Data Warehousing for Business Intelligence
Course 4: Business Intelligence Concepts, Tools, and Applications

Module 4 Bonus Materials

Lesson 2: Performance Measurement System

We've arranged for students in this MOOC to purchase at a very low cost digital versions of chapters 1, 2, and 4 of the authoritative textbook *Business Intelligence and Analytics: Systems for Decision Support*, 10th edition, 2015 by Sharda, R., Delen, D., and Turban, E. See the optional text book link under course overview to purchase (US$4 for one chapter, US$10 for all three; the regular price for students is $15 per digital chapter).

- A performance measurement system is one component of a performance management system. The latter task is accomplished by a performance measurement system, which can be considered a subset of the overall performance management system.
- A performance measurement system typically comprises systematic methods of setting business goals together with periodic feedback reports that indicate progress against goals. This is a key and necessary element of the BPM process. BI tools, on the other hand, enable users to access, analyze, and act on the data in the data warehouse or data mart. The most common methods for viewing performance data using BI tools are *dashboards* or *scorecards.*
- Performance measurement system proactively monitor performance. That is, instead of requiring users to continually look at dashboards or scorecards to see how they are doing, the systems notify or alert all relevant users when something is awry. BI tools enable users to define alerts for KPIs they want to track. The system sends the alert via their preferred channel (i.e., e-mail, Web, pager, phone) along with a hyperlink so users can view relevant reports. "Alerts embed analysis into an action-oriented process—they operationalize BI," For example, if sales are below forecast for the month, a BI system might automatically alert sales, marketing, and finance managers to check their sales, pipeline, and cash flow reports respectively, BI tools also play a key part in the Act & Adjust phase because they not only alert users to the problem, but provide additional detail and guidance to help users figure out what to do.
    - Tools used for Performance Measurement are:
    - KPI (Key Performance Indicator)
    - Balanced Scorecard
    - Six Sigma

For new processes, the model that is used is called ***DMADV*** (define, measure, analyze, design, and verify). Traditionally, DMAIC and DMADV have been used primarily with operational issues. However, nothing precludes the application of these methodologies to strategic issues such as company profitability.

DMAIC is a closed loop performance improvement model that involves the following steps:
define, measure, analyze, improve, and control.

- First, you define the goals, objectives, and boundaries of the improvement activity.
- Next, you measure the existing system, in order to monitor its performance against the goals.
- Then, you analyze the system to identify ways to eliminate the gap between the current performance of the system or process and the desired goal. This leads to improvement, which involves initiating actions to reduce these gaps.

- Finally, control involves modifying compensation and incentive systems, policies, procedures, manufacturing resource planning, budgets, operation instructions, or other management systems.
- In recent years, there has been a focus on combining the Six Sigma methodology with other successful methodologies. For instance, the methodology known as *Lean Manufacturing, Lean Production,* or simply as *Lean* has been combined with Six Sigma in order to improve its impact in performance management.

The real key to an effective performance measurement system is to have a good strategy.

- Measures need to be derived from the corporate and business unit strategies and from an analysis of the key business processes required to achieve those strategies. Of course, this is easier said than done. If it were simple, most organizations would already have effective performance measurement systems in place, but they do not. KPIs provide insight into the critical success factors of the enterprise and help the enterprise in measuring the progress. KPIs are high-level, well-defined quantifiable measurements based on pre-established criteria. KPIs should be designed to measure the performance against the targets. KPIs are not performance targets but are a mechanism to assist you in moving the enterprise to the desired state.
- Effective performance management/measurement should focus on key factors. It should mix past, present, and future. Also, it should balance the needs of shareholders, employees, partners, suppliers, and other stakeholders. Performance measures should start at the top and flow to the bottom, and should involve targets that are based on research and reality rather than arbitrary.

Measures of business drivers are called *key performance indicators* or KPIs. These are unique types of metrics because they are intended to reflect future performance. In other words, they are leading, not lagging, indicators of performance. KPIs should drive individuals and groups to take action that leads to positive outcomes. As we shall see later, it is not easy to create effective KPIs. A **performance indicator** or **key performance indicator** (**KPI**) is a type of performance measurement.

