A Yardstick for Knowledge Management

By Mark E. Van Buren

An ASTD partnership with leading firms lays a foundation of standards for measuring and managing intellectual capital.

Illustration by Andy Giarnella

A new era has begun, the knowledge era, which is likely to have a dramatically different terrain and which will require a new business compass to navigate. The compass of the industrial and information eras—the financial balance sheet—will no longer suffice. Composed of backward-looking indicators of performance, the balance sheet has always handicapped the ability of firms to move quickly and nimbly. Agility is critical to the success of firms in the rapidly changing landscape of the knowledge era. To increase their agility, firms need forward-looking indicators.

The American Society for Training & Development, in partnership with seven pioneer companies of the knowledge era, recently established a beachhead on one of the most challenging issues firms face in the new economy—how to create sound methods and standards for measuring the value of investments in intellectual capital. The partnership—the ASTD Effective Knowledge Management Working Group—is made up of Charles Schwab, Chevron, Dow Chemical, EDS, Motorola, Polaroid, and PricewaterhouseCoopers. They have forged new ground in these areas of measurement: the stocks of intellectual capital, the knowledge management process itself, and the economic value generated by intellectual capital. Together, those measures lay the foundation for a widely applicable set of leading indicators for the knowledge era.

A recent report, "Leveraging Intellectual Capital," from The Conference Board and ASTD observes: "Measurement is a critical issue for executives. They realize that even if they are not expected to present measurable deliverables today, they probably will be tomorrow." The significance—and lack of progress—of this issue is made clear in the results of a recent survey by Ernst & Young's Center for Business Innovation. Measuring the value and performance of knowledge assets ranked as the second most important challenge companies face today (43 percent), surpassed only by changing people's behavior (56 percent). But only 4 percent claimed to be "good" or "excellent" at "measuring the value of knowledge assets or impact of knowledge management."

What isn't measured, isn't managed

Most organizations have only a vague understanding of how much they invest in their intellectual capital, let alone what they receive from those investments. Standard financial accounting systems don't allow for easy estimation of intellectual capital investments, even after such investments have been clearly identified. Without methods for measuring intellectual capital, many firms don't realize its full potential. Instead, they either under-invest in it or many of their investments are ineffective. And without standards, stakeholders have no way to judge the value and effectiveness of investments in intellectual capital across firms.

Some companies are making inroads in measuring and leveraging their intellectual capital assets. They include Skandia AFS, Dow Chemical, and Buckman Laboratories, among others. To their credit, some of these organizations have made their measurement systems available publicly in one form or another. However, none of the systems is widely accepted. Idiosyncratic or company-specific measurement systems developed in isolation do little to create measurement methods that are robust enough to be adopted across the board in diverse organizations.

Greater strides on intellectual capital measurement can come only from collective action. Measurement standards require formalized information sharing, common definitions and metrics, and shared methodologies—none of which can be accomplished by market forces or the isolated work of organizations. The ASTD Effective Knowledge Management Working Group—made up of companies from different industries with diverse intellectual-capital management initiatives—has laid a groundwork for developing a standard set of measures that can be used to undertake assessments of knowledge management activities across a wide variety of organizations.

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However, it should be noted that the standard of evidence for evaluating the effects of knowledge management can vary with the nature of the activity. For instance, an insistence on extremely rigorous evidence could in some cases rule out the possibility of making long-term, strategic investments. The important point is that the ultimate purpose of developing sound methods for measuring the value and effects of intellectual capital is to generate the information needed for continuously improving its value to an organization. Though such information may not be needed in an environment where spending on intellectual capital is typically viewed as a cost, it is essential when it becomes a strategic investment.

