PERFORMANCE MANAGEMENT STRATEGIES

How to Create and Deploy Effective Metrics

By Wayne W. Eckerson

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THE DATA WAREHOUSING INSTITUTE

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About the Author

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About TDWI

The Data Warehousing Institute™ (TDWI), a division of 1105 Media, Inc., is the premier provider of in-depth, high-quality education and research in the business intelligence and data warehousing industry. TDWI is dedicated to educating business and information technology professionals about the strategies, techniques, and tools required to successfully design, build, and maintain business intelligence and data warehousing solutions. It also fosters the advancement of business intelligence and data warehousing research and contributes to knowledge transfer and professional development of its Members. TDWI sponsors and promotes a worldwide Membership program, quarterly educational conferences, regional educational seminars, role-based training, onsite courses, certification, solution provider partnerships, an awards program for best practices, resourceful publications, an in-depth research program, and a comprehensive Web site (www.tdwi.org).

About TDWI Research

TDWI Research provides research and advice for BI professionals worldwide. TDWI Research focuses exclusively on BI/DW issues and teams up with industry practitioners to deliver both broad and deep understanding of the business and technical issues surrounding the deployment of business intelligence and data warehousing solutions. TDWI Research offers reports, commentary, and inquiry services via a worldwide Membership program and provides custom research, benchmarking, and strategic planning services to user and vendor organizations.
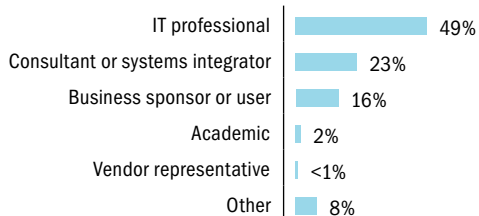
Acknowledgments

Research Methodology

Focus. This report is designed for business and technical managers who oversee or participate in a performance management initiative and want to learn how to create effective key performance indicators. The report examines the methods and techniques organizations can use to transform strategies into metrics that drive positive change and desired outcomes.
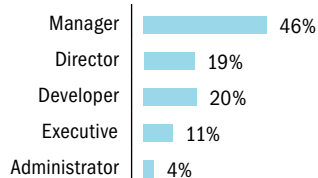
Methodology. The research for this report is based on a 25-question survey and in-depth interviews with a dozen performance management practitioners and solution providers. TDWI issued the survey in September 2008 and 678 people completed it. The majority of survey respondents are corporate IT professionals or consultants who work at large organizations in the U.S. in a range of industries.

KPI Status. More than one-third of respondents said they had either "partially" (31%) or "fully" (9%) deployed an initiative to develop KPIs. Another 52% said their KPI project was "planned" (24%) or "under way" (28%). Only 8% said they don't have a KPI project. This data suggests that creating effective KPIs as part of a performance management initiative is still a new concept for most organizations. However, TDWI's survey respondents are typically more representative of organizations that want to learn about a new area of endeavor rather than those that have already done it.
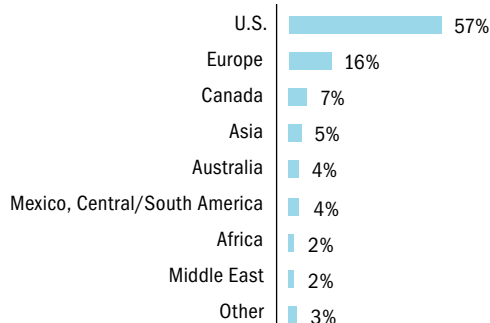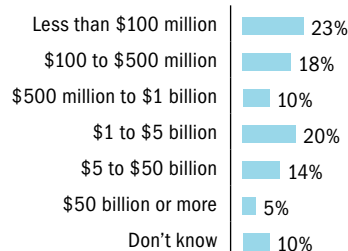
Which best describes your position?

IT professional	49%
Consultant or systems integrator	23%
Business sponsor or user	16%
Academic	2%
Vendor representative	<1%
Other	8%

What is your level?

Manager	46%
Director	19%
Developer	20%
Executive	11%
Administrator	4%

Where are you located?

U.S.	57%
Europe	16%
Canada	7%
Asia	5%
Australia	4%
Mexico, Central/South America	4%
Africa	2%
Middle East	2%
Other	3%

What are the annual revenues of your organization?

Less than $100 million	23%
$100 to $500 million	18%
$500 million to $1 billion	10%
$1 to $5 billion	20%
$5 to $50 billion	14%
$50 billion or more	5%
Don't know	10%

Top industries represented

Consulting/professional services	13%
Software/Internet	7%
Retail/wholesale/distribution	6%
Banking	6%
Education (university)	6%
Healthcare	6%
Insurance	6%
Financial services	5%
Manufacturing (non-computers)	5%
Telecommunications	4%
Other	36%
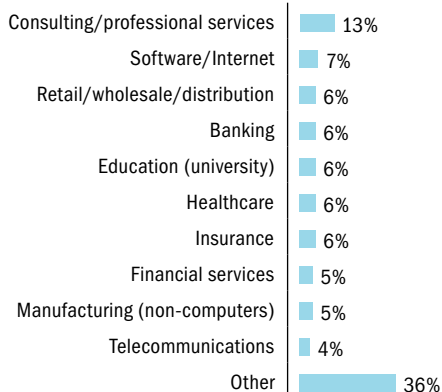
What is the status of your initiative to develop key performance indicators?

Doesn't exist	8%
Planned	24%
Under way	28%
Partially deployed	31%
Fully deployed	9%
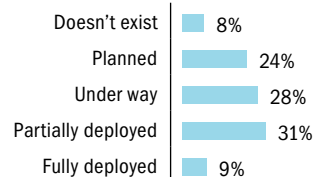
Based on 678 respondents.

Performance Management Strategy

Performance metrics are a powerful tool of organizational change.

Organizational Change. Performance metrics are a powerful tool of organizational change. The adage "What gets measured, gets done," is true. Companies that define objectives, establish goals, measure progress, reward achievement, and display the results for all to see can turbo-charge productivity and gracefully move an organization in a new direction.

Executives use performance metrics to define and communicate strategic objectives tailored to every individual and role in the organization. Managers use them to identify underperforming individuals or teams and guide them back on track. Employees use performance metrics to focus on what's important and help them achieve goals defined in their personal performance plans.

But performance metrics are a double-edged sword. The wrong metrics can have unintended consequences: they can wreak havoc on organizational processes, demoralize employees, and undermine productivity and service levels. If the metrics don't accurately translate the company's strategy and goals into concrete actions that employees can take on a daily basis, the organization will flounder. Employees will work hard but have nothing to show for their efforts, leaving e veryone tired and frustrated. In short, the company will be efficient but ineffective.

Performance management is a discipline that aligns performance with strategy.

Performance Management. Performance metrics are a critical ingredient of performance management, a discipline that aligns performance with strategy. Performance management harnesses information technology to monitor the execution of business strategy and help organizations achieve their goals. As Figure 1 shows, performance management is a four-step virtuous cycle that involves creating strategy and plans, monitoring the execution of those plans, and adjusting activity and objectives to achieve strategic goals. This four-step wheel revolves around integrated data and metrics, which provide a measurement framework to gauge the effectiveness of strategic and management processes.
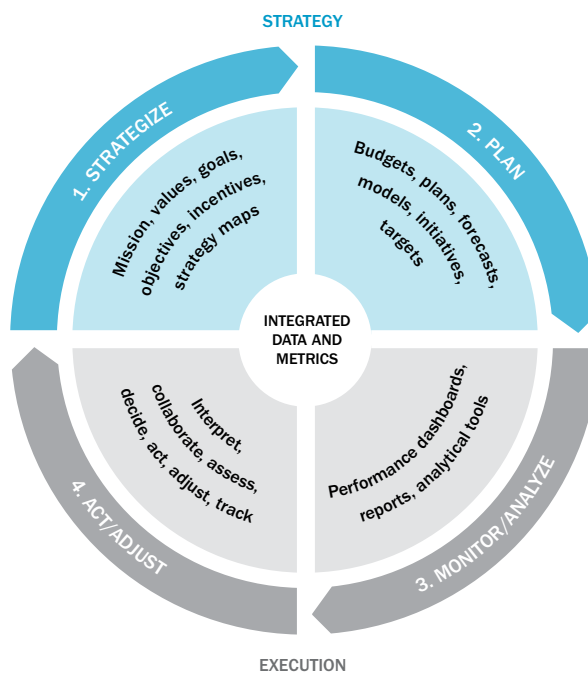

Figure 1. The performance management cycle

Performance Management System. A performance management system supports this virtuous cycle. It consists of an interlinked business architecture and technical architecture. (See Figure 2.) Performance metrics are the lynchpin that fastens the business and technical architectures into a coherent whole. The metrics sit at the bottom of the business architecture and embody an organization's approach to each layer above. In essence, performance metrics distill an organization's strategy to serve its stakeholders, linking strategy to processes. No wonder most organizations struggle to define performance metrics!

A performance dashboard encapsulates performance metrics in a layered and visual information delivery system that lets users measure, monitor, and manage the effectiveness of their tactics and their progress toward achieving strategic objectives. A performance dashboard may consist of one or more dashboards, scorecards, reports, and analytical tools that run off a common set of data and metrics. Collectively, they enable users to identify problems and opportunities, collaborate on an approach, take action, and adjust plans and goals as needed. Each performance dashboard uses a subset of components that are displayed in each level of the technical architecture based on the metrics and strategic objectives it supports.

BUSINESS ARCHITECTURE						
STAKEHOLDERS	Investors	Board	Workforce	Customers	Suppliers	Regulators
STRATEGY	Mission	Vision	Values	Goals	Objectives	Strategy map
TACTICS	Budgets	Plans	People	Process	Initiatives	Projects
SEMANTICS	Terms	Dimensions	Rules	Hierarchies	Attributes	Governance
METRICS	Outcomes (lagging)		Drivers (leading)		Operational	

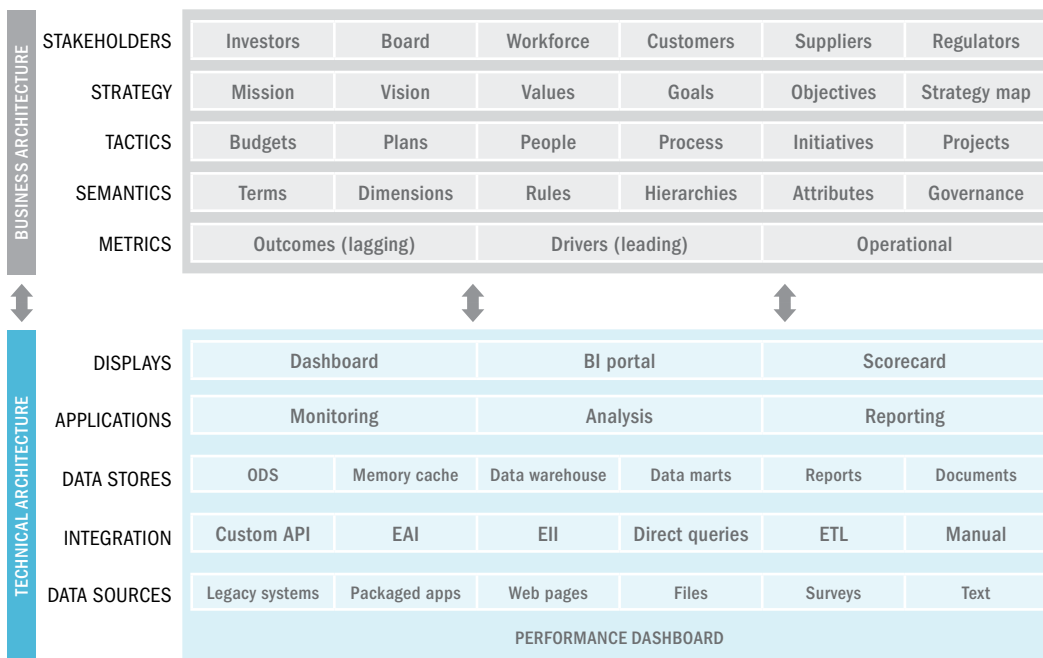| TECHNICAL ARCHITECTURE						
DISPLAYS	Dashboard		BI portal		Scorecard	
APPLICATIONS	Monitoring		Analysis		Reporting	
DATA STORES	ODS	Memory cache	Data warehouse	Data marts	Reports	Documents
INTEGRATION	Custom API	EAI	EII	Direct queries	ETL	Manual
DATA SOURCES	Legacy systems	Packaged apps	Web pages	Files	Surveys	Text
PERFORMANCE DASHBOARD						

Figure 2. Performance metrics embody the strategy of an organization and serve as the lynchpin that fastens business and technical architectures in a performance management system. Note: The diagram displays a superset of components at each level in the technical architecture; not all elements are required.

