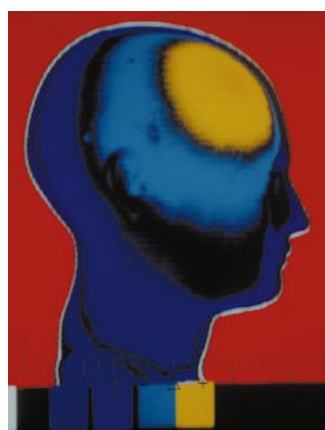


# Knowledge Management and IT: How Are They Related?

Larry Todd Wilson and Charles A. Snyder

**Y**ou see the phrase “knowledge management” everywhere—television, magazine covers, new-product press releases, and conference keynote

speeches. These sources are heralding it as the strategy that will define the “value proposition” for corporations beyond the 90s. But



**Knowledge management applications must convey**

**two types of information. The challenge for IT professionals begins here.**

what is knowledge, and what does it mean to manage knowledge? What does the knowledge movement have to do with IT? And how can IT professionals create applications that add value for users working in a KM environment?

In addressing these questions for IT professionals, we will limit our discussion to the IT aspects of KM. However, keep in mind that other dimensions—people and processes—are critical to successful knowledge management.

Most organizations don’t understand how to manage knowledge effectively. Furthermore, most IT solutions do not provide

all of the assistance that users need to be capable performers. To provide context for this discussion, we define some relevant terms and describe their relationship to one another.

## TWO TYPES OF INFORMATION

*Information* is facts that have been organized so that they have structure and relationship to the task currently at hand. There are two types of information. The first type, *support information*, includes descriptive explanations that serve as a basis for understanding (who, what, when, where, with what, and why). The second type, *guidance*, strengthens your ability to act, through explanations of how to accomplish a task. This distinction between guidance and support information was discovered after analyzing the natural ways that people express what they know.

To become knowledgeable with respect to any task, you must have access to both types of information. Then you can use your own cognitive processes, unique background, and experience to interpret and derive meaning from the information. With the knowledge constructed through this process, an individual becomes capable of the focused action (thinking, feeling, or doing) necessary to complete a task.

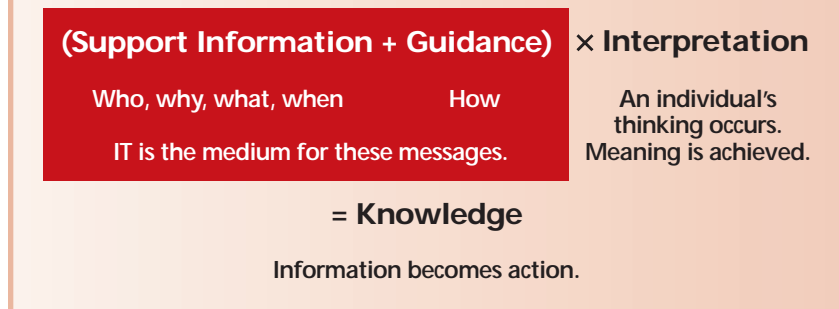
For example, a network manager could assign the gathering of information about virus protection packages to a new sys-

tems analyst. The analyst can obtain mountains of support information from a variety of sources, such as vendor literature, Web pages, and word of mouth, and still not be able to recommend a selection.

Only with the guidance of an expert (in this case, the network manager) can the analyst complete the task successfully. The network manager can provide guidance to the analyst regarding selection criteria, which is part of the overall decision making process. This guidance includes the steps of decision making: state the goal, list alternatives, list criteria, weight criteria, evaluate alternatives, and make a decision. Guidance would also include criteria such as the necessary capabilities of such software, how users are likely to react to it, and the problems the manager has had with such software in the past. A good decision is a function of the guidance used to think through the process.

## MANAGING KNOWLEDGE

From our perspective, knowledge management involves helping people become more capable contributors to their organization’s strategic plan. IT can play a major role as a medium (probably the most effective medium) for delivering support information and guidance. But providing sufficient amounts of *both* types of information will require rethinking the current design of software because users are unaccustomed to having access to guidance via

**Figure 1. Turning information into knowledge.**

IT. The challenge for IT professionals begins here.

Most software applications enhance understanding with abundant support information, but leave you with little or no guidance about how to do the task. The absence (or inadequacy) of guidance places you at a great disadvantage when the time comes to translate knowledge into action.

So here's how IT and knowledge management relate: To support knowledge management successfully, the structure and focus of IT applications must embrace both support information and guidance. Applications must give IT users an interface that lets them access both types of information *selectively* and *at point of need*, based on their own unique experiences, background, and the situation.

### HOW SOME APPLICATIONS MIGHT IMPROVE

Many standard enterprise applications could benefit from considering the distinction between support information and guidance. When you evaluate or develop products in these areas, we offer our thoughts on how some applications might be improved. We offer four examples: database management systems, workflow applications, personal productivity applications, and Web portals.

#### Databases

Databases are electronic filing systems, typically used for managing large structured sets of persistent

data. In other words, databases contain lots of support information. Databases could be enhanced by serving as repositories of guidance. If so, then databases would provide better support for all users and especially those users who lack sophistication in using these systems. Other opportunities for improvement exist before and after information retrieval.