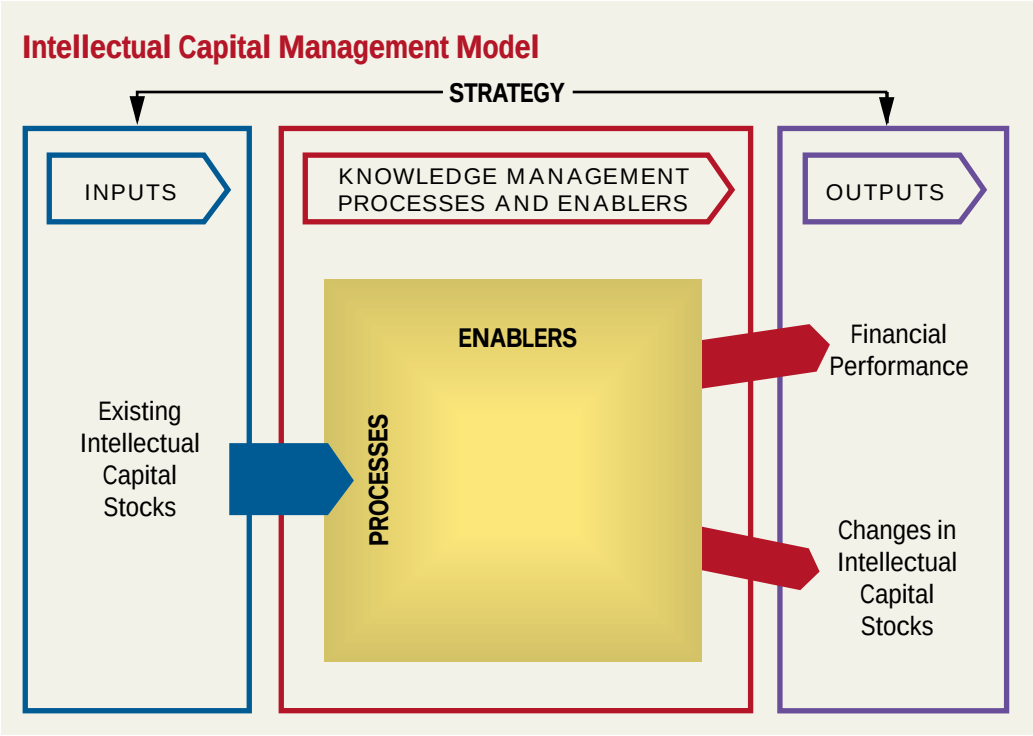
Types of measurement

Efforts to address the measurement challenges surrounding intellectual capital fall into two basic, but overlapping, types: measuring stocks of intellectual capital and measuring effectiveness.

Measuring stocks. The simplest form of this type of measurement is a straightforward enumeration of the intellectual capital of an organization–the number of patents, Ph.D. professionals, *Fortune* 500 contracts, and so forth. The result is an inventory of intangible assets that account mainly for the types and amount of assets an organization

has, but little else.

Usually, organizations are interested in measuring not just the quantity, but also the monetary value of their intellectual capital stocks. Because the intangible nature of these assets makes such valuations exceedingly difficult, most attempts at valuation provide only an approximation of the total value of an organization's entire intellectual capital stocks, without enumerating each and every element. One such formula for measuring the value of intellectual capital is consultant Paul Strassman's method for valuing "knowledge capital." Under his formula, the value of knowledge capital can be estimated as the ratio of "management value-added" to the price of capital, in which management value-added is essentially profits after tax minus shareholder equity.



An especially popular approximate monetary measure of intellectual capital is derived from a firm's market-to-book value. Market value is a company's stock price, multiplied by the number of outstanding shares; a company's book value is the replacement cost of its physical assets. The assumption is that the portion of a company's market value in excess of its book value is the value that the market places on its intangible assets. According to Charles Handy, author of *The Age of Unreason*, the intellectual capital values of most organizations assessed in that manner are worth three to four times their book values. This measure changes constantly as a company's stock price fluctuates and may reflect such factors as takeover rumors or global volatility, and can be constructed only for publicly traded firms.

Measuring effectiveness. This type of measurement goes beyond the value of stocks of intellectual capital to the economic value they *produce*. The emphasis shifts from intellectual capital to the processes by which it is managed—from stocks to flow. This form of measurement looks at the output side of the process as well as the input side.

