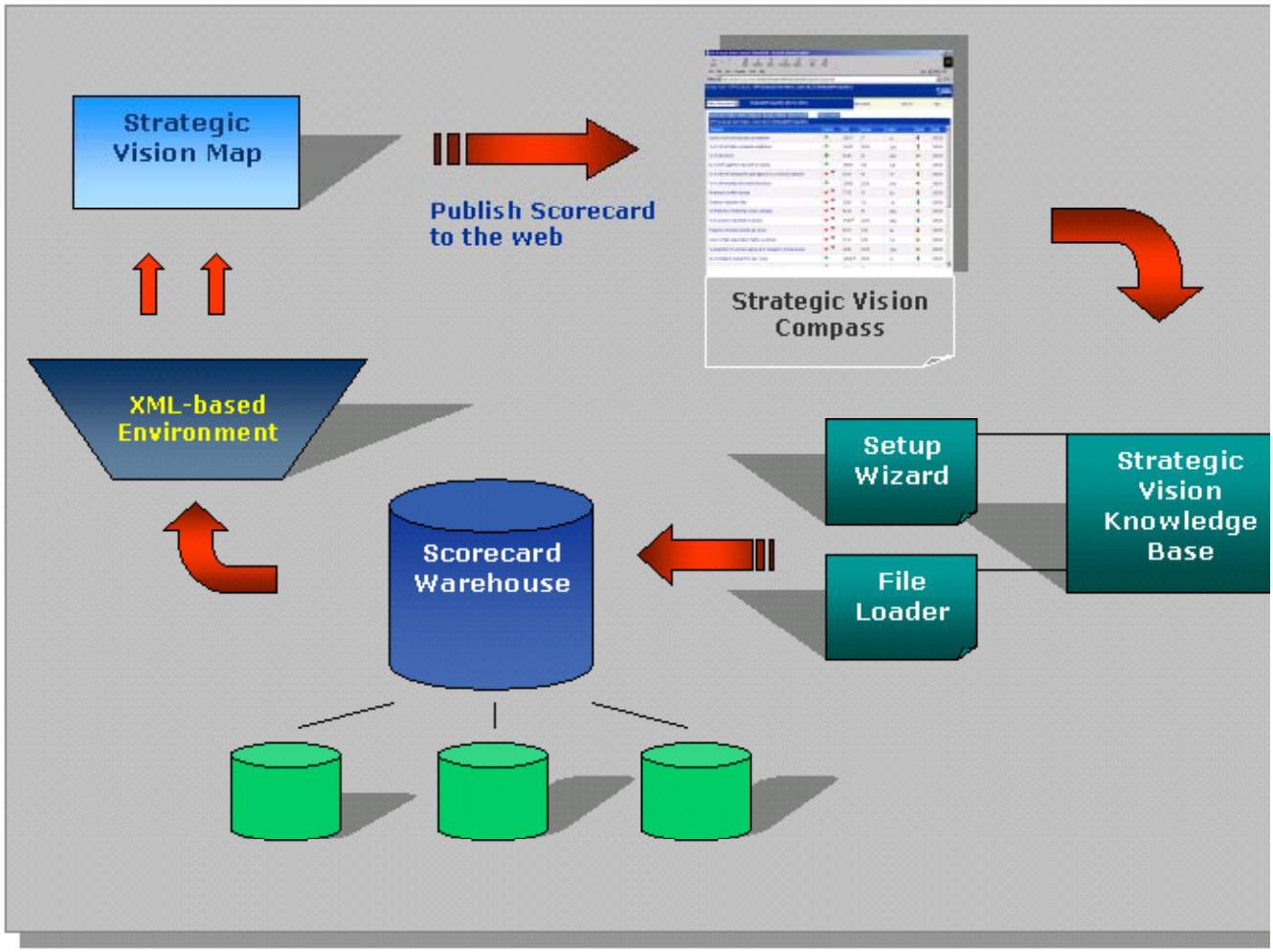

Figure 1. Strategic Vision Process Flow

Figure 2 shows what the user sees upon logging on to the Compass. *(Note that due to the timing of the paper submission, the images contained here are for SAS Strategic Vision Release 1.2 and will have been updated by the time of the formal presentation).* The left hand panel shows the Scorecard hierarchy. We have, in this template, a parent scorecard, **Pharma Scorecard** and two sample children scorecards, **New Products** and **Productivity**. The upper right hand window shows the current results for the metrics. Note that what columns to include is defined in metadata and so is customizable.