Maturity. Martin Phillips and Brent Winsor of Cognos work with many customers to help them identify the most appropriate performance management solutions based on their requirements and expectations. These solutions usually correlate with the maturity of a customer's performance management capabilities and vision. Most customers can be grouped into three levels of performance management maturity.

Level 1: Visualize Metrics. Here, customers need insights into key indicators of performance. A dashboard or report helps them visualize and streamline performance information in a consistent manner. The metrics aren't necessarily aligned with strategic objectives or measured using formal performance targets. These customers seek to create dashboards and reports that enable them to display standard types of metrics.

Level 2: Manage Performance. These customers want to measure and display performance across multiple teams in a consistent way to improve productivity. They assign owners to each metric and hold them accountable for outcomes. They use performance management as a vehicle to identify issues, discuss solutions, and track fixes. These customers need a scorecard application, a metrics data mart, and a consistent set of facts to measure performance.

Level 3: Drive Strategy. These customers use KPIs to achieve strategic objectives and goals. They define driver KPIs and correlate them with outcomes. They know what behaviors drive desired outcomes and set targets accordingly. These customers need a complete performance management system comprising scorecards and dashboards.

This report aims to help organizations drive to the highest level of maturity (Level 3) and reap the highest ROI from their performance management initiatives.

Understanding KPIs

KPI Components

Metrics versus KPIs. Until now, we've used the term *metric* to refer to measurements of business activity. But in a performance management system, we want to do more than just measure business activity; we want to measure performance aligned with business strategy.

A KPI embodies a strategic objective and measures performance against a goal.

To distinguish between run-of-the-mill metrics and strategically aligned metrics, cognoscenti use the term *key performance indicator*, or KPI. The only difference between a metric and a KPI is that a KPI embodies a strategic objective and measures performance against a goal. The goals attached to a KPI are multidimensional: they have ranges that are encoded in software, a time frame by which the goals must be achieved, and a benchmark against which the goals are compared. (See Table 1.)

Strategy	KPIs embody a strategic objective.
Targets	KPIs measure performance against specific targets. Targets are defined in strategic, planning, or budget sessions and can take different forms (e.g., achievement, reduction, absolute, zero).
Ranges	Targets have ranges of performance (e.g., above, on, or below target).
Encodings	Ranges are encoded in software, enabling the visual display of performance (e.g., green, yellow, red). Encodings can be based on percentages or more complex rules.
Time frames	Targets are assigned time frames by which they must be accomplished. A time frame is often divided into smaller intervals to provide mileposts of performance along the way.
Benchmarks	Targets are measured against a baseline or benchmark. The previous year's results often serve as a benchmark, but arbitrary numbers or external benchmarks may also be used.

Table 1. *Elements of a KPI*

Goals and Targets. The goals associated with KPIs are known as *targets* because they specify a measurable outcome rather than a conceptual destination. Ideally, executives, managers, and workers collectively set targets during strategic, planning, or budget discussions. Such collaboration ensures buy-in and more accurate targets. Targets can also be set by a KPI team charged with translating strategic objectives into a performance plan.

Since KPIs derive much of their impact from the targets associated with them, it's important to differentiate between types of targets. Ranga Bodla, senior director of enterprise performance software at SAP, defines five types of targets:

1. **Achievement:** Performance should reach or exceed the target. Anything over the target is valuable but not required. Examples include revenues and satisfaction.

2. **Reduction:** Performance should reach or be lower than the target. Anything less than the target is valuable but not required. Examples include overtime and attrition.

3. **Absolute:** Performance should equal the target. Anything above or below is not good. Examples include in-stock percentage and on-time delivery.

4. **Min/max:** Performance should be within a range of values. Anything above or below the range is not good. Example: mean time between repairs.

5. **Zero:** Performance should equal zero, which is the minimum value possible. Examples include employee injuries and product defects.

Ranges. To help workers gauge their performance, most organizations stratify targets; that is, they divide the target into ranges, usually percentage increments above and below the target. (Think of the concentric circles around a bull's-eye in an archery target.) Organizations can create any number of ranges around a target, although most use three: above target, on target, or below target.

Encodings and Thresholds. The next step is to encode ranges into graphical displays on a performance dashboard or report. It's important that organizations apply a consistent encoding or scoring system to their KPIs no matter what type of targets they use. That way, when users look at a KPI display within a dashboard, all the conditional formatting (i.e., color coding) will connote the same performance values, according to Bodla. For instance, above target, on target, or below target ranges easily translate into red, yellow, and green color encodings.

The boundary line between ranges is called a threshold. When performance exceeds a threshold, the graphical representation of the KPI changes, say from yellow to green. Threshold-based encodings make it easy for users to assess the status of key business processes or projects at a glance, which is the major reason performance dashboards are so popular.

Although the use of three ranges is common, I once saw an operations group use 16 ranges and encoding schemes. Some organizations use multiple ranges to emphasize "stretch" or visionary goals that motivate employees to achieve above the norm and think outside the box. Others want to track granular gradations in performance, especially when they've attached monetary incentives to achievement levels.

Not all organizations encode target ranges using color; some use a variety of graphical devices, such as bullet graphs or other icons. For example, a beer manufacturer might use graphics of beer mugs that are empty, half-full, or full to portray performance against goals.[1] The number of target ranges and choice of graphics depends on a group's culture and preferences.

The boundary line between target ranges is called a threshold.

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[1] Stephen Few has written prolifically about how to display numeric business data and provides guidelines for designing the visual display of performance dashboards. See his book *Information Dashboard Design* (O'Reilly, 2006).

Encoding performance is not always straightforward.

Encoding Nuances. Encoding performance is not always straightforward. Many organizations display only a handful of KPIs in an executive scorecard. As a result, those KPIs may be averages or aggregates based on multiple lower-level KPIs. The problem with averages and aggregates is that they may show above-target performance even when one or more of the lower-level metrics registers abysmal performance scores.

To avoid such dilution, architects apply Boolean rules to the thresholds and encodings. For instance, they might write a rule that says if one business unit scores in the bottom range, then mark the overall score as below average even if the rest of the associated KPIs are above average. Or architects may assign double or triple weights to the scores in the bottom range so they have a greater impact on the higher-level KPIs.

Time Frames. Performance targets have time frames, which affects how KPIs are calculated and displayed. Many organizations establish annual targets for key processes and initiatives. To keep employees on track to achieve those long-term targets, many organizations divide time frames into intervals that are measured on a more frequent basis. For instance, a group may divide the annual target to improve customer satisfaction from 60% to 64% into four quarterly intervals with 1% targeted improvement each quarter. In some cases, such as a retail environment affected by seasonal shopping, groups may backweight the targets toward the end of the year, since most sales occur during the December holiday season. (See Figure 3.)
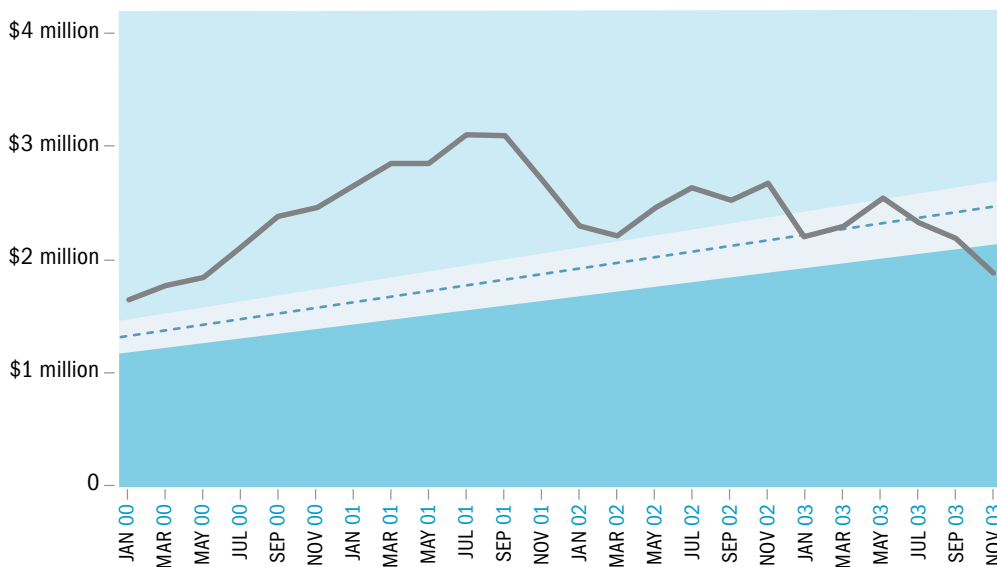
Net Sales EMEA

Figure 3. *This chart shows actual performance for the KPI "Net Sales EMEA" against a target and ranges that increase in monthly intervals. The dotted line is the target, the bold line is the actual, and the shaded areas represent the ranges (i.e. "above," "on," and "below" target).*

Benchmarks. Finally, KPI targets are measured against a benchmark that becomes the starting point for improving performance. Typically, the benchmark is last year's output. So, for example, a sales team may need to increase sales by 15% compared to last year. Or the benchmark could be an external standard, such as the performance level of an industry leader. Here, a company might want to set a goal of closing the gap in market share with its closest rival by 50% next year.

In some cases, the benchmark may be completely arbitrary. This often occurs with visionary goals, where an executive mandates a seemingly impossible goal to achieve. Like John F. Kennedy's famous imperative to send a man to the moon by the end of a decade, visionary goals force employees to think outside existing norms and processes to achieve the desired outcome.

Reading KPIs

Reading KPIs should be straightforward. Users should be able to look at a visual display that has been properly encoded and know instantly whether a process or project is on track. But we find that many employees don't know how to read KPI displays—or more alarming—how to interpret KPIs. (The latter involves a degree of analytical literacy that we'll address later.)

Seven Attributes. To assist users with interpreting KPIs, a good performance dashboard displays seven attributes for each (see Figures 4a and 4b):

1. Status
2. Trend
3. KPI name
4. Actual value
5. Target value
6. Variance
7. Variance percentage

Status measures performance against the target and is usually shown with a stoplight. *Trend* measures performance against the prior interval or another time period and is often displayed using arrows or trend lines. The KPI name is usually hyperlinked so users can click on it to view a time series chart. The actual and target values are self-explanatory and usually displayed with text. *Variance* measures the gap between actual and target and is displayed using text or a micro bar chart or bullet chart. Variance percentage divides the variance against the target. These seven attributes combine to provide valuable insight into the state of performance.