The purpose of measuring effectiveness is to ascertain the financial gain achieved through knowledge management. You can classify effectiveness measures of financial gain into two kinds. One kind measures effectiveness as changes in the monetary value of an organization's intellectual capital stocks. Measuring effectiveness that way involves, by necessity, undertaking the measurement of stocks, as discussed previously.

The other kind of effectiveness measure assesses how knowledge management affects financial performance—that is, how well intellectual capital stocks are turned into financial capital. Inevitably, discussions on financial performance turn to the Holy Grail of measures: return-on-investment. However, financial assessments of effectiveness such as ROI are particularly difficult to make for knowledge management activities. A recent study by the American Productivity and Quality Center found that 80 percent of companies do not calculate ROI on their knowledge management activities.

Some companies have proposed ways to measure the effectiveness of intellectual capital management that don't focus exclusively on financial measures. Skandia's Navigator and Karl-Erik Sveiby's Intangible Asset Monitor are two intellectual-capital reporting tools that contain both financial and nonfinancial measures. Charles Lucier, Booz-Allen & Hamilton's first chief knowledge officer, and Janet Torsilieri, also at Booz-Allen, suggest two tiers of nonfinancial outcome measures: operating performance outcomes and direct measures of learning. Examples of operating performance measures include lead times, customer satisfaction, and employee productivity. Learning measures include such items as the number of participants in communities of practice, employees trained, and customers affected by the use of knowledge.

A model for management

Believing that both stock and effectiveness measurement are necessary and important to managing intellectual capital, the ASTD Effective Knowledge Management Working Group has created an Intellectual Capital Management Model that includes two sets of measures. One is a core set of measures to enumerate the intellectual capital stocks that are common to most organizations. Changes in these measures over time also serve as one set of effectiveness measures. The

Table 1: Core Intellectual Capital Measures

INDICATOR	MEASURE
Human Capital	
Retention of Key Personnel	the percentage of employees most essential to the organization retained during the previous year
Ability to Attract Talented People	percentage of openings requiring advanced degrees or substantial experience filled in the previous year
IT Literacy	percentage of employees with a basic level of proficiency in standard office computer applications
Training Expenditures as a Percent of Payroll	total expenditures on training in the previous year as a percent of the organization's annual payroll
Replacement Costs of Key Personnel	average cost to recruit, hire, and train someone to fill an essential job in the organization
Employee Satisfaction	percentage of employees highly satisfied with the organization and their jobs
Employee Commitment	percentage of employees highly dedicated and committed to the organization
Innovation Capital	
R&D Expenditures	total expenditures on conceiving and designing new products and services in the previous year
Percentage of Workforce Involved in Innovation	percentage of employees with primary responsibility for conception and design of new products and services
Product Freshness	percentage of all current products and services introduced in the last three years
Process Capital	
Processes Documented and Mapped	percentage of business-critical processes documented and analyzed
Use of Documented Processes	percentage of document processes being fully utilized
Customer Capital	
Customer Satisfaction	percentage of customers completely satisfied with products and services
Customer Retention	percentage of top customers ending sales contract in the previous year
Product and Service Quality	percentage of customers reporting complaints about products or services
Average Duration of Customer Relationship	average number of years existing customers have been purchasing products and services
Repeat Orders	percentage of existing customers that previously purchased products or services

second is a set of key measures of financial performance to assess effectiveness.

The model on page 73 has three primary parts. Reading from left to right, the model begins with a firm's existing stocks of intellectual capital. These stocks become inputs into the second part of the model, the firm's knowledge management processes and enablers. In the third part of the model, two sets of outputs are achieved: changes in the stocks of intellectual capital and financial performance. Enveloping or coordinating those is a firm's business strategy. Everything that occurs in a firm's system must be aligned with its primary strategic objectives.