- *Before information retrieval.* Now, database users have to know what information they want and how to get to it before they begin accessing a database, because most systems lack search guidance. Questions that prompt users about how to structure their queries would help focus the domain and scope of the inquiry. Such help would be especially useful for users who are not sure what information they need. The user could access the most pertinent support information quickly and directly.
- *After retrieval.* Here, guidance could take the form of questions. The system could prompt users about how to apply the support information returned by their query. That is, how can they use the data to make better decisions? Another possibility is for the system to provide a *validity check* for the support information. This simply means that a system returns some measure (weights, for example) indicating the validity of the information's source.

#### Workflow systems

Workflow systems usually provide automated document routing to the proper individuals. Workflow supports rules that coordinate a process-centric transfer of the information. However, these systems typically offer little guidance to the individuals who receive these documents about how to use the information in their work. An important distinction lies in offering a user the name of a task (which some workflow systems currently do) and offering a user individualized guidance about how to perform the task.

Furthermore, workflow systems could store information about the manner in which decisions are made. This stored metaknowledge could serve as a valuable source of information when improving work processes and associated workflows.

#### Personal productivity applications

Wizards, like those found in word processors and spreadsheets, provide some guidance. However, for novice users, the guidance contained in wizards is insufficient to support successful task completion, especially for complex tasks. To use wizards, a user must know that they exist, how to access them, and the extent of the help they can offer in completing a task. Tax preparation and performance review programs provide abundant support information and some guidance. The guidance within these programs follows deterministic branches of a decision tree based on tax laws or a static process. These applications could be improved by changes in the software to reflect changes in the user's context. Applications should allow the user to adapt guidance and support information so that it meets their personal needs.

#### Enterprise information portals

An emerging class of technology, *enterprise information portals*, promise to filter the organization's uni-

verse of information through a single interface. If these systems were designed to provide guidance and support information, a major advantage would result from decreasing the time/cost expended in searching—locating the support information required for a given task. Additional value to users would include

- decreased frustration in locating information needed in their work,
- increased satisfaction from finding something truly useful on the first try (instead of the fifth or even worse, the fifteenth try), and
- the increased feeling of competence that comes from completing even complex tasks smoothly and quickly, because you have all the needed information and guidance.

**T**he relationship between IT and knowledge management is strong and much needed. Only a complete rethinking of the elements of software design to incorporate both support information and guidance will yield increased functionality and improved user performance. In choosing or developing various products, ask yourself, Will this information technology help users gain understanding? Will it improve their ability to act?

Information technology that is designed to enhance both understanding and action can add great value to business applications. Taking this next step in IT design will enable dramatic improvements in workplace performance. ■

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## Using Metrics to Justify Investment in IT

Elliot Chikofsky and Howard A. Rubin

**I**n this era of closely scrutinized IT budgets a well-defined measurement program can provide the hard numbers to justify your expenditures. The IT division of a financial services company recently discovered how useful metrics can be. By collecting key measures and constructing a scorecard that mapped IT operations to business drivers, they started a dialogue with business managers about how IT operations contributed to their business units. During budget negotiations, the IT staff braced for cuts, but instead found business managers advocating *increased* IT spending. The business units now knew where IT dollars were going and could see and document how increased IT services contributed toward business success.

Clearly, today's IT professional needs to become familiar with metrics and how a measurement program can contribute to the IT organization and support business objectives.

### SELECTING METRICS

To gain support from senior management, you must link technical metrics to business metrics—you must show how increases in productivity

**A firm grasp of metrics and how to implement them can prove vital to the health of your organization—and your career.**

and quality translate into a better bottom line. So your business and strategy determine the metrics you track. Select measures that are obtainable and that truly matter to your organization's work.

You also must be able to collect or derive the metrics data without undue burden. Remember that it's not the measures themselves that matter, but the decisions that will be based upon them. Measures that are expensive or cumbersome to collect will detract from the measurement program's perceived value. Overly intrusive or complex data collection can turn peo-



## Talking to the Business Side

A useful technique for communicating with business managers is David Nolan and Robert Kaplan's balanced scorecard approach ("The Balanced Scorecard—Measures that Drive Performance," *Harvard Business Review*, Jan.-Feb. 1992, pp. 71-79).

Each scorecard displays your company's applicable metrics along four key dimensions: how you view your customers, how you view your investors, the processes you need to excel, and how you build for the future.

Scorecards provide a focus for discussion between IT and business leaders.



## Software Metrics Starter Set

The following core metrics can be used with minimal overhead as the starting point for understanding the IT application environment.

► **Size.** Track the actual software size against original estimates and revisions both incrementally and for any release. Use software size to estimate the amount of remaining work and the resources needed to do it. Comparing estimates with actual size can provide a historical basis for improving project management and planning.

