

WHITE PAPER

# Knowledge-Enabling the Organization

**Knowledge Management Based on Business Components Enables Organizations to Leverage Knowledge for Competitiveness and Growth**

Open Engineering, Inc.  
50 California Street, Suite 860  
San Francisco, CA 94111 USA (415) 989-9050  
[www.openeng.com](http://www.openeng.com)

## Knowledge-Enabling the Organization

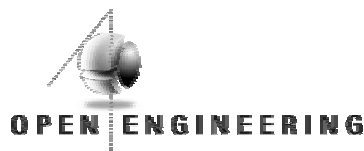
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For more information, please contact Gene Knauer, Director of Sales & Marketing  
Open Engineering/San Francisco (415) 989-9050 x17

Open Engineering, Inc.  
50 California Street, Suite 860  
San Francisco, CA 94111 USA (415) 989-9050  
<http://www.openeng.com>



## Strategic Knowledge Management

We hear much today about the goals of the "new organization" and the requirements for the "new business" – flexibility, responsiveness, mass customization, one-to-one marketing, adaptability, insight, partnering, cooperating with competitors, sustainable growth, reinvention, and market share over profit. While moving faster is important, operating *smarter* is essential to survive and thrive in the face of these requirements. To become smarter requires ready access to knowledge that *isn't* readily available to individuals in most organizations today.

### *Accessing and Sharing Organizational Knowledge*

Knowledge within an organization is as dynamic as the knowledge gathered in an individual's brain. Relationships between elements of knowledge often comprise the most valuable and powerful aspect of knowledge. These relationships can be productively applied only if they are known and accessible when the knowledge is needed.

But organizational knowledge exists divided among the minds of many individuals. Each person forms a different "information island". Each person may have overlapping, complementary, or unique knowledge, but usually knowledge of what others know is anecdotal and undocumented. The connections between the knowledge of one individual and those of others within an organization are never wholly contained within any one person's mind. Thus some of the most important relationships (and thus knowledge) are formed only by accident, if at all. Consequently, while an individual may clearly know what he or she knows, the organization often does not know what it knows.

Organizational knowledge is further lost when people leave the company, transfer to new jobs, transition between technical and management roles, or transfer between line and staff organizations. Organizational knowledge is thus inherently more distributed, disconnected, and subject to loss than knowledge possessed by an individual.

Consequently, while desktop computers, database and end-user data access tools, and user-friendly web browsers may have put information at our fingertips, the knowledge that ties all of

this information together so that we can work smarter remains just out of reach for many organizations.

But when an organization can integrate and apply its knowledge as though it were one individual, informed, well-executed actions can result, giving companies a tremendous competitive advantage.

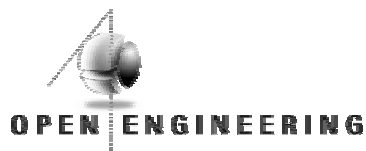
***Elements of a Solution***

Three elements are necessary to master the organizational knowledge challenge:

<p><b>Capture, understand, and be able to change and manage key elements of organizational knowledge.</b></p>	<p>It is impossible to catalogue all organizational knowledge. Instead, certain conceptual business structures, (i.e., key processes within the supplier through consumer value chain, key business events, important constraints and business rules, and relationships between key business concepts which give meaning to the concepts themselves) form the foundation for managing organizational knowledge. Specification and management of this foundation enables sharing, management, and leverage of the broader base of organizational knowledge. Success at capturing and managing organizational knowledge is measurable by the effectiveness of the structures used to classify and thus organize access to it.</p>
<p><b>Link organizational knowledge foundation to business strategy, vision, and metrics.</b></p>	<p>Process and business event metrics are required to manage and improve business operations. It's difficult to manage a business whose process performance cannot be characterized against some standard or baseline, and it is impossible to understand and resolve profit-erosive process variability. The challenge</p>