By looking at the measures of intellectual capital stocks that some companies have proposed or used, the group was able to classify them into four commonly used categories of intellectual capital:

❑ Human Capital. The knowledge,

Table 2: Elective Intellectual Capital Measures

Human Capital
- ❑ organizational learning
- ❑ effectiveness of learning transfer in key areas
- ❑ management credibility
- ❑ employee wages and salaries
- ❑ educational levels—percentage of college graduates
- ❑ employee empowerment
- ❑ management experience
- ❑ time in training
- ❑ percentage of employees with X+ years of service
- ❑ empowered teams

Innovation Capital
- ❑ number of copyrights and trademarks
- ❑ number of patents used effectively
- ❑ planned obsolescence
- ❑ new opportunities exploited
- ❑ new markets development investment
- ❑ R&D productivity
- ❑ sales from products released in past five years
- ❑ research leadership
- ❑ net present value (NPV) of patents
- ❑ effectiveness of feedback mechanisms
- ❑ average age of patents
- ❑ percentage of R&D invested in product design
- ❑ number of patents pending
- ❑ number of new ideas in knowledge management database
- ❑ direct communications to customer per year

Process Capital
- ❑ strategy execution
- ❑ quality of decisions
- ❑ percent of revenues invested in knowledge management
- ❑ percent of company effectively engaged with customers
- ❑ IT access per employee
- ❑ strategy innovativeness
- ❑ cycle time
- ❑ IT investment per employee
- ❑ process quality (defects, error rates)
- ❑ time-to-market
- ❑ collaboration levels
- ❑ IT capacity (such as CPU)
- ❑ IT capacity per employee
- ❑ operating expense ratio
- ❑ administrative expense per total revenues

Customer Capital
- ❑ market growth
- ❑ customer needs met
- ❑ marketing effectiveness
- ❑ annual sales per customer
- ❑ market share
- ❑ average customer size (in dollars)
- ❑ five largest customers as percentage of revenues
- ❑ days spent visiting customers
- ❑ support expense per customer
- ❑ image-enhancing customers as percentage of revenues

skills, and competencies of people in an organization.

❑ Innovation Capital. The capability of an organization to innovate and to create new products and services.

❑ Process Capital. An organization's processes, techniques, systems, and tools.

❑ Customer Capital. The value of an organization's relationships with its customers.

To winnow the measures in each category into a manageable number of intellectual capital measures, the group ranked the items on the basis of their

❑ relevance to a firm's knowledge management objectives

❑ strategic importance to top executives and external stakeholders

❑ collectability—the availability of information or data

❑ applicability to a wide variety of firms.

For each of the categories, the group produced two sets of intellectual capital measures: a core set and an elective set. Measures that ranked in the top quartile were considered core indicators. (See table 1 on page 75.)

Measures falling into the second quartile were labeled "elective" measures because they might be highly relevant to the knowledge management efforts of organizations only in certain industries or lines of business. (See table 2.) For instance, one elective measure of innovation capital (the number of patents being used effectively) has tremendous significance for Dow Chemical, an intellectual-property-driven company, but it's much less important to a consulting firm such as PricewaterhouseCoopers.

An identical process was used to identify sets of core and elective financial-performance outcomes (for example, measures of economic value; see table 3).

Table 3: Financial Performance Measures

Core Measures
Return-on-equity
Earnings per share
Growth rank in industry
Total shareholder return

Elective Measures
Market capitalization
Return-on-assets
Revenue growth
Market share
Revenue per employee
New product sales
Value added per employee
Market value

Unpacking knowledge management

The heart of the Intellectual Capital Management Model is the middle section of knowledge management processes and enablers—an area that much of the work on intellectual capital has treated as a black box, meaning that few people have tried to understand the inner workings. But, in fact, the processes and enablers are the critical leverage points for enhancing a firm's knowledge management capability. The Intellectual Capital Management Matrix begins to unpack the knowledge management box.

On the left-hand side of the matrix are the following general categories of knowledge management processes:

❑ Define. Identifying intellectual capital types, needs, and requirements.