KPI Displays

Perspective / KPI	Trend	Status	Actual	Target	Previous Target	Target % Change	Lead/Lag	Type	Unread Comments	Associated Initiative	Oct 2007 Actual	Oct 2007 Target
Financial												
DSO	—	●	39.69	38.17	38.17	-0.00	Leading	Quantitative			-	38.18
Direct Profit	↘	●	24,299,956.57	25,854,105.27	27,749,739.40	-6.83	Lagging	Quantitative	2	Initiatives	-	27,014,588.17
EBITDA as % of Revenue	↘	●	27.45	32.22	32.32	-0.30	Lagging	Quantitative			-	-
(+) Index Example		●										
Advertising Effectiveness	↗	●	77.02	82.00	82.00	-	Leading	Qualitative			79.05	82.00
Market share	—	●	7.88	8.45	8.02	5.39	Leading	Quantitative			8.27	8.85
Number of New Dealers		●	10.00	5.00	5.00	-	Leading	Quantitative			10.00	5.00
Revenue	↘	●	36,335,162.20	37,615,490.46	40,315,130.50	-6.70	Leading	Quantitative			-	39,192,632.64
Service Cost	—	●	2.00	8.00	8.00	-	Lagging	Quantitative			2.02	8.00

Figure 4a. This chart uses a combination of text and graphics to display various attributes of KPIs within the financial perspective of a balanced scorecard. The status indicators use both color and symbols. The symbols enable color-blind people(8% of males and 2% of females) to read the chart at a glance. Screenshot courtesy of Business Objects, an SAP company.
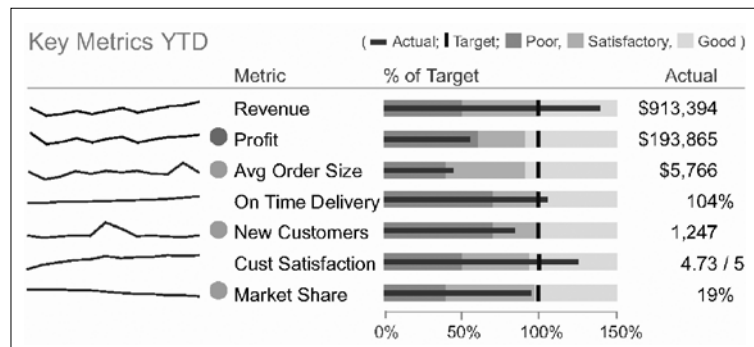

Figure 4b. This chart provided by Stephen Few uses sparklines to indicate trend; a stoplight to indicate status; a bullet graph to indicate actual, variance, and targets; and text to indicate actual as well.

In essence, *status* signals a problem, *variance* describes its extent, and *trend* defines its movement.

Status is the attribute most people respond to first, since it's usually displayed as a stoplight or gauge. A red stoplight on a dashboard jumps out at the viewer, who feels impelled to take notice. From there, users will examine variance and variance percentage to help them understand with precision just how bad (or good) the situation is. They then look at the trend, which signifies whether the situation is new or old, improving or declining. In essence, status signals a problem, variance describes its extent, and trend defines its movement.

But collectively, these attributes can give mixed signals. For example, if a KPI's status is red but its trend is positive, what should a user think? Perhaps someone already spotted the problem and applied a remedy that is now working. Conversely, what if a KPI's status is green but its trend is downward? A green light indicates that performance is above average, but shouldn't the user take action now before the green light turns yellow?

Interpreting KPI attributes gets even more complex when the targets change each period or interval. For instance, if a KPI's status is green and its trend is positive, but its variance is increasing, should the user be alarmed? This combination of signals indicates that performance is improving, but not fast enough to meet accelerated interim targets. In this case, many companies plot percentage variance, not actual values, to highlight whether the gap between actual and target is growing or shrinking over time. This takes some of the guesswork out of interpreting KPIs, which is especially helpful for new employees or managers who've been assigned to a new area.

Types of KPIs

Outcome versus Driver KPIs. There are two fundamental types of KPIs: outcomes and drivers. Outcome KPIs—sometimes known as lagging indicators—measure the output of past activity. They are often financial in nature, but not always. Examples include revenues, margins, return on equity, customer satisfaction, and employee retention.

On the other hand, driver KPIs—sometimes known as leading indicators or value drivers—measure activities that have a significant impact on outcome KPIs. These KPIs measure activity in its current state (number of sales meetings today) or a future state (number of sales meetings scheduled for the next two weeks). The latter is more powerful, since it gives individuals and their managers more time to adjust behavior to influence a desired outcome.

There is confusion about the difference between these two types of KPIs. (Some industry experts add performance indicators, key risk indicators [KRIs], diagnostic indicators, and other types of KPIs, which clouds the issue.) Truth be told, there often isn't a lot of difference. "One man's outcome measure is another man's value driver," says Neal Williams, founder of Corda and currently head of its professional services. "An outcome KPI in one dashboard could be a driver KPI in another."

Creating KPIs. Most organizations find it easy to create outcome KPIs because they measure the desired state of a strategic objective. In fact, most companies already track outcome KPIs in management reports or dashboards, although most are slanted to financial objectives. Not surprisingly, the majority of KPIs (56%) are outcome or lagging indicators, although a majority (57%) are non-financial measures, according to our research. (See Figure 5.)

> "One man's outcome measure is another man's value driver. An outcome KPI in one dashboard could be a driver KPI in another."

What percentage of your KPIs are:

Lagging indicators	56%
Leading indicators	35%
Other	9%

What percentage of your KPIs are:

Non-financial measures	57%
Financial measures	43%
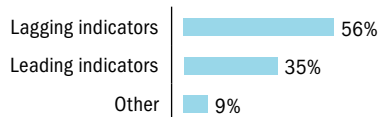
Figure 5. Based on 271 respondents who have partially or fully deployed a KPI initiative.

On the other hand, many organizations struggle to define accurate drivers of future performance. It often takes months or years of trial and error to find metrics that correlate with future outcomes. A place to start is a brainstorming session in which a group identifies desired outcomes and then asks, "What behaviors or activities will drive or lead to that outcome?" Each time the group identifies a new driver, it should ask the same question: "What behaviors or activities will produce that result?" After several iterations, the group will find one or two root causes that have the most significant impact on the desired outcome.

> Many organizations struggle to define accurate drivers of future performance.

Organizations can also conduct a statistical analysis to correlate outcomes with driver KPIs. For example, one online service provider identified two KPIs that correlate with the ability of telemarketers to meet daily sales quotas: the amount of time they spend on the phone with customers and the number of clients they speak with each day. The company also created a third KPI based on the previous two that projects every 15 minutes whether the telemarketers are on track to meet their daily quotas. This value driver, which is based on a simple statistical regression algorithm, enables sales managers to identify which telemarketers to assist during the next hour or so.

Operational Metrics. At TDWI's BI Executive Summits, we've had lively debates about what organizations should measure and what they should not. Some people get zealous about the notion that organizations shouldn't measure anything that isn't directly related to a strategic objective. There's a lot of validity to this argument, especially since most organizations are awash in metrics that don't add much value to the business and consume needless time, energy, and money to manage and display.

However, there are plenty of operational metrics that may not directly roll up to a KPI in an executive scorecard, but are still important to measure. Michael Masciandaro, director of business intelligence at Rohm and Haas Company, says, "There are plenty of operational processes that may not be strategic, but if they break, you probably want to know about it, and sooner rather than later!"

> "There are plenty of operational processes that may not be strategic, but if they break, you probably want to know about it!"

For example, Masciandaro says mean time between repairs is a critical plant metric that drives maintenance costs but "will never show up on an executive dashboard." He adds, "Manufacturing has hundreds of these measures." Of course, scorecard advocates could argue that mean time between repairs is a key driver of cost and profit KPIs that do exist on the executive dashboard. They would argue that all operational metrics should drive higher-level KPIs, or it isn't worth the time and energy to track them. We will talk about the relationship between KPIs and operational metrics in the next section.

Qualitative and Quantitative KPIs. Another distinction between KPIs is that some are based on quantitative data, while others are based on qualitative or subjective data. Quantitative data measures activity by counting, adding, or averaging numbers. Operational systems that manage inventory, supply chain, purchasing, orders, accounting, and so on all gather quantitative data used by KPIs. Financial KPIs are based on quantitative data, as are employee injuries, number of training classes, and so on. Quantitative data forms the backbone of most KPIs.

But qualitative KPIs are just as important. The most common ones gauge customer or employee satisfaction through surveys. While the survey data itself is quantitative, the measures are based on a subjective interpretation of a customer's or employee's opinion on various issues. These opinions can help explain why performance is dropping when all other indicators seem fine. Many companies use customer satisfaction KPIs to refine products and optimize processes.

"Our annual customer satisfaction survey measures customer perception of Cisco's performance on all aspects of doing business with us," says David Hsiao, director of quality data infrastructure at Cisco Systems. "We then analyze this perception data along with internal process measures, field experience, and financial data to identify linkages. Regression analysis then identifies the key drivers that impact customer loyalty, revenue, and profitability per geographic theatre, vertical market, customer account, and product. This provides invaluable insights to us on how to run our business."

Cascading KPIs

Types of Performance Dashboards

The tension between leading KPIs, lagging KPIs, and operational metrics raises the question about how to deploy, align, and integrate these metrics across different business units, departments, and levels within an organization. To answer this question, it's important to understand the differences between strategic, tactical, and operational performance dashboards. (See Table 2.) Generally, strategic dashboards comprise outcome KPIs, operational dashboards show driver KPIs and operational metrics, and tactical dashboards have a mix of outcome and driver KPIs.

	STRATEGIC	TACTICAL	OPERATIONAL
Focus	Execute strategy	Optimize process	Control operations
Use	Management	Analysis	Monitoring
Users	Executives	Managers	Staff
Scope	Enterprise	Departmental	Operational
Metrics	Outcome KPIs	Outcome and driver KPIs	Driver KPIs
Data	Summary	Detailed/summary	Detailed
Sources	Manual, external	Manual/core systems	Core systems
Refresh cycle	Monthly/quarterly	Daily/weekly	Intraday
"Looks like a…"	Scorecard	Portal	Dashboard

Table 2. *Types of performance dashboards*

Strategic Dashboards. Strategic dashboards, or scorecards, are designed to enable senior executives to execute strategy, manage performance, and drive new or optimal behaviors across the enterprise. They are primarily designed to facilitate monthly strategic review or operational planning sessions and help executives collaborate on ways to fix problems or exploit opportunities. As such, they consist largely of outcome KPIs that measure past performance on a monthly basis. The KPIs average, aggregate, or conglomerate lower-level KPIs into a summary-level KPI.[2] Since a strategic dashboard focuses on helping an organization chart a new strategic direction, there is often little data to populate KPIs in strategic dashboards. Thus, a majority of KPIs are populated manually via Excel or contain data obtained from external data sources.