> KPIs evaluate the success of an organization or of a particular activity in which it engages. Often success is simply the repeated, periodic achievement of some levels of operational goal (e.g. zero defects, 10/10 customer satisfaction, etc.), and sometimes success is defined in terms of making progress toward strategic goals. Accordingly, choosing the right KPIs relies upon a good understanding of what is important to the organization. “What is important” often depends on the department measuring the performance - e.g. the KPIs useful to finance will really differ from the KPIs assigned to sales.

Common KPIs

- **Customer performance.** Metrics for customer satisfaction, speed and accuracy of issue resolution, and customer retention.
- **Service performance.** Metrics for service-call resolution rates, service renewal rates, service-level agreements, delivery performance, and return rates.
- **Sales operations.** New pipeline accounts, sales meetings secured, conversion of inquiries to leads, and average call closure time.
- **Sales plan/forecast.** Metrics for price-to-purchase accuracy, purchase order-to- fulfillment ratio, quantity earned, forecast-to-plan ratio, and total closed contracts.

Some examples are:

- New customers acquisition.
- Demographic analysis of individuals (potential customers) applying to become customers, and the levels of approval, rejections, and pending numbers
- Status of existing customers
- Customer attrition
- Turnover (i.e., revenue) generated by segments of the customer population

- Outstanding balances held by segments of customers and terms of payment
- Collection of bad debts within customer relationships
- Profitability of customers by demographic segments and segmentation of customers by profitability

Many of these customer KPIs are developed and managed with customer relationship management software. Faster availability of data is a competitive issue for most organizations.

For example, businesses which have higher operational/credit risk (involving for example credit cards or wealth management) may want weekly or even daily availability of KPI analysis, facilitated by appropriate IT systems and tools.

By definition, KPIs provide context. They show users or groups what is an acceptable level of performance. KPIs embed organizational expectations. This can be done in several ways:

- **Thresholds.** Thresholds define an upper and lower range of acceptable performance.
- **Targets.** Targets define a desired end-state at a particular point in time. For example, a target might be a 10 percent growth in net profits by year end. These targets may come from the plan or budget. An integrated BPM solution can synchronize these targets in both planning and scorecard modules.
- **Benchmarks**. Benchmarks compare performance to external standards, such as an industry benchmark, a statistical measure (Six Sigma accuracy levels), or results from a direct competitor.

The key features described in the book are **strategy, targets, ranges, encodings, time frames, and benchmarks**.

- KPIs embody strategic objectives and measure performance against specific **targets,** based on specified ranges of values.
- **Encodings** provide visual cues (e.g., color) to indicate how close or far from a target we are on a particular metric.
- **Benchmarks** provide something to compare against.

It is a huge undertaking for organizations to determine what KPIs are important, who owns them, and how to define threshold settings that trigger whether a [stoplight] metric will display as red, yellow, or green

Gathering Requirements

The first step towards identifying the right metrics and building consensus and "buy-in" to BPM is to gather business requirements. Organizations use many techniques to identify key drivers of business value and the metrics that encapsulate them.
The challenge is defining valid, relevant, and effective key performance indicators (KPIs) tailored to each group in the organization.

- What is the right number of KPIs?
- Which really drive strategic value and proactive action?
- Which conflict with other KPIs or incent employees to work at cross-purposes with key objectives?

Organizations define drivers, goals, and objectives in strategic planning sessions, which can last several days, weeks, or months. One technique for defining business drivers is "**strategy mapping**" which emanates from a BPM methodology known as Balanced Scorecard. Strategy mapping helps executives define business drivers as well as map their cause-effect relationships at various levels of an organization.

Less Is More. To avoid confusion and focus workers on critical areas of value and growth, organizations should limit the number of KPIs they publish to a handful of measures.

See Web resources below for information

- Hyperion Performance Measurement
- Key Performance Indicators
- KPIs and Business Intelligence: What and Why to Measure
- Images for Performance measurement system
- Top Ten Reasons for a Performance Measurement System