❑ Create. Creating new intellectual

capital and uncovering existing intellectual capital.

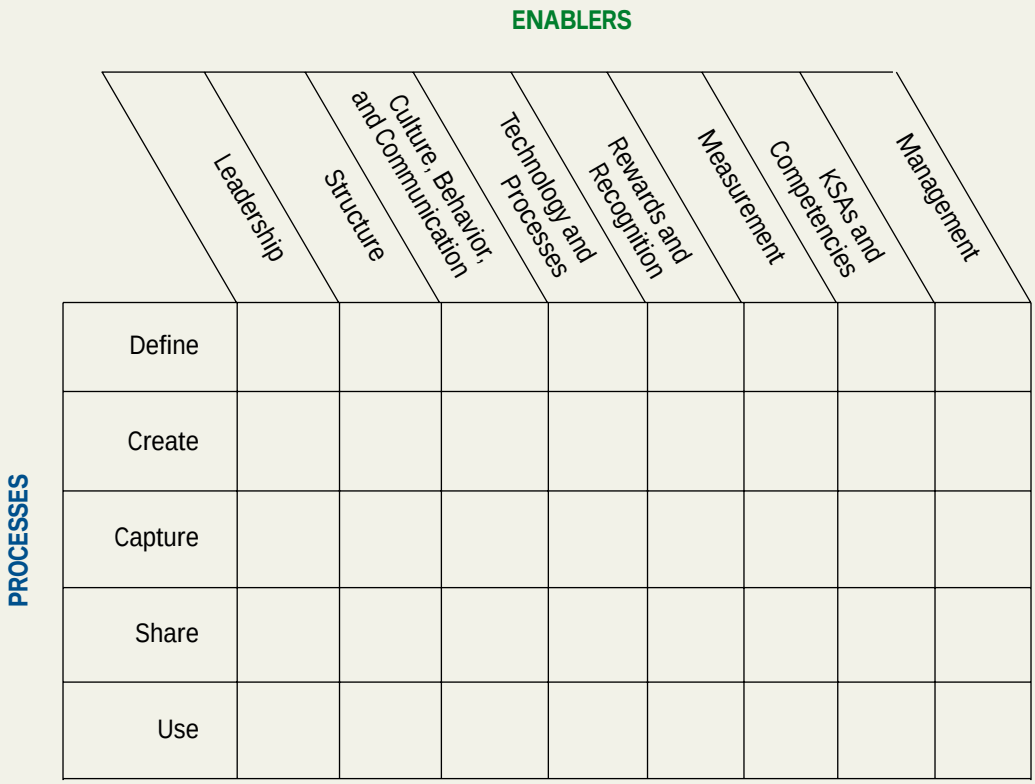
- Capture. Compiling, gathering, representing, codifying, and reorganizing intellectual capital.
- Share. Disseminating, distributing, and transferring intellectual capital.
- Use. Applying, incorporating, reusing, exploiting, and leveraging intellectual capital.

Although the process categories are listed sequentially, in reality, the processes overlap and reinforce each other. The processes take on many different forms and often appear in an organization as concrete activities or initiatives. Many are activities that organizations have engaged in always—such as succession planning, market research, total quality management, reengineering, and strategic planning. In the knowledge era, most of the work that goes on in organizations involves the management of knowledge. (See the box, Knowledge Management Activities, on page 78.)

Across the top of the Intellectual Capital Management Matrix are these categories of knowledge management enablers:

- Leadership. The actions and statements of a company's leaders that demonstrate a strong belief in, understanding of, and commitment to the values and business objectives of the company.
- Structure. The organization of individuals, work groups, teams, and business units within and across a company.
- Culture, Behavior, and Communication. Widely shared beliefs, norms, and values about appropriate ways of behaving and conducting work within a company.
- Technology and Processes. The formal tools and methods used by a company to carry out core business activities.
- Rewards and Recognition. The methods of positive reinforcement used by a company to encourage desired behaviors.
- Measurement. The tools and methods used to record, monitor, and track the performance of individuals, units, and the company as a whole.
- Knowledge, Skills, Abilities, and Competencies. The existing capabilities of employees to carry out the work of the company.
- Management. The tasks associated with ensuring that the activities of the company are performed as planned.