The **Status** column is a graphical representation of the adjacent column, **Performance Against Target**. The ranges defining red, yellow and green are also metadata driven. The red flag indicates that a value at a lower level is worthy of attention. This is of particular importance for those metrics which, when aggregated, show as green.

- The symbol, Σ, designates that the result is a calculation from other columns. When the users mouse hovers over the symbol, a formula is displayed. Note three uses:
  - In the column header **Performance Against Target**, a calculated field, the default formula is shown

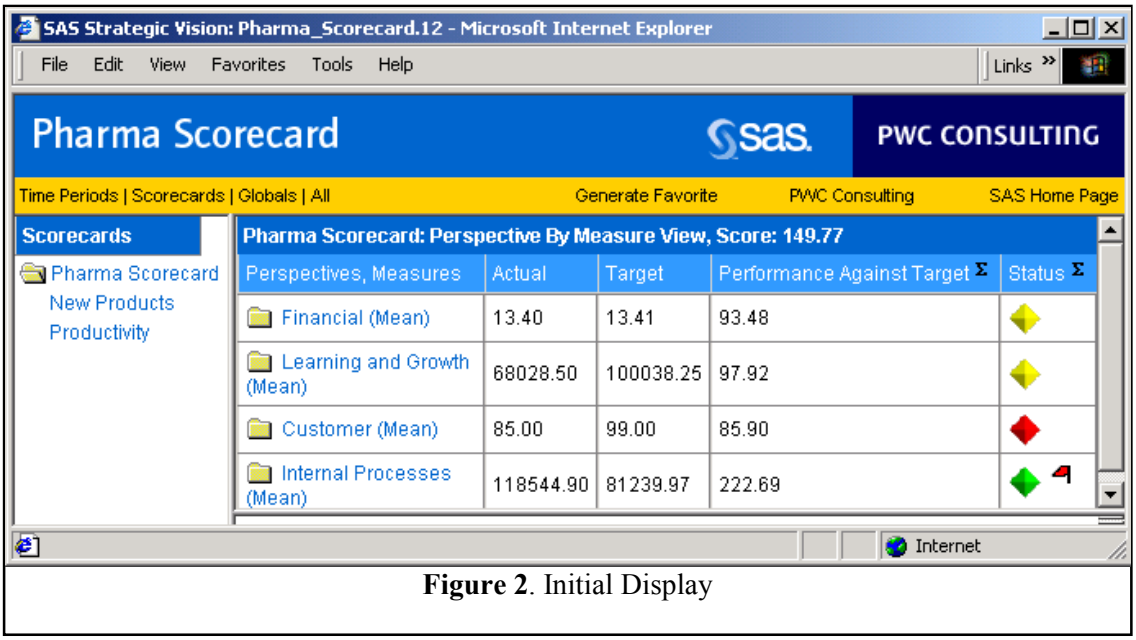

Figure 2. Initial Display

- Exceptions to the default are indicated by the presence of Σ in a row. Note that a low actual value, compared to target, for **Days of Sales on Hand** is desirable and so an alternative formula is provided.
- Actual and Target values, normally provided as data from a warehouse, can also be calculated. There are three examples on this default Scorecard template of typical calculations:
  - The value is *inherited* from a child scorecard
  - The value is a calculation from a child scorecard
  - The value is a calculation using other metrics in the current scorecard.

NAVIGATING THE SCORECARDS

The Scorecard hierarchy is shown in the left hand panel, of Figure 2 and is repeated in Figure 3. Any scorecard can be selected to show the detailed results for that scorecard. The items in the light blue bar can be used to navigate to the list of:

- Time periods
- Scorecards (as currently shown in Figure 3)
- Global parameters that apply to apply to all Scorecards
- All, which shows an expanded list of everything. The major use is expected to be to navigate among the various scorecards.