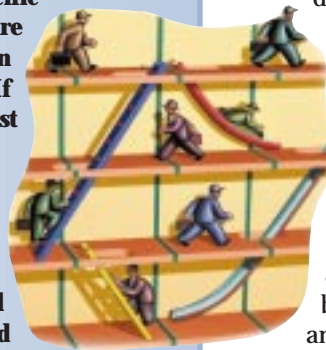
► **Effort.** Track the staff hours expended during specific development and maintenance activities and for the entire project. Effort measures let you compare between planned and actual resource use. Metrics reveal trends. If the effort expended exceeds planned estimates, and cost or schedule begin to slide, watch for quality to follow.

► **Schedule.** Track performance toward meeting commitments, dates, and milestones. Use project planning and scheduling tools to help staff and management agree on what constitutes progress slippage, how project plans get revised, and how replanned schedules affect overall performance. Entry and exit criteria for project events and activities must also be understood and agreed upon.

► **Quality.** Track defects reported, progress in resolving defect reports, and what portions of the applications were affected by those defects—your software's quality or lack thereof will be reflected most clearly in the number and severity of defects. Focus on total numbers of defects open and closed, rate of defect removal, defect classification, and those components most susceptible to defects.

► **Rework.** Track the effort lost when portions of the product must be scrapped or reworked for failing to meet expectations. For applications under change control, make the change request the foundation of your rework metric. Classify and track change requests separately for corrections, enhancements, adaptations, perfecting changes, and user support.

—Elliot Chikofsky and Donn DiNunno, Meta Group



ple off and encourage them to invent numbers. The best measures are those that are a natural outcome of people's work, like the number of batch jobs processed in a day or the amount of downtime a system records.

Select metrics that are *actionable*: You should be able to define what your organization should do when any measure reaches a high or low threshold value. A measure is not a good candidate if it defies such definition or cannot be linked directly to a higher level actionable metric. For example, a daily ratio of network peak traffic to data center print volume may be easy to obtain, but it is unclear what action you should take for any particular value of

the ratio observed. In contrast, the percentage of help desk tickets resolved on first call is an actionable metric because changes in value outside a regular operating range have direct meaning to management.

### GETTING STARTED

It's best to begin with a baseline study of key projects and applications. Examine your present development process and cost estimation approach for the factors that influence project success. Review your applications portfolio for attributes that influence your ability to keep the systems running and up to date.

In any IT operational areas, you

need measures that reflect the productivity, quality, delivery, and the level of effort required. In applications development and maintenance, an initial metrics program will typically measure five aspects—size, effort, schedule, quality, and rework. These aspects address important product and process characteristics central to planning, tracking, and improving development processes. We

offer the "Software Metrics Starter Set" sidebar as an example of the types of measures you would track in a software project.

Don't worry about identifying the best measures in advance. Other measures and areas for investigation will become evident during the analysis. The baseline can then be expanded to other projects and applications, often organization-wide. Continuous base-lining helps an IT organization interpret its trajectory and rate of change as it builds a history from key measures of IT performance.

Putting measurement to work is hard: Our research shows that only one of six measurement programs persists for two or more years. Some organizations introduce metrics as the latest management fad, to which experienced employees nod silently and think, this too shall pass. For tips about keeping a metrics program on course, see the "Measurement Do's and Don'ts" sidebar.

### COMPARATIVE ANALYSIS

Remember that effective measurement is not a one-time operation. It is a continuous process that helps your organization learn from experience and refine its data collection and measures to reflect growing knowledge.

Your organization's baseline also provides a basis for comparison with other organizations in your own industry and others. Besides comparing projects and applications across organizations, you can also compare IT processes, staffing, technology, budgets, and expenditures.

As Y2K efforts wind down, backlogged projects across the organization are competing for limited resources. At the same time, company management is demanding more justification of how IT contributes value to the business.

You'll want to help your organization make smart choices about which of the competing projects to pursue. Metrics will help you do that. As the IT function moves closer to the heart of the business, people who understand the value of metrics will command a premium. ■

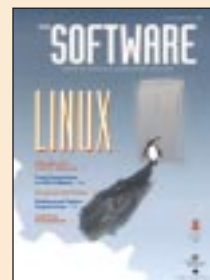
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## Measurement Do's and Don'ts

- **Never measure for measurement's sake.** If you don't know what to do with the results, why collect them?
- **Don't seek perfection.** Too many organizations try to find the perfect measure or bet their whole program on a single measure. Experience shows that various measures are best for different phases of operation and levels of management decisions.
- **Use only a few measures to begin with.** It is easy to adopt too many metrics—sometimes hundreds—instead of focusing on the dozen or so that mean the most to staff and relate directly to business performance.
- **Include all the stakeholders.** An effective program must build understanding among its key stakeholders. You must have programmer and project manager support. People must understand the program goals, how the results will be used, and how their own work can benefit from measurement. You must make it clear that the measurement program is not a cover for identifying poor performers.
- **Avoid sabotage.** Intentional and unintentional sabotage of a metrics program often occurs, whether through overt action, passive resistance, or general lack of cooperation. Lack of commitment is one of the surest ways to derail a measurement program.
- **Make measures part of the operation.** Successful metrics are a feedback mechanism that your organization should recognize and act on. To be most effective, the measures should influence the applicable reward system of the project, the department, or the organization.

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