Intellectual Capital Management Matrix



Establishing a standard for measuring the value of intellectual capital is likely to take years to unfold.

Though neither the enablers nor the process categories are in any way new, the matrix represents a novel way of thinking about their interaction and the knowledge management process as a whole. The cells of the matrix help firms locate the specific activities that they undertake to manage their knowledge. One example of a knowledge management activity that falls in the Share-Leadership cell is the work that Chevron CEO Ken Derr does to stimulate the sharing of knowledge in the company. In every meeting he has with his senior staff, he reminds them of the tremendous financial gains they've achieved through sharing best practices.

Your part in setting the standard

Establishing a standard for measuring the value of intellectual capital is likely to take years to unfold. Before the core intel-

lectual capital indicators and financial performance measures are finalized, they must go through a thorough empirical-validation process. Therefore, the next stage of the process is to accumulate a large amount of data on the core intellectual capital and financial measures from a sizeable number of firms through the ASTD Benchmarking Service—a free service that collects data from thousands of firms around the world. (See the box at right.) The information collected through this service will permit rigorous statistical analyses of the intellectual capital indicators and their value. In particular, ASTD will be able to pinpoint which stocks of intellectual capital are most likely to produce positive financial returns.

This set of leading indicators for the knowledge era will provide standard measures that let firms track their investments in intellectual capital over time (and, thus, their future competitiveness) and compare their investments to those of other firms. Systematic comparisons using the standard measures will also help external stakeholders, particularly investors, assess the potential future performance of firms, using more than balance sheets. The Intellectual Capital Management Model and its measures represent a major step toward providing precisely the kinds of methods that firms and their stakeholders will need to foresee the future. ❑

Benchmark Your Intellectual Capital

Organizations interested in benchmarking their intellectual capital investments are reminded to participate in the free 1999 ASTD Benchmarking Service by completing the ASTD Measurement Kit, packaged with the March 1999 issue *of Training & Development.* For the first time, the Measurement Kit includes a module containing the core intellectual capital indicators discussed in this article. Participants will receive a free customized report that compares their intellectual capital and training investments, practices, and outcomes with those of other participating organizations in their industry, and compared with overall and leading averages.

To request a free copy of the Measurement Kit, contact the Benchmarking Service at benchservice@astd.org or 703.838.5841. The deadline for submitting data on paper is May 15, 1999. You can participate electronically by completing the *Electronic Measurement Kit (E-Kit)* at www.astd.org. *E-Kit* submissions received after May 15th will be subject to a processing fee of $100.

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Knowledge Management Activities

Defining Intellectual Capital	Creating Intellectual Capital	Capturing Intellectual Capital	Sharing Intellectual Capital	Using Intellectual Capital
❑ defining core competencies	❑ training	❑ building best-practice databases	❑ sharing best practices	❑ decision making
❑ establishing staffing requirements	❑ succession planning	❑ building yellow pages	❑ forming knowledge networks	❑ strategic planning
❑ setting competency requirements	❑ market research	❑ building expert directories	❑ forming online discussion groups	❑ product development
❑ writing job descriptions	❑ competitive intelligence	❑ creating knowledge repositories	❑ deploying performance and decision support systems	❑ marketing
❑ defining core processes	❑ selection and recruitment	❑ total quality management	❑ deploying intranets	❑ forecasting
❑ defining market segments	❑ identifying core competencies	❑ data-warehousing	❑ deploying extranets	
❑ dentifying potential partners, suppliers, or distributors	❑ best-practice searches	❑ process documentation and reengineering	❑ internal communications	
	❑ benchmarking	❑ writing manuals	❑ external communications	