	<p>lies in selecting metrics. What events should be measured? What process performance measures are meaningful? Where in the business process should these measures be applied? A working answer can be developed from a well-articulated business strategy on one hand, and metrics on the other. Operations and business knowledge can be linked to business strategy; and such linkages can change and evolve as the strategy and business change. Without such linkages, organizational knowledge will not be structured to serve strategy, tactics, and performance management, and the performance drivers from business management will not shape the collection, application or structure of organizational knowledge.</p>
<p><b>Link the organizational knowledge foundation to operational information and work management systems.</b></p>	<p>As with business strategy, knowledge without a clear connection to the business's operations and operational data is knowledge without context. Knowledge richly connected to its operational context, however, can be mined for practical ideas and insights, applied to inform tactical actions, and applied as a daily operational management tool. Thus, linking organizational knowledge with operational data and process structures (i.e. workflow) forms a complete link from strategy through operations, including the systems upon which the business depends for its daily operations and decision-making.</p>

Until very recently, organizations have lacked integrated management systems for planning, strategy and business knowledge. Information resides in mainframe, standalone client/server and ERP systems, document repositories, email, voicemail, spreadsheets, PDAs, and



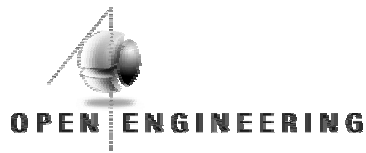
in peoples' heads. Recognizing this problem, many among the *Fortune* 1000 are embarking upon data warehouses, decision support systems, on-line analytical processing (OLAP) systems, knowledge management, and data/applications integration efforts. Enterprise Resource Planning (ERP) vendors like SAP and PeopleSoft and other types of software firms now offer tools that enable organizations to not just gather data, but design an environment for creating real knowledge from the information generated by these operational systems. Many of these tools add value, and some are indeed quite powerful as data extraction, warehousing, analysis and OLAP solutions. Missing from most, however, is the ability to relate or manage more than database records. While sound data management and database design practices are important, the problem of relating business knowledge is much broader than that addressed by star-schema database designs or OLAP tools. It is this broader problem that knowledge management and business components can address. Solutions to this broader problem can, in turn, greatly add to the value of data warehouse and operational work/data management systems, and hence to the corporate bottom line.

### Capture and Understand Business Knowledge

The objective of knowledge management is to establish a framework for organizing, finding and managing group knowledge. A taxonomy can be put in place that relates information that can be captured and stored, such as categories of data about subjects of importance like customers, suppliers, products, competitors, orders and inventory. This taxonomy can also relate data to business processes and their motivating or consequent business events. One usually captures business rules and constraints that specify the sequence of business activities, limits, boundaries, legal or policy decisions. The taxonomy also provides meaningful business relationships to less structured data; reasoning and descriptive materials found in documents, maps, images, web resources – even to sources of data such as stock market feeds, consumer purchasing data, environmental data or other pertinent external data repositories.

Capturing business knowledge requires:

- ***A guiding structure or conceptual framework (called a taxonomy)*** for organizing business knowledge into meaningful groups and establishing context-sensible relationships between groups
- ***Mechanisms for representing business knowledge***, which are compatible with the taxonomy



- *Tools for containing, validating and distributing the business knowledge*, which are compatible both with the chosen representations and taxonomy

## Organizing Taxonomy

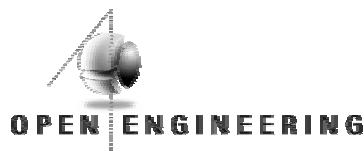
A taxonomy establishes a way to identify what business knowledge is important, and how that important information will be consolidated into groupings. Groupings must serve multiple purposes within any organization, so the successful taxonomy will focus on the broader meaning, rather than the narrower use, of each piece of business knowledge.

There is no “right” taxonomy. Effective use of a taxonomy is determined by its value in capturing and organizing knowledge for the business. There are patterns of ideas—groupings and concepts that are found again and again, regardless of industry—that comprise a useful starting point for evolving any organization’s taxonomy.