Tactical Dashboards. Tactical dashboards, on the other hand, are designed to help mid-level or departmental managers optimize the performance of the people and processes under their supervision. These dashboards collect summary and detailed data on a daily or weekly basis, largely from operational systems, so managers and their analysts can identify problems and devise fixes to ensure they achieve their short- and long-term objectives. As such, their dashboards comprise both outcome and driver KPIs that are either automatically or manually populated with data. The outcome KPIs are generally mirrored or mapped from a strategic dashboard, while the driver KPIs are mapped from an operational dashboard. In many cases, a tactical dashboard looks more like a portal that managers can customize to suit their business needs and personal preferences.

Operational Dashboards. Finally, operational dashboards enable front-line workers to monitor and control core processes on an intraday basis. These dashboards are populated with detailed data from operational systems and comprise driver KPIs and operational metrics, many of which drive

[2] One problem with summary-level KPIs is that they can obscure poor results in lower-level KPIs. See "Encoding Nuances" on page 8.

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higher-level KPIs as discussed earlier. These dashboards trigger alerts when predefined thresholds are exceeded and often resemble automobile dashboards. They may be continuously updated as events occur, making dials and gauges "flicker" in real time.

Aligning KPIs. A performance management strategy aligns organizations around a shared set of KPIs and common data. This is challenging to do as organizations grow and fragment into multiple departments, business units, and levels of management. It would be nice to have one dashboard that meets the needs of all workers. But in reality each group needs its own performance dashboard, and often more than one depending on what it's trying to accomplish. In fact, groups tend to have more dashboards at lower levels of the organization than at higher levels. Typically, the CEO uses one dashboard, while his direct reports have two, and mid-level managers use three or more.

The multiplicity of interlocking performance dashboards is best understood through the concept of cascading. In an aligned organization, KPIs cascade from higher levels to lower levels of the organization and from strategic dashboards to tactical and operational dashboards. Our survey shows that KPIs generally cascade between two and three organizational levels. (See Figure 6.)

A performance management strategy aligns organizations around a shared set of KPIs and common data.

What is the average number of levels the KPIs cascade down?

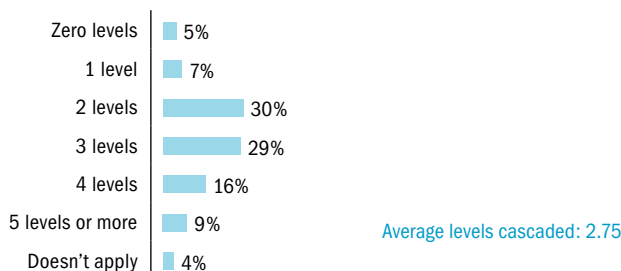|	
Zero levels	5%
1 level	7%
2 levels	30%
3 levels	29%
4 levels	16%
5 levels or more	9%
Doesn't apply	4%

Average levels cascaded: 2.75

Figure 6. Based on 271 respondents who have partially or fully deployed a KPI initiative.

Vertical Cascading

With vertical cascading, strategy rolls down and metrics roll up.

The most commonly understood form of cascading works in a vertical direction, usually within the context of a strategic dashboard. Here, an outcome driver at the executive level is repeated at each level in the organization, and sometimes shows up within individual performance review plans. These cascading KPIs are embedded within performance dashboards that cascade vertically throughout an organization.[3] With vertical cascading, strategy rolls down and metrics roll up. See Figure 7.

[3] In reality, most strategic dashboards cascade only two levels in an organization. A handful of organizations cascade them to an individual level.

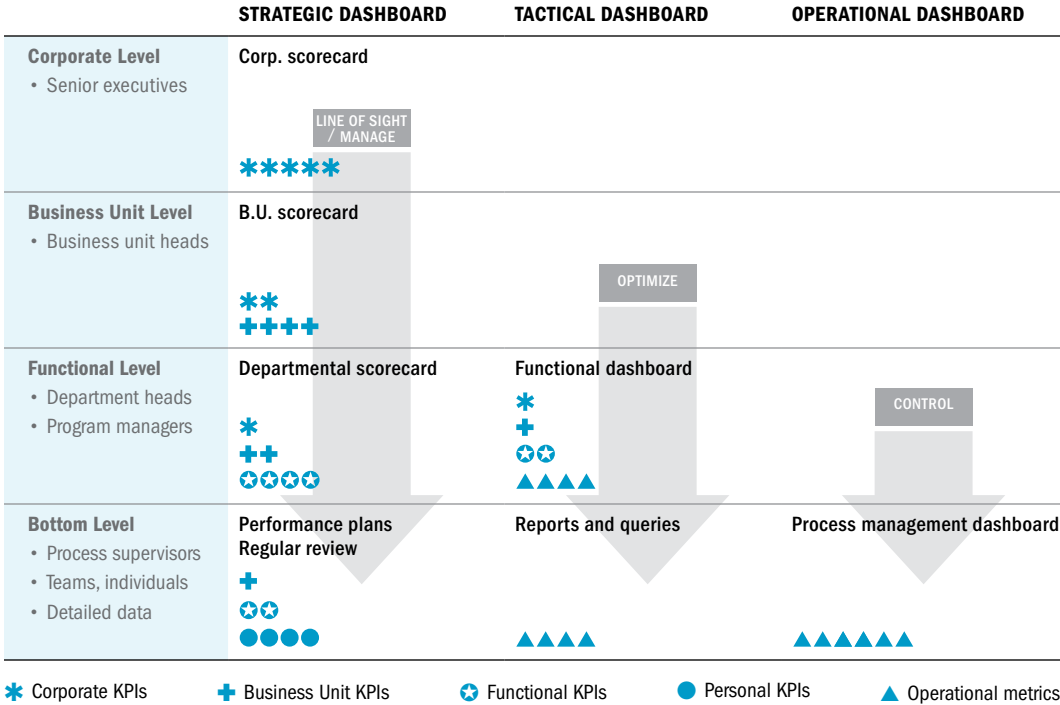## Vertical and Horizontal Cascading

Figure 7. Vertical cascading provides a line-of-sight view of performance across dashboards of the same type, e.g., strategic dashboards. Horizontal cascading uses a governance process to align KPIs across different types of dashboards.

Vertical cascading occurs in two ways: within a single performance dashboard and among performance dashboards of the same type. KPIs are tightly coupled within a single dashboard, letting users seamlessly drill down from summary-level to detail-level views of performance across dozens of dimensions. (See "The MAD Framework," Figure 11, page 20, for a more detailed description of this type of cascading.) Among dashboards of the same type, KPIs are loosely coupled, each reflecting KPIs from a dashboard at an organizational level above it. Each dashboard also introduces new KPIs, which in turn are cascaded to lower-level dashboards.

Our research shows that lower levels of an organization have more KPIs than higher levels. There are an average of 16 KPIs at the executive level, 22 KPIs at the business unit level, and 24 KPIs at the departmental and workgroup levels. In addition, an average of 12 executive-level KPIs cascade down multiple levels. (See Figure 8.)

How many KPIs exist at each of the following levels of your organization?

Executive	16
Business unit	22
Department	24
Workgroup	24
Individual	10

Top-level or executive KPIs
cascaded multiple levels: 12.33

Figure 8. Based on 271 respondents who have partially or fully deployed a KPI initiative.

Metric Roll Ups. A cascaded KPI is often duplicated from one level to the next (as with financial metrics). But sometimes the high-level KPI is derived from one or more lower-level metrics. Types of cascading KPIs include:

- **Duplicate KPIs:** The high-level KPI is duplicated at lower levels. When rolled up, lower-level KPIs are either summed or averaged. Sometimes companies use weighted averages or Boolean rules to ensure that poor performers in underlying dashboards are reflected in higher-level KPIs. Most cascading financial metrics are duplicated.

- **Derived KPIs:** A derived KPI is rolled up from lower-level metrics that measure the same activity in different ways. For example, regions in a global company may calculate net sales differently and use different currency calculations. When rolled up, their calculations are harmonized into a single enterprise KPI.

- **Conglomerate KPIs:** A conglomerate KPI comprises two or more lower-level KPIs that are summed or averaged. For example, the KPI "sales and administration expenses" may be decomposed into "total selling expenses" and "total administration expenses," which are lower-level KPIs.

- **Unique KPIs:** There may be some metrics that exist only in one dashboard and are not rolled up at all. This is often true of operational metrics.

Once an organization has set up its cascading metrics and dashboards, it's important that it provide a way to collectively view the relationships among the KPIs and their impact on each other. A strategy map is one way to do this, but strategy maps are designed to engineer the relationship among strategic objectives more than among KPIs. A better option is to use a metrics map that displays cause-effect flows between KPIs. (See Figure 9.) In addition, some dashboards let users decompose higher-level KPIs into their lower-level constituents to trace the sources of problems.
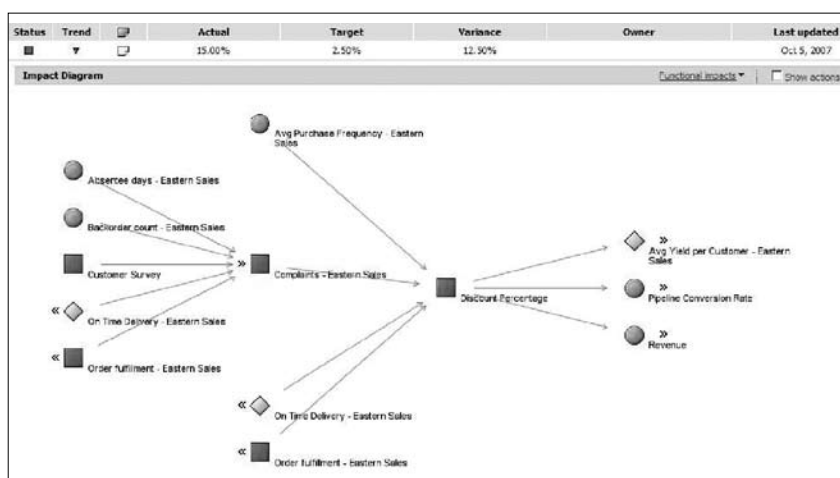
Metrics Map

Figure 9. A metrics map traces the root causes of a given score, showing the impact and contributions of lower-level metrics to higher-level ones. Screenshot courtesy of Cognos, an IBM company.

Purpose. The purpose of vertical cascading is to give executives a line-of-sight view of performance across all groups and levels of the organization. This enables them to monitor the execution of their strategy and pull the right levers as needed to get the organization back on track. This is a far cry from the days when executives threw a strategy over the wall and prayed that something would stick when the numbers showed up at the end of the month, quarter, or year.

Vertical cascading also enables workers at all levels to understand how their efforts contribute to the whole. They see the same metric on their dashboards that the CEO sees. And if they know how to affect that metric through their daily actions, they understand intuitively how their actions impact the bottom line and help the company achieve its goals. For many workers, this is both empowering and motivating.

Vertical cascading also engenders friendly competition among peer groups within an organization. When an organization uses a dashboard to publish performance results across peer groups using identical metrics, productivity goes through the roof. "When we publish plant-by-plant performance, it's amazing how it aligns behavior," says Masciandaro.

Horizontal Cascading

Horizontal cascading aligns KPIs across different types of dashboards: strategic, tactical, and operational. (Refer back to Figure 7.) This is challenging to do, since most organizations are littered with dozens or hundreds of dashboards and scorecards that were created independently for different reasons. There is typically a lot of overlap among these dashboards, and there is no guarantee that seemingly identical KPIs are defined or interpreted consistently. Horizontal cascading tries to bring together top-down (scorecard) initiatives that manage strategy with bottom-up dashboard projects that manage processes.