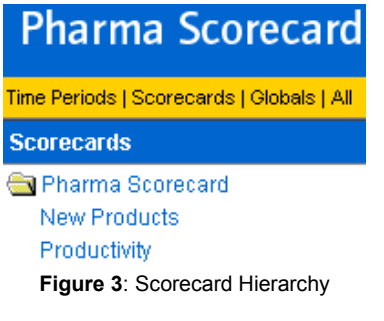

Figure 3: Scorecard Hierarchy

The user can always return to the display shown in Figure 3 by clicking on the *Scorecards* link.

Upon selecting the **Pharma Scorecard** item, it expands to show the details for the scorecard (shown in Figure 4). The items listed there are defined using the Strategic Vision Map component and can be completely customized for each implementation. Any of the items listed in blue can be selected to see the details. The items listed under **Tables** and **Views** will appear in the upper right hand panel. The **Diagrams** and **Radar Charts** will appear in new browser windows. By default the user is initially brought to the **Perspective by Measure** view (also listed under **Views**). The user can click on any of the folder icons and the display will expand to show the metrics associated with the view. By clicking on the text (e.g., Financial) the metadata describing the perspective is displayed.

The **Executive Strategy** diagram displays all the objectives, organized by the perspective that have been defined for the default Scorecard. The **Executive Theme** diagram shows the objectives, organized by theme. Finally, the **Strategy Map** shows the same objectives as in the Executive Strategy diagram, but it also includes the related metrics.

The list of measures can be displayed in the upper right hand window by selecting Measures (see Figure 4). Alternatively, if the user is navigating by Perspective, clicking on the folder causes it to expand and show the measures linked to that Perspective. Upon clicking on a specific measure, the lower right hand panel will be populated by the details about the selected measure as shown in Figure 5. From here, the user can navigate to see the details about the **Strategic Theme, Perspective,** or **Strategic Objective** that this metric corresponds to. Clicking on the Owner will display details about who to contact for this particular metric. Again, all of these are metadata driven and can be easily customized.

Figure 4. Scorecard Details

Pharma Scorecard Measures | Trend Graph | Intraspect Comment Manager

Measures	Corporate Cost Index
Business Definition	Cost to volume ratio compared to normaliz
Unit of Measure	%
Strategic Theme	Sustainable Growth
Perspective	Financial
Strategic Objective	Improve Cost Structure
Owner	Jeanine Wilmot
Measure Definition Date	01MAR2001
Supporting Application	../scripts/broker.exe/allway.csv?_service=srm&_debug=2&_program=sash 20Hierarchy&AC=Time% 20Hierarchy&A=TOTAL_SPEND&A1S1=SU 20Spend%20x%20Business%20Unit%20
Supporting Documentation	../SV/SCSCM/redirect.html?/gm/PerformSe
Update Frequency	Monthly

Figure 5. Measure Details

Of particular note are the **Supporting Application** and **Supporting Documentation** links. The **Supporting Application** link can provide access to an operational system that has details related to the metric/measure of interest. The link shown in this example is to a SAS web OLAP application for spend analysis (e.g. SRM). Clicking on this link results in the display shown in Figure 6. Just as this link was provided for **Corporate Cost Index**, any of the metrics can have links defined for supporting operational or Business Intelligence application.

This application allows the user to save the URL to Intraspect in order to start a collaborative discussion about a discovery made in the data.

The **Supporting Documentation** links perform a search into the Intraspect repository of unstructured information. Any web-based search can be defined or supported. In this example implementation Intraspect is used as both the Comment Manager as well as the repository for unstructured documents.

? Total Spend by Supplier Hierarchy

Start a Collaborative Discussion

Accrual_Date_BU_Fiscal_Year	2000	2001	TOTAL
	Total_Spend	Total_Spend	Total_Spend
Supplier_Level_1_Description	Sum	Sum	Sum
	5265701	3362038	8627739
Australia	26000	.	26000

Figure 6. Supporting Application

CONCLUSION

A growing number of organizations are beginning to implement the next-generation of balanced scorecard implementations.

Kaplan and Norton's original concepts, expanded by the concept of systems thinking, and implemented using a metadata driven architecture to enable your balanced scorecard is a powerful technique. By using a data warehouse, a metadata-driven systems architecture and integrated analytics, you can now build and design the enterprise system architecture necessary to support your company's strategy, monitor its execution and improve performance at all levels.

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