As an example of how taxonomies organize knowledge, consider classification of the activities of most organizations into:

- selling
- promoting
- procuring resources
- developing new products/services
- producing products/services
- delivering products/services
- billing

By classifying knowledge around primary business processes, this taxonomy helps the organization decide what knowledge should be accessible to best enhance work. For example, hiring employees, negotiating working capital loans or arranging supply contracts would be considered *procuring resources*. Information such as job market statistics, references to top universities in various professional specialties, recruiting Web sites, economic data, your bank’s last few annual reports, and environmental or political research, could be invaluable to doing the job of procuring resources. Also useful would be access to internal data on salaries, benefits, company financial performance, sales projections and manufacturing or marketing plans. Relating the relevant information together would substantially empower a hiring manager, the CFO, and the procurement negotiator in this example.



In addition, there are *concepts* common to the business processes bulleted above (i.e. selling, promoting, procuring resources, etc.), which form a complementary taxonomy. They include:

- resources
- products
- business parties
- transfers
- agreements
- plans
- locations

By cross-classifying knowledge around primary business concepts (as well as primary business processes) organizations gain insight into the players, roles, resources and results of their business activities. All resources have capacity (bandwidth) limitations. How does one schedule people, facilities and goods—whether for important business meetings, or for delivery logistics, or for delivery of access to data? These represent different viewpoints on the same resources—each with some knowledge in common, as well as relationships to other purpose-specific knowledge

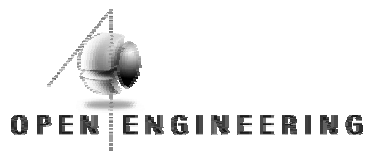
Customers, employees, suppliers, competitors and shareholders are all business parties. Can your organization measure the benefit and risk from a supplier or customer relationship with a competitor? Only if you can identify who these business parties really are – and the shipping, billing and contact information retained in most organizations’ separate and disconnected application databases rarely provides clear answers. The separate islands of information that constitute “information systems” for most organizations could never reveal such insights. As another example, products, business parties, agreements, locations (which includes facilities) are all resources. Equipment like trucks, ships, manufacturing plant equipment and communications devices are also resources. Any resource can be a financial asset or liability in a particular context. How does an organization assess the value of its assets and liabilities when considering a merger / acquisition? How does one assess the relative value of a competitor, perhaps to buy market share?

These different viewpoints can be very valuable to an array of different departments and job functions within an organization. Organizing knowledge in multiple, integrated ways serves multiple, overlapping needs within the organization, and can additionally serve the organization’s business partners and customers. The key, of course, is to establish taxonomies that provide a comprehensive and integrated view of the subject areas of interest.

In choosing a taxonomy, consider that:

- The structure of thought must be meaningful to the consumers of the knowledge





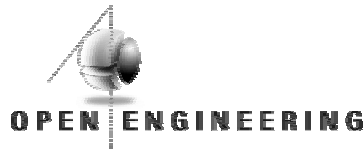
- Structures are more meaningful when they reflect underlying business concepts
- Structures are more useful if they create opportunities for abstraction across similar properties of common concepts and enable the creation of powerful insights. For example, recognizing that customers, employees, competitors and suppliers are all business parties with potentially complex but important relationships enables an organization to ask broader questions about the market and supply chain efficiency than if the knowledge were stored in separate applications.
- Greater value is gained from structures that establish common meaning across entire organizations. Structures that are only useful to one department or business function may be powerful to employees in those areas, but usually cannot provide insights into how that department or function integrates with the balance of the business. As the greatest business opportunities and problems today can be found in these gaps or “white spaces” between well-defined organization units and functional areas, narrow equates to limited knowledge and opportunity.
- Someone within the organization must establish, maintain and control change in the taxonomy. Establishing useful knowledge structures is an active task, not a passive one.

It is often useful to start the organization’s taxonomy with a robust set of business patterns, not because the patterns are “right” and no one can improve upon them; rather the value is in the fact of improving upon a known start point. As with many new technologies, organizations that are newly embarking on knowledge management have much to learn very quickly. Inventing a taxonomy is a time-consuming process that requires many iterations and refinements. Few organizations can justify the time; and time spent up front on such tasks will lengthen time to delivery of real business results. Organizations save time and money, and progress more quickly to realizing leverage from organizational knowledge, when a basic taxonomy is readily available. Starting from a blank sheet of paper is not as productive. Organizations can more easily break out of traditional “stovepipe” thinking by using such business patterns as the foundation of the taxonomy. This has proven to be a good area for invention to give way to reuse and evolution.

## Mechanisms and Tools

Mechanisms for knowledge management are modeling and abstraction techniques that capture such business constructs as:

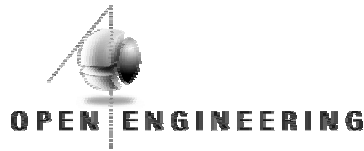
- Business processes and workflow (i.e. key business verbs like selling, producing, etc.)
- Business events that are or should be measured and managed



- Business actors, resources and the ideas represented by key business nouns (i.e. business parties, agreements, production capacity, market volatility)
- Relationships between actors, resources and other business concepts
- Relationships between business events and business verbs and nouns (i.e. what events result from, cause, indicate or prevent which business processes from occurring)
- How does the business think of some things as being types of (specializations of or variations on) other things?
- How does the business describe the roles that parties and resources assume in business processes?
- What facts are or should be retained about business nouns, verbs and events?
- What constraints (i.e. business rules) does / must the business place on any of the above items?
- What is the structure of organizational authority and visibility to information, control of processes, decision-making power, etc., and how does this reflect on access to and security of organizational knowledge?
- What is the logistical structure of an organization, including its customers and suppliers? How does that structure impact resource availability, workflow and delivery of products/services?

There are a number of ways to model the above. How models are visualized is less important than the semantics and interrelationships that structure the models (often called the “meta model”). Structures for managing taxonomies have been applied to real-world knowledge capture problems for more than a decade. Any business pursuing strategic value from organizational knowledge will evolve their mechanisms over time. Supporting such change requires flexible modeling and repository tooling so that those responsible for establishing the taxonomy and maintaining the references to and information about organizational knowledge can reconfigure the tools as needs change. In addition, change management practices and tools will be required – and must be integrated with the modeling and retention tools.

Significant leverage can also be gained by integrating the above tools used to model taxonomies and business concepts with group discussion management technologies. Some of these technologies are email and document based; and others emulate Internet news groups with the addition of features to link subject matter across discussion groups. This kind of technology is available from a variety of vendors, and if properly integrated with the organization’s knowledge



taxonomy, will simplify the tracking and capture of business policy making. At its best, these tools will allow non-technical and business users to capture crucial business rules and reasoning through the simple medium of electronically-hosted discussions.

The “solution” to knowledge capture and management is not found in one single technology or product. Existing technologies can be integrated to accomplish these tasks, and new products that offer new options and opportunities continue to become available as well. Beware of shrink-wrapped knowledge management products. Implementing knowledge applications across an organization requires a broader solution—with methods for labeling, capturing, representing, and sharing knowledge.

## Applying Knowledge Strategically

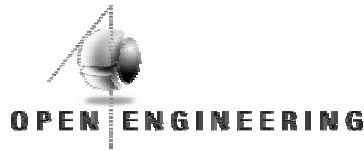
“Every organization operates on a Theory of the Business, that is, a set of assumptions as to what its business is, what its objectives are, how it defines results, who its customers are, what the customers value and pay for... what is an opportunity can only be decided if there is a strategy. Otherwise there is no way to tell what genuinely advances the organization toward its desired results, and what is diversion and splintering of resources.”

— Peter Drucker, *Management Challenges for the 21<sup>st</sup> Century* HarperBusiness, 1999.

Next steps in strategically applying knowledge

<b>Deploy a Knowledge Portal</b>	to foster communication of, collaboration with, and evolution of business knowledge
<b>Use business strategy as a filter</b>	to focus on mission-critical knowledge management activities
<b>Identify measurement points</b>	for business processes, events, and other constructs to quantify progress towards desired business strategies
<b>Generate key elements of the business and the strategy</b>	as a set of software components, which are drawn from the

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### ***Knowledge Portals***

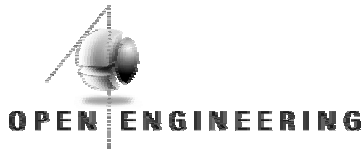
Corporate intranets utilizing data warehouses and data marts have given users new capabilities to identify, capture, store, retrieve, and distribute information from internal and external sources. These points of information aggregation have evolved their own names: “enterprise information portals” or “knowledge portals”. These portals take internal company information, (such as data in legacy systems, enterprise resource planning systems and client/server applications), put it a searchable Yahoo-like taxonomy, and make it accessible via a Web browser.

Getting such an enterprise view is of enormous value to individuals and teams trying to move business strategies forward. A shift away from information systems as a group of isolated "programs" addressing discrete disciplines and toward a ubiquitous information "environment" which can become a fundamental component of the working milieu in every business and social institution<sup>1</sup> is at least partly behind the projected growth in the corporate portal, which is forecasted to be a \$15 billion industry unto itself by 2002 (from \$4.4 billion in 1998).

Business strategy is best expressed, captured and reviewed by those who develop it: the business management and executive team. This requires tooling that non-modelers can use in the context of developing the strategy, that can serve as both a strategy capture and performance measurement platform, and that maintains “behind the scenes” mapping between the business person’s expression of strategy and the structures in the meta model. Such tooling does exist, and has been used successfully in a variety of organizations internationally.

A shared knowledge repository is an essential tooling element. The repository is used to deploy and maintain the knowledge portal, support a wide variety of dissemination and automatic code generation requirements, and interface with and populate corporate information system repositories such as those available from Computer Associates, Microsoft and others.

### ***Critical Performance Measures***



A variety of performance measures are critical to quantify progress toward desired business strategies. It is not sufficient to address basic measures such as costs, cycle time, quality, customer satisfaction and budgetary measures. Root causes, changes of direction and the rate of change also have to be addressed. Utilizing a knowledge portal, performance measures can become an integral part of strategies, organization, processes, activities, functions, individuals, teams, products, markets, materials and other entities.

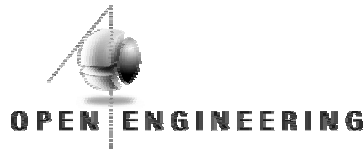
Performance measures for projects are also very critical. Invariably we spend a lot of time defining and justifying projects but almost never go back to find out and communicate whether a project delivered its intended outcomes. Corporate best practices can arise only by objectively comparing and sharing the results of projects. It is often as important to know and share why a project failed as why one succeeded. Following a simple but well thought out process that addresses both issues and outcomes, and takes into consideration the external and internal factors that influence the formulation and implementation of strategies can produce remarkable results. Some useful measurement techniques are:

- absolute statistical measures
- comparison with best practices
- functional metrics
- changes over time
- industry benchmarks
- deviation from expectations
- current or expected status
- relative value rankings
- feedback from satisfaction surveys of relevant constituents

### ***Strategic Business Components™***

The shift away from centralized information systems for planning and control to distributed, Internet-enabled, collaborative, *component-based systems* is giving companies the tools to rapidly deploy the above measures and much more. As software components, business processes and supporting data capture can be integrated and reengineered as needed. Knowledge portals, software components, middleware, and corporate intranets/extranets make collaboration around evolving business knowledge possible.

By capturing strategic knowledge and performance measures in a shared knowledge repository, Strategic Business Components™ can be automatically generated to enforce business



rules, update process changes, and cull information in real-time from operational business systems to check alignment with a company's strategic plans.

Furthermore, by providing a business-accessible means of integrating legacy information systems, Strategic Business Components can enable solutions to such business needs as:

- content integration for electronic service delivery
- application integration to enhance customer service
- mass customization

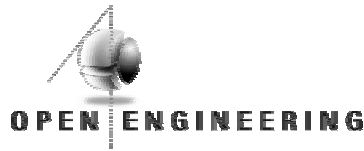
### ***Performance Measurement Dashboards***

Using strategic business components, the overall mission and performance of an organization can be represented on a dashboard to provide a quick, real-time, high-level view. Dashboards can be created that reflect the model of each business area, and track performance to plans. These dashboards can be linked to the knowledge portal, allowing operational and strategic knowledge related to performance measures to be readily examined by interested parties.

## **Implementing this Vision**