While this hodgepodge of dashboards may confuse and frustrate a chief performance officer, it doesn't faze the average mid-level manager, who often uses multiple performance dashboards to manage various facets of her job. For example, a manager might use a strategic dashboard (i.e., scorecard) to track progress toward achieving strategic objectives defined by the executive team. She might use a tactical dashboard to monitor departmental objectives and processes, and she may use an operational dashboard to check key operational processes on an hourly basis. She may also have an individual performance plan that is based on KPIs and derivatives of all these dashboards.

The goal with horizontal cascading is to align the KPIs among all these independent dashboards to achieve the greatest degree of coordination possible. Ideally, an organization has a business-driven governance group that oversees the dissemination and alignment of KPIs. The governance group reviews every dashboard project to ensure KPI alignment and foster cooperation and coordination across groups. Short of that, each dashboard project should take a week or two to "look up" and "look across" to what other groups are doing to ensure they aren't reinventing a dashboard that already exists.

Vertical cascading gives executives a line-of-sight view of performance across all groups and levels of the organization.

Horizontal cascading tries to bring together top-down (scorecard) initiatives that manage strategy with bottom-up dashboard projects that manage processes.

Characteristics of Effective KPIs

So far, we've discussed how to construct and cascade a KPI. But we haven't addressed how to create a KPI that drives positive change and desired outcomes. After all, you can have the most elegant KPI, but unless it helps the organization achieve its strategic objectives, it's a failure.

On this score, it appears most organizations need to improve. Our survey shows that almost one-third (31%) of survey respondents whose organizations have fully or partially deployed KPI initiatives say their KPIs have "changed behavior and improved performance" to a very high or high degree. Almost half (47%) said the impact of the KPIs has been moderate, while 8% said the impact has been low or very low. See Figure 10.

To what degree have your KPIs changed behavior and improved performance in your organization?
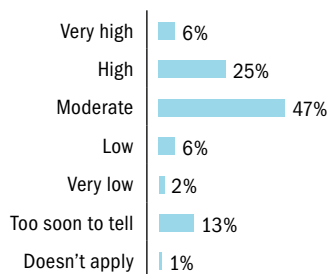
Very high	6%
High	25%
Moderate	47%
Low	6%
Very low	2%
Too soon to tell	13%
Doesn't apply	1%

Figure 10. Based on 271 respondents who have partially or fully deployed a KPI initiative.

> **The key to creating effective KPIs is as much art as science.**

The key to creating effective KPIs is as much art as science, but there are many guidelines to help the uninitiated achieve success. Organizations that create KPIs with the following 10 characteristics are likely to deliver high-impact KPIs:

1. **Sparse:** The fewer KPIs, the better.

2. **Drillable:** Users can drill into detail.

3. **Simple:** Users understand the KPIs.

4. **Actionable:** Users know how to affect outcomes.

5. **Owned:** KPIs have an owner.

6. **Referenced:** Users can view origins and context.

7. **Correlated:** KPIs drive desired outcomes.

8. **Balanced:** KPIs consist of both financial and non-financial metrics.

9. **Aligned:** KPIs don't undermine each other.

10. **Validated:** Workers can't circumvent the KPIs.

> **Less is more when it comes to KPIs.**

1. Sparse. When it comes to the number of KPIs to deploy, most performance management practitioners say less is more. The common argument is that most people can only focus on a maximum of five to seven items at once; therefore, we should limit the number of KPIs to that range.

The better argument is that there are really only a handful of metrics—perhaps even just one—that can dramatically impact a desired outcome or outcomes. In my book on performance dashboards, I recount the story of how British Airlines ignited a dramatic performance management revolution in the 1980s by focusing on one all-encompassing metric: on-time flights. That metric touched a host

of interconnected processes and services, so focusing the entire company on it reshaped the way the company did business from its foundations.[4]

When creating an executive dashboard, most companies permit each department to bubble up one KPI to appear on the executive dashboard. Obviously, it takes a lot of discussion to identify and create a KPI that represents the performance of an entire department. And it's likely that the first KPI proposed will change over time or another KPI will prove more indicative of departmental performance. Focusing on a few KPIs enables users to understand at a deep level exactly what behaviors the KPI is driving and fine-tune the KPI to deliver better results.

However, a practical argument to limit the number of KPIs is that sourcing data to populate and display KPIs requires an enormous amount of work and time, especially if the data is sourced directly from operational systems. IT managers need to clean, integrate, and validate the data, which can take months, and the quality may still not be sufficient. Unfortunately, most executives and managers don't understand or appreciate the work involved in sourcing data. As a result, it's wise to start small with a handful of KPIs and then iterate quickly as the project gains acceptance.

2. Drillable. The problem with having only a handful of KPIs is that organizations represent a dynamic balance between strategy and process. Strategy seeks change, while process seeks stability. You can represent strategy with a few KPIs, but you need hundreds or more to monitor processes, which often cut across departmental boundaries. Therefore, the best performance dashboards parse out KPIs and data based on role, level, and task. The high-level or initial view of a dashboard contains a handful of strategic KPIs that cascade to hundreds and thousands of KPIs at more detailed views within a performance dashboard. This internal cascading is true for all types of dashboards: strategic, tactical, and operational.

Strategy seeks change, while process seeks stability.

I created the MAD framework to portray how to design performance dashboards that preserve KPI sparsity without eliminating valuable lower-level metrics and data. MAD stands for monitor, analyze, and drill; each corresponds to different levels of metrics and data within a dashboard. See Figure 11.

At the highest level, executives and managers view graphical representations of KPIs to monitor strategic objectives and/or core processes (which depend on the type of dashboard). When they see a problem (e.g., a red stoplight), they can drill down to the next level to analyze the cause of the alert by slicing and dicing summarized dimensional data, typically using a ROLAP or MOLAP tool. If they need more detail to complete the analysis or understand the impact of the problem, they can drill into detailed data in operational reports that run against the data warehouse or operational systems.

The best performance dashboards parse out KPIs and data based on role, level, and task.

Cisco Systems has used the MAD framework to create tactical dashboards for its sales, marketing, finance, and human resources departments. The top level of each dashboard contains 10 high-level KPIs agreed upon by senior managers. Each of those so-called "actionable metrics" begets 10 "contributing metrics" at the middle layer, and each of those begets 10 more "detail metrics" at the bottom layer. Altogether, each Cisco dashboard contains more than 1,000 metrics that can be viewed across 30 or so dimensions. However, all the metric complexity and dimensionality is rolled up into 10 outcome KPIs at the highest level.

[4] Wayne Eckerson, *Performance Dashboards: Measuring, Monitoring, and Managing Your Business* (John Wiley & Sons, 2005). See also *Key Performance Indicators: Developing, Implementing, and Using Winning KPIs* by David Parmenter (John Wiley & Sons, 2007).
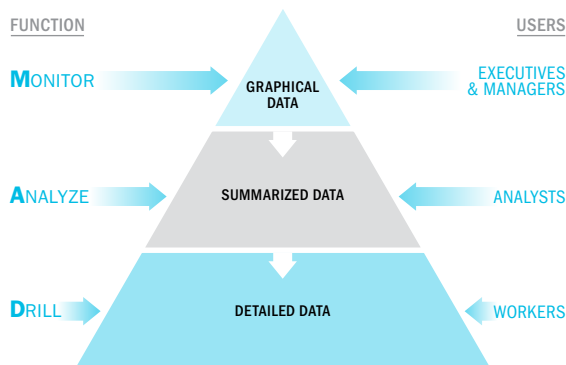
The MAD Framework

Figure 11. Performance dashboards should preserve KPI sparsity without eliminating valuable lower-level metrics and data.

While Cisco "hides" lower-level KPIs using a drill-down metaphor, others parcel out KPIs using multiple tabs or radio buttons on a dashboard display or by nesting KPIs under one another using a collapsible folder structure. Our research shows that organizations have an average of between 11 and 25 KPIs. This makes sense if respondents are counting the top-level KPIs in a dashboard framework. Most organizations I've talked with have about that many outcome KPIs. See Figure 12.

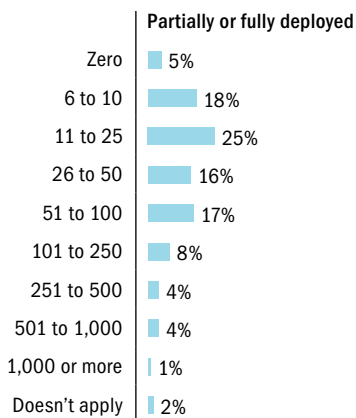### How many KPIs exist in your organization?

Figure 12. Based on 271 respondents who have partially or fully deployed a KPI initiative.

Employees must know what's being measured and how it's calculated.

3. Simple. KPIs must be easy to understand. Employees must know what's being measured and how it's calculated. Complex KPIs consisting of indexes, ratios, or multiple calculations are difficult to understand and, more importantly, difficult to act on. In short, if users don't understand the meaning of a KPI, they can't influence its outcome.

It's important to train people on KPI targets. For instance, is a high score good or bad? If the metric is customer loyalty, a high score is good, but if the metric is customer churn, a high score is bad. Sometimes a metric can have dual polarity; that is, a high score is good only until a certain point. For instance, a telemarketer who makes 20 calls per hour may be doing exceptionally well, but one who makes 30 calls per hour may not be connecting well with potential clients. An effective scoring and encoding system is critical to making KPIs simple and understandable.

4. Actionable. All performance management practitioners underscore the importance of creating actionable metrics. "We don't want to build KPIs that are nice to have; we want to build KPIs that impact the company," says Alex Crabtree, senior manager of BI solutions at NetJets. Not only should KPIs be easy to understand, but users should also know how to positively affect the outcome of a KPI.

Unfortunately, while many organizations publish KPIs, their users often don't know how to interpret the results or what to do when a KPI trends downward. This is especially true for new managers, who may overreact the first time they see a red stoplight. Managers need to manage according to overall trends rather than the current status of a KPI (e.g., percentage change in variance rates rather than red lights). This avoids the whipsaw effect, in which a manager overreacts to a dip in performance that represents a normal statistical variation rather than a manifestation of a deep-rooted problem that needs to be fixed. In fact, overreacting to a redline performance can sometimes make the problem worse. Performance dashboards are meant to liberate and empower employees, not put them under the microscope of an over-controlling boss who inadvertently uses the scores to sabotage morale and personal initiative.

> Performance dashboards are meant to liberate and empower employees, not put them under the microscope of an over-controlling boss.

A related problem occurs when organizations publish KPIs but don't empower users to take action. Bureaucracy, territoriality, or habit may prevent managers from delegating authority to workers to take action and address problems. Companies with hierarchical cultures often have difficulty here, especially when dealing with front-line workers whose actions they have historically scripted. Managers need to be trained to delegate and coach workers to take the right actions.

A different problem is that new employees may take the wrong action in response to a red flag. The analytical literacy in most organizations is extremely low, and most organizations would do well to put new hires through a course in how to read and respond to dashboard indicators. Use case scenarios are extremely helpful. Some organizations are trying to bake analytical techniques and actions into software using decision trees, breadcrumbs, or suggested next steps. This way, novices can follow the trail of experts who've been down the path before. These so-called guided analytics are still in their infancy.

> The analytical literacy in most organizations is extremely low.

5. Owned. Every KPI needs an owner who is accountable for its outcome. Some think it's imperative that each KPI have only one owner so there is no potential for finger-pointing, and that the individual owner feels highly motivated and responsible for managing the KPI. Others say the opposite: make two people responsible for a KPI and you engender teamwork. This coordination might be especially valuable in an organization that wants to break down departmental silos and cross-pollinate ideas among different groups.

Typically, a KPI has a business owner and a data owner. The business owner is responsible for the meaning and value of the KPI. If someone has a question about the origin of the KPI, how it was calculated, or what actions to take should performance drop, they should call the KPI's business owner. The data owner, on the other hand, is responsible for populating the KPI with data and adhering to standard system-level agreements (SLAs) governing the accuracy and scheduled loading of the data, among other things. Both the business and technical owners should be listed in the KPI's metadata with contact information.

> A KPI has a business owner and a data owner.

6. Referenced. Most BI professionals have learned the hard way that if users don't trust the data, they won't use it. The same is true for KPIs. The data has to be clean, accurate, and most importantly, *perceived* as accurate. Just being accurate isn't enough; users must believe it is as accurate as their existing reports or spreadsheets (which may be woefully inaccurate, but are trusted nevertheless).

> The data behind a KPI has to be clean, accurate, and most importantly, *perceived* as accurate.

One way to engender trust in your KPIs is to provide reference data about them. Users should be able to right-click on a KPI or button to reveal a dialogue box that identifies the business and technical owners of the KPI as well as the details about the origins of the KPI, how it was calculated, when it was last updated, and other relevant details.

7. Correlated. Ultimately, KPIs need to impact performance in the proper direction. Unfortunately, many organizations create KPIs but never evaluate them after the fact to see if they statistically correlate with desired outcomes. This correlation makes explicit the linkage between driver KPIs and outcome KPIs and gives executives greater confidence in making decisions. They know that if they "pull a certain lever" it will create a specific result. A strategy map correlates strategic objectives and KPIs, giving executives a high-level view of how objectives relate to one another. See Figure 13.
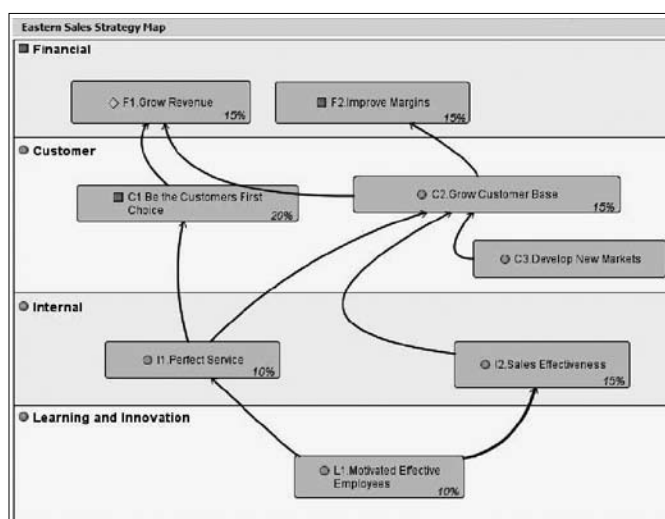
Strategy Map on a Balanced Scorecard

Figure 13. *A strategy map links strategic objectives across multiple perspectives to display which objectives drive others. Each objective is represented by one or more KPIs so the relationship between objectives can be statistically correlated. Screenshot courtesy of Cognos, an IBM company.*

It's important to correlate KPIs on a continuous basis because their impact changes over time as the internal, economic, and competitive landscape shifts. Most KPIs have a finite lifespan; you get most of the value from them in the first year or so. Afterward, you need to rejigger the targets or KPIs to sustain progress or move to new KPIs that better reflect the current strategy. But if you're not continuously monitoring the impact of KPIs, you'll never be able to evaluate any shifts in their effectiveness.

Many organizations spend lots of time and energy evaluating the effectiveness of their KPIs, especially if monetary incentives are attached to the results. They use statisticians to perform regressions that map KPIs to intended results and engage in discussions with peers and executives to negotiate the KPIs and targets.

8. Balanced. It's also important that you offer a balanced set of KPIs. This is the philosophical underpinning of the balanced scorecard methodology. Its creators, Robert Kaplan and David Norton, believe organizations should measure performance across multiple dimensions of a business, not just a financial perspective. They advocate a "balanced" approach to measurement, which helps executives focus on and invest in the key drivers of long-term growth and sustainability.

Kaplan and Norton offer four perspectives or categories of metrics: financial, customer, operations, and learning and growth. They also advocate that organizations create a strategy map that defines strategic objectives in each perspective and shows how they interrelate, giving executives a pictorial view of what drives goals. (Refer back to Figure 13.) And since each objective is associated with a KPI, the map also shows cause-effect linkages between KPIs. Thus, a strategy map is another way to identify leading indicators.

On a micro level, it's important that KPIs provide a balanced perspective to individuals whose performance is being monitored. For example, a single KPI may drive behavior in an unintended direction, which forces managers to introduce a second KPI that balances the first. The classic example is a call center KPI that motivates telemarketers to increase the number of calls per hour. By itself, this KPI will cause telemarketers to take as many phone calls as possible without regard to quality. Without a counterbalancing KPI such as customer satisfaction or call resolution ratio, the call center will experience a dramatic decline in effectiveness that undermines long-term goals.

9. Aligned. It's important that KPIs are aligned and don't unintentionally undermine each other, a phenomenon that some call "KPI sub-optimization." For instance, a logistics group that wants to streamline inventory costs may decide to reduce inventory levels. But this makes it difficult for a retail store to prevent stock-outs of fast-moving items—which is a KPI for the store staff. "We've seen our staff take unexpected action to boost a metric that turned out to undermine other measures," says one performance manager.

It's often difficult to detect KPI sub-optimization until you put KPIs into play and monitor the results. You quickly discover the imbalances and can then make adjustments. This is why many performance management practitioners caution against striving for KPI perfection. They recommend getting KPIs to a point where you are 80% confident they will work and then committing to practice to see what happens.

10. Validated. KPIs need to be not only aligned and balanced, but also tested to ensure workers can't "game" the system—or circumvent the KPIs out of laziness or greed. Organizations need to test their KPIs to ensure workers can't affect their outcome without taking the required actions to improve the business. One way to avoid this problem is to include employees in defining the KPIs and targets in the first place. They know better than anyone the nuances involved in the processes and potential loopholes that may tempt users to game the system.

The tendency to game KPIs increases dramatically once organizations attach monetary incentives to KPIs. So it's imperative to test and validate KPIs in the reality of the workplace before using them as part of an employee incentive system.

We asked survey respondents about their support for many of these KPI characteristics. A majority (53%) said their KPIs align with strategic objectives to a high degree, but less than a third of respondents were as confident about other characteristics. (See Figure 14.) Most surprisingly, only 18% said the statement, "Employees know what actions to take to affect KPIs," applied to their KPIs to a high degree.

The tendency to "game" KPIs increases dramatically once organizations attach monetary incentives to KPIs.

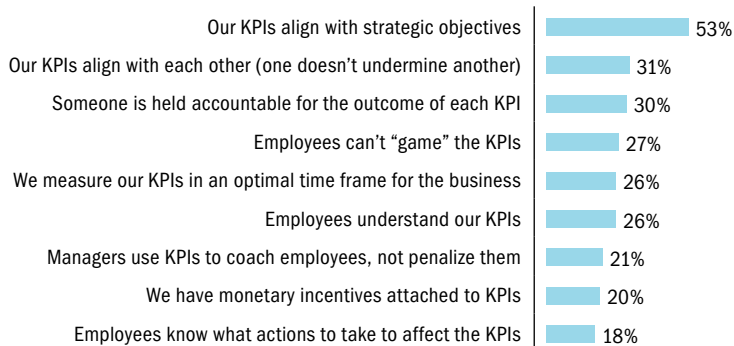**Which of the following statements apply to your KPIs to a high degree?**

Our KPIs align with strategic objectives	53%
Our KPIs align with each other (one doesn't undermine another)	31%
Someone is held accountable for the outcome of each KPI	30%
Employees can't "game" the KPIs	27%
We measure our KPIs in an optimal time frame for the business	26%
Employees understand our KPIs	26%
Managers use KPIs to coach employees, not penalize them	21%
We have monetary incentives attached to KPIs	20%
Employees know what actions to take to affect the KPIs	18%

Figure 14. Based on 271 respondents who have partially or fully deployed a KPI initiative.

Creating KPIs

Now that we know the components and characteristics of effective KPIs, the next step is to understand how to create and maintain them. This is where organizational dynamics come into play. Much of the art involved in creating effective KPIs boils down to managing people and navigating the currents of organizational politics. Guidelines for creating effective KPIs divide into three groups: before the project starts, during the project, and after the project.

Before You Start

It's important to lay a strong foundation to ensure the success of your performance management project and the effectiveness of your KPIs. To establish this foundation, an organization must:

- Set the strategy
- Obtain sponsorship
- Adhere to a methodology
- Frame the project

Set the Strategy. Since KPIs align performance with strategy, it should go without saying that you need a clearly defined strategy to succeed. However, it is surprising how many companies don't have a strategy or haven't clearly articulated the strategy to a level of granularity that makes it possible to develop effective KPIs.

At a high level, a strategy consists of a mission, values, vision, goals, objectives, and plans. The mission and values define why the organization exists, what it does, and its guiding principles. The vision combines an overarching purpose with an ideal, future-state competitive positioning. Goals are broad statements that embody what the organization would like to achieve in three to five years, while objectives represent short-term goals of one to three years. Plans define how the organization will allocate resources and staff to achieve the objectives.

Although most organizations have an overall or corporate strategy, few keep the strategy current.

Although most organizations have an overall or corporate strategy, few keep the strategy current. Moreover, few business units, departments, or working groups take the time to translate the corporate strategy into a strategy of their own or a set of objectives to guide their plans, budgets, and initiatives for the coming year. Since most dashboards are implemented at the departmental

level, this means most KPI teams are groping in the dark, trying to identify relevant KPIs for their dashboard solutions.

In the absence of a clearly articulated and up-to-date strategy or set of objectives, a KPI team must spend significant time interviewing departmental executives and corporate executives to understand the mission and direction of their group before they can commence with the actual work of defining KPIs.

Obtain Sponsorship. Sponsorship is critical to a performance management strategy. Without engaged and committed senior sponsors at any level of the organization, it's difficult to get anything done. First, you need senior sponsors to help you identify strategic objectives (something that many seem ill-equipped to do, unfortunately). Next, they need to persuade their peers to support the initiative and allocate the time of some of their key analysts to the project. They also need to secure funding and evangelize the solution to relevant employees to ensure buy-in and uptake.

It's best if the sponsor initiates the performance management project rather than being convinced to support it by a lower-level (e.g., IT) manager. The best sponsors have prior experience with fact-based measurement from a prior assignment in another company or from a balanced scorecard workshop or conference where they have discussed the merits of such initiatives with experts and peers.

The sponsor needs to create a KPI steering committee composed of his peers that represents all departments and groups in the organization. The committee serves as a governance board that oversees the direction of the initiative, secures funding, resolves disputes, and assigns members to the KPI development team.

Adhere to a Methodology. Most performance management practitioners say it's important to adhere to a methodology. They say it's almost irrelevant what methodology you use, as long as it's been battle-hardened and refined over time. A methodology helps keep the project on track and takes proactive steps to overcome internal resistance to the program.

Given the political nature of implementing KPIs, it's wise to hire a management consultancy to work with sponsors, educate them on the process, and provide moral support and guidance along the way. Consultants provide the vision, rationale, and external validation needed to kick-start a project. Consultants also provide the necessary neutral voice to facilitate group sessions to brainstorm and prioritize KPIs.

Some methodologies, such as balanced scorecard or Six Sigma, are complex and expensive to implement. They require a top-down approach that raises political challenges. Other methodologies focus on departmental initiatives and take a bottom-up approach to delivering KPIs. Many survey respondents said that a good performance management strategy incorporates both top-down and bottom-up approaches to ensure both strategic alignment and grassroots buy-in to the program.

TDWI research shows that a majority of organizations use traditional requirements-gathering techniques, such as interviews and joint design sessions, to develop KPIs, while 42% and 15% use the balanced scorecard and Six Sigma methods, respectively. See Figure 15.

> **Without engaged and committed senior sponsors at any level of the organization, it's difficult to get anything done.**

> **A good performance management strategy incorporates both top-down and bottom-up approaches.**

What approaches do you use to develop KPIs?

Review and prioritize metrics in existing reports	55%
Interviews and joint design sessions	51%
Balanced scorecard methodology	42%
Use facilitator to help executives brainstorm and prioritize	32%
Benchmark against leaders in our industry	27%
Six Sigma	15%
Total Quality Management	13%
Hire management consultancy to recommend KPIs	11%
Doesn't apply	1%
Other	3%

Figure 15. Based on 271 respondents who have partially or fully deployed a KPI initiative.

Frame the Project. Prior to starting the performance management project, the KPI steering committee needs to create a KPI development team and define the project's scope. The KPI development team typically consists of three to five business managers or analysts, who define the requirements for the KPIs and work with a KPI technical team to encode the KPIs in software and populate them with data.

Survey respondents said senior executives, managers, and analysts are the most likely candidates to define KPIs, although only 21% assigned these participants to a formal KPI team—which we feel is an important step. Only 11% used an outside business or IT consultancy, and only 7% used a strategic management firm, such as McKinsey & Co. or Palladium, which are typically called in to create a top-down performance management system. Our respondents indicated that the IT department, managers, and analysts are responsible for implementing the KPIs. See Figure 16.

Who is responsible for your KPIs?

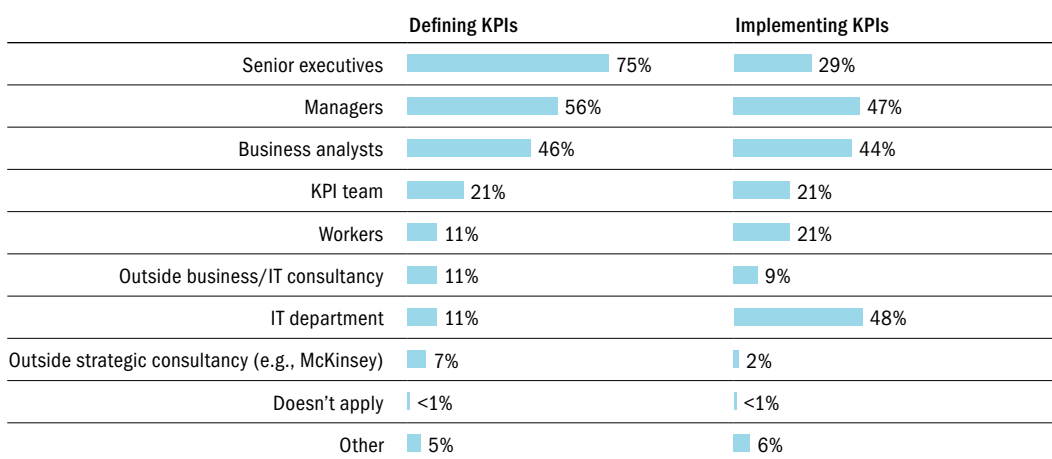|	Defining KPIs	Implementing KPIs
Senior executives	75%	29%
Managers	56%	47%
Business analysts	46%	44%
KPI team	21%	21%
Workers	11%	21%
Outside business/IT consultancy	11%	9%
IT department	11%	48%
Outside strategic consultancy (e.g., McKinsey)	7%	2%
Doesn't apply	<1%	<1%
Other	5%	6%

Figure 16. Based on 271 respondents who have partially or fully deployed a KPI initiative.

In terms of scope, the KPI development team should strive to model between five and seven objectives per project, each of which may result in multiple KPIs. For example, as a team models profit margin, they may discover several legitimate ways to measure it. "There's a lot of overhead

involved in gathering data and making sure it's accurate, so I recommend that each team model six things," says Corda's Neal Williams.

Many survey respondents underscored the importance of going slow and doing things right. "Start small and take time to define the most important KPIs for your business," wrote one respondent. KPIs are powerful agents of organizational change, and you need to make sure you're getting the change you want. The fewer the KPIs, the more you can evaluate the impact of each and make refinements to ensure it drives the right behavior. This is especially true if the KPIs are used for compensation purposes.

Many survey respondents underscored the importance of going slow and doing things right.

During the Project

The KPI project consists of gathering and refining requirements and then translating them into software. The key steps are:

- Define requirements
- Prioritize and normalize
- Collect the data
- Develop the dashboard

Define Requirements. There are many approaches to gathering requirements, and most of them do a reasonable job. The two keys are: let business requirements drive the project, not the tool; and iterate quickly.

Corda's Neal Williams developed a 10-step workshop three years ago to help teams accelerate the deployment of dashboards by defining business requirements up front. Before that, groups would purchase Corda's dashboard product and start implementing the tool before they knew what they wanted to measure. "Many teams got a mandate from above to implement a dashboard, and then we struggled through many product iterations to figure out what to measure and how to display the KPIs."

Today, Willliams' three-day workshop enables a KPI team composed of three business people and an IT professional to create a detailed blueprint with a complete set of specifications that the technical team uses to build the dashboard. Williams says the blueprint reduces the number of product development iterations by 80% to 90% and significantly accelerates dashboard delivery times.

The workshop has 10 steps. The output of each step is written in English sentences or depicted in diagrams. There is no coding or prototyping during these steps.

1. **Frame:** Write a framing statement that defines your strategic objectives.
2. **Elaborate:** Write questions aligned with the strategic objectives.
3. **Define metrics:** Describe measures that answer each framing question.
4. **Define targets:** Describe targets, goals, and benchmarks.
5. **Diagram drill paths:** Diagram the drill paths needed to answer the questions.
6. **Define behaviors:** Describe behaviors that drive each type of indicator.
7. **Check data:** Check data availability and condition for each KPI.
8. **Check for compliance:** Ensure KPI definitions align across the organization.
9. **Check for balance:** Ensure KPIs drive desired outcomes.
10. **Assign owners and users:** Assign a business and a data owner for each KPI.

Consultants offer a range of techniques to gather requirements. For example, Ranga Bodla of SAP recommends a brainstorming session where every idea is mapped out on a flip chart. Jim Gallo of Information Control Corporation recommends an iterative approach using a requirements-gathering and model-generation tool called Consensus from Balanced Insight. Ryan Uda from Cisco recommends having business people map out "a day in the life" to elicit areas where metrics could make a process more efficient. Others recommend issuing surveys to business users or mapping out business processes.

Dongyan Wang, senior director of enterprise BI at NetApp and formerly director of enterprise BI for Cisco Systems, uses the MAD framework to articulate requirements. "One business team gave us a well articulated 130 pages of requirements describing everything they wanted in a series of reports. We fit their requirements into [the MAD] framework and gave them back a three-page document that defined three analytical dashboards with all the KPIs and dimensions, which addressed all their requirements and even more! Once we educate executives and managers about the [MAD] framework, especially after they have seen a MAD framework in real action, the rest is easy," he says.

No matter what is approach is used to gather requirements, it's critical to get buy-in from employees and workgroups whose performance will be measured. The best way to do this is to let them vet the proposed KPIs at some point in the requirements process. They will quickly spot loopholes and nuances in the metrics that managers and executives may overlook.

For example, a service company wanted to measure the performance of its field service technicians with a repeat-call KPI. The KPI would reduce the number of visits a technician made to complete a single job, which would reduce mileage costs, save time, and increase revenue per technician. But technicians pointed out that repeat calls are necessary if the customer purchases a temporary patch job which subsequently breaks and the customer then wants to upgrade their service. Armed with this on-the-ground knowledge, the company refined the repeat call metric to accommodate these nuances.

Prioritize. Once the team brainstorms requirements and potential metrics, it needs to prioritize and normalize them. To prioritize, teams should evaluate potential KPIs using a rating system that measures each KPI against a number of criteria, many of which can come from our list of KPI characteristics from the previous section. For example, a weighted criteria list might include:

- Does it link to strategy?
- Can it be quantified?
- Does it drive the right behavior?
- Is it understandable?
- Is it actionable?
- Does the data exist?

Two years ago, the CEO of an Internet retailer hired McKinsey & Co. to create a set of global KPIs that could be used to measure performance across all regions and business units and better focus the company on a few key processes that would enable it to achieve its goals. The McKinsey consultants spent months conducting interviews with departmental representatives throughout the world and came up with hundreds of metrics. A small KPI team composed of the CFO, two senior vice presidents, two consultants, and an IT representative distilled the superset into 50 KPIs. The team sent the list to the CEO, who pared the top-level list to 24, making sure that each department had at least one KPI on the list.

The KPI team then decomposed the 24 top-level KPIs into 80 KPIs for drill-down and reporting purposes. The 80 KPIs are updated monthly in a scorecard that the executive team and its direct reports review during regular operational meetings. "The KPIs guide the direction of the meetings and have made us a fact-based, numbers-driven organization," says the IT manager who participated in the project. "The executive team now focuses on what's broken instead of letting everyone present everything that they're doing, both good and bad."

Normalize. Normalization involves standardizing definitions and rules. This is generally easy to do in a single department, where people view the business the same way. But it's challenging in an enterprise deployment, since departments define common terms, such as sales or customer, in different ways. There is generally no easy way to normalize definitions and rules except to get the relevant parties in the same room and make them hash out an agreement. (This is another key role that the sponsor must play.) The parties don't have to merge their definitions into one; they simply have to agree to give unique labels to each metric and map their definitions into a single enterprise definition for global reporting purposes.

Collect the Data. Populating KPIs with data can be challenging, time-consuming, and expensive if the data doesn't already exist in a data warehouse. A data warehouse ensures the data is cleansed, integrated, and validated—which can be a monumental task depending on the condition of the source data. Of course, a data warehouse isn't much use if the data doesn't exist at all. As mentioned earlier, the uncertainty of dealing with source data is a major reason to minimize the scope of the KPI project.

When data doesn't exist or it's full of errors and anomalies, the technical team needs to alert the KPI steering committee so they can decide how to proceed. If the data doesn't exist, the steering committee must decide whether to build a system that generates the data, manually enter the data, or scrap the KPI altogether. If the data is in poor condition, the steering committee again has to decide if it's worth the cost to clean up the data or if they should just choose another KPI. These decisions are best made early in the process, which is why it's important the KPI team has an IT representative.

Unfortunately, it's often hard to get the attention of the business to fund an initiative to collect or improve the data. Often, the business "shoots the messenger" when IT informs them about data problems. To avoid this scenario and galvanize support for a data initiative, some dashboard designers simply gray out the values for an affected KPI in a dashboard with a note that reads "no data yet" or "data is not accurate enough to display." While these notes may still tempt the business to shoot the messenger, they also surface the data quality problems at a high level. When users feel they are within inches of obtaining valuable data to do their jobs, they often exert considerable pressure on business executives to fix the problem.

Develop the Dashboard. Once requirements are gathered and prioritized and data is sourced and evaluated, the technical team can begin to develop the dashboard. Actually, most consultants recommend working on parallel tracks using an agile or spiral development methodology that involves frequent iterations. (See Figure 17, next page.) The technical team sources the data while dashboard designers develop mock-ups of the dashboard screens to show the KPI team.

This point in the process is the ideal time to select a dashboard product. Unfortunately, many teams put the cart before the horse and purchase dashboard or BI tools too early. This means that technology constraints within products often dictate their dashboard designs. Some end up with overpowered tools that are too expensive or complex for the design and scope of their initiatives. Others wind up with underpowered tools that don't support the dimensionality, performance, or scalability that users require.

When users feel they are within inches of obtaining valuable data to do their jobs, they often exert considerable pressure on business executives to fix the problem.
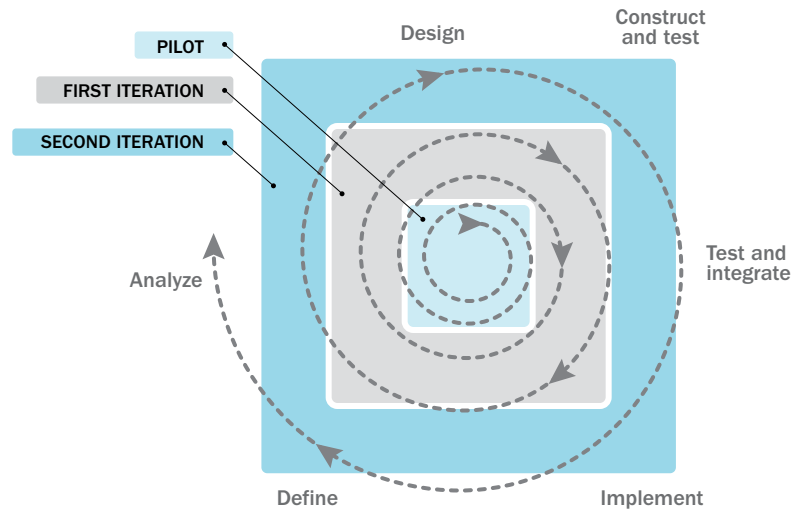
Spiral Development Methodology

Figure 17. A spiral or agile methodology calls for multiple quick iterations and continuous feedback to rapidly deliver projects that meet user needs. Concept courtesy of Information Control Corp.

Designing a GUI. Technical developers don't make the best graphic designers. Thus, it's best that the report development team leverage external expertise and guidelines when creating a dashboard interface. Stephen Few offers many helpful hints about dashboard design, as referenced earlier in this report. Some teams hire usability labs to help refine dashboard designs and identify features that confuse users and might impede adoption.

Dashboard technology has evolved substantially in the past few years, so there are more options to choose from to display KPIs. Many dashboards now give designers the option to display KPIs using Flash or AJAX, which provide scintillating displays. Also, many can combine a variety of gadgets, visualization techniques, and views on a single screen, and use Web services to link to external data sources, such as maps. (See Figure 18.) Dashboards can now be displayed through mobile devices—which underscores the importance of creating a clean, sparse design.
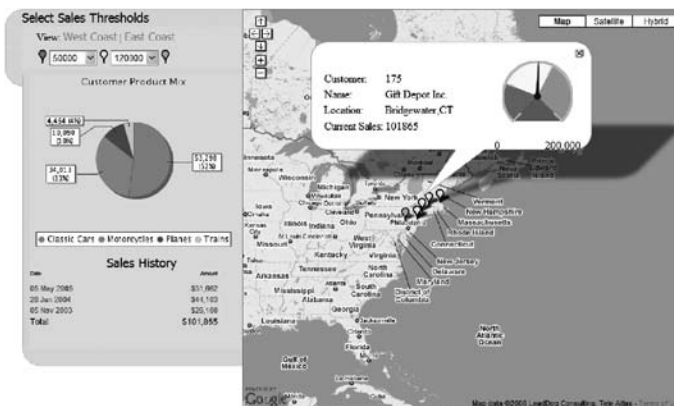
Dashboard Visualization

Figure 18. Modern dashboards offer a range of visualization techniques that provide designers with a wealth of possibilities for displaying KPIs. Screenshot courtesy of Pentaho.

After the Project

After the KPIs are encoded in a dashboard, then the real work begins! No software solution can succeed unless it connects with users. The KPI steering and project team must:

- Market the project

- Monitor and revise KPIs

- Govern the process

- Coach managers and users

Market the Project. If users don't know the dashboard exists, they won't use it. If they don't know the benefits it offers compared to their existing ways of gathering information, making decisions, and measuring performance, they won't use it. If they don't trust the data or it doesn't perform, they won't use it.

Fortunately, well-designed performance dashboards usually sell themselves. Plus, when they are embedded in a performance management initiative sponsored by senior executives, there is usually no alternative! Nevertheless, it behooves the KPI team to create a marketing plan as part of the project plan that defines target groups of users, key messaging for each group, and the frequency and channel for delivering the messages.

Training and support needs to be woven into the marketing program. While dashboards should be intuitive to use, the KPI team should offer training and various forms of support. Getting senior executives on board is critical to adoption, but they typically need a lot of hand-holding. Many successful performance practitioners sit side-by-side with executives to show them how to use the dashboard in the context of their daily jobs. Once executives start using the dashboard, their subordinates follow in classic trickle-down fashion.

The KPI team needs to offer a variety of training options to other users, including classroom, Web-based, and computer-based training. Often the best trainers are colleagues in the department. The KPI team should recruit "super users" to spread the word and help teach colleagues how to use the system and troubleshoot their problems. The KPI team then provides the first line of support to their super user network.

Monitor and Revise. It's rare to define KPIs correctly the first time or create the perfect dashboard interface for the initial rollout. Thus, it's critical that the KPI and technical teams closely monitor usage with software tools and regularly scheduled meetings. Usage monitoring tools can identify which users are logging on and what queries they're running. If the KPI team notices that a group is not using the system as fully as anticipated, they need to schedule a meeting and identify the obstacles limiting adoption.

More importantly, the KPI team and KPI owners need to track whether the KPIs are driving the desired outcomes. Ideally, the team uses statistics to correlate behavior with outcomes. However, it's usually easy to tell whether a KPI is having the desired effect or an unintended consequence. "You really don't know what impact a KPI will have until you put it into practice," wrote one respondent. "You need to be ready to make adjustments to ensure you drive the right behavior."

Once KPIs stabilize, an organization may then consider attaching financial incentives to them. Unless employees buy into the KPIs, understand what they mean, know how to impact them, and are empowered to take requisite actions, then it's unwise to use the KPIs in a bonus or merit pay system. Employees must also feel the targets associated with the KPIs are achievable; otherwise, they'll demoralize the staff and undermine productivity.

If users don't know the dashboard exists, they won't use it.

It's rare to define KPIs correctly the first time or create the perfect dashboard interface for the initial rollout.

Govern the Process. The KPI steering committee and project team shouldn't disband after the dashboard is delivered. They should form the basis of a KPI governance team that monitors the effectiveness of the dashboard and KPIs, authorizes new KPIs and changes to existing ones, and sets direction for the program. Some companies hire a chief performance officer whose job is to oversee performance processes and technical implementations and guide the governance committees.

Coach Managers and Users. One of the most important but overlooked elements of a performance strategy is the need to teach managers how to interpret KPIs and coach subordinates about how to improve their performance. As mentioned earlier, when first given a performance dashboard, managers tend to overreact to every dip and ripple in performance. "It's important to look at longer-term trends and not overreact," says one senior officer at a manufacturing firm.

Managers also need to understand that KPIs are there to help them improve the performance of their team or their subordinates, not penalize them. Managers should view the KPIs as an early indicator that an employee or team may need a little extra help or coaching to understand how to impact the KPIs in a positive direction. A telemarketing firm uses dashboards to project whether salespeople are on target to meet their daily quotas every 15 minutes. When a manager sees a string of red lights, he knows a telemarketer may be having trouble with a customer and needs help.

Measures without meetings are useless.

Finally, it's important to use KPIs as a regular feature of management meetings and personal performance reviews. "Measures without meetings are useless," says one performance manager. "Unless managers hold regular sit-down meetings with their staff to review performance, nothing will change. Managers need to ask, 'What are you doing about this number?'"

Conclusion

Creating effective KPIs is as much art as science. Fortunately, there are a lot more people today who understand both the art and science of creating KPIs and how to implement performance management solutions.

Nevertheless, creating KPIs is hard work and there are no shortcuts. The task can be made significantly easier if executives have taken the time to create a well-articulated strategy and kept it up to date. Lacking that, teams assigned to create dashboards or scorecards will struggle to define KPIs that align with strategic objectives and move the organization in the desired direction.

Perhaps the most challenging aspect of creating KPIs is that it is such an inexact science (which is why there is room for artists in this process). All the analysis in the world won't create a perfect KPI. That's because KPIs are designed to drive human and organizational behavior. Few people are perspicacious enough to sort through the complex tangle of ideas, prejudices, expectations, roles, experience, and motivations to envision how a KPI will affect behavior. Sometimes you just have to implement the KPI to find out how it works.

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IBM Cognos 8 BI Scorecarding
Monitoring metrics at the right readiness level

The experience of thousands of IBM Cognos customers has shown that not all organizations needing a scorecarding application have the same requirements. A company's scorecarding needs can be determined according to what IBM Cognos calls the scorecarding "readiness level."

At the initial level of scorecarding readiness, a department or a team within a department simply needs to monitor a limited number of performance indicators against certain metrics. At this level, the metrics are not necessarily aligned with the company's long-term strategic objectives. For organizations that need this basic performance monitoring, IBM Cognos 8 BI Scorecarding satisfies the need to calculate metrics in a consistent manner and present them visually.

- Because IBM Cognos 8 BI Scorecarding is deeply connected to an integrated BI infrastructure, you can monitor your metrics in an IBM Cognos 8 BI report or dashboard that will automatically update when the data supporting the metrics changes.

At the next level of the IBM Cognos scorecarding readiness scale is scorecarding that measures the performance of multiple teams in a standardized way, but is typically outside of any top-down, organization-wide initiative. IBM Cognos 8 BI Scorecarding allows you to track performance against departmental, team or franchise objectives.

- Metrics are standardized and defined in a consistent way according to a common framework, so they mean the same thing to different teams or franchises.

- Scorecard metrics are linked to BI reports and analysis to reveal the underlying details of why a given metric is performing in a certain way.

- Every metric is assigned an owner and has a target, creating accountability and focus.

At the top level of the readiness scale is strategy management—a top-down, enterprise-wide initiative where the CEO and executives define a strategy and use scorecards to cascade strategic intent deep down into the organization. Strategy management is typically driven by a specific management methodology, such as the balanced scorecard.

- To support the strategy, initiatives are defined and planned as part of the organization's planning and budgeting process.

- Strategic objectives are defined using both financial and non-financial terms. Non-financial indicators can include diverse factors ranging from customer satisfaction to internal training for employees. These are considered leading indicators, in that if you succeed against them, they will have a positive impact on financial indicators like revenue and cost.

- The organization communicates strategy through scorecards and strategy maps, ensuring that strategy is linked to operations, and all departments are defining projects and activities that support the strategy.

IBM Cognos 8 BI Scorecarding automates the strategy management process and helps organizations link strategy to execution at whatever level of scorecard readiness they find themselves. With this valuable tool, you can not only understand where your organization is at a given moment, but you can help set your course more precisely and steer the organization to a more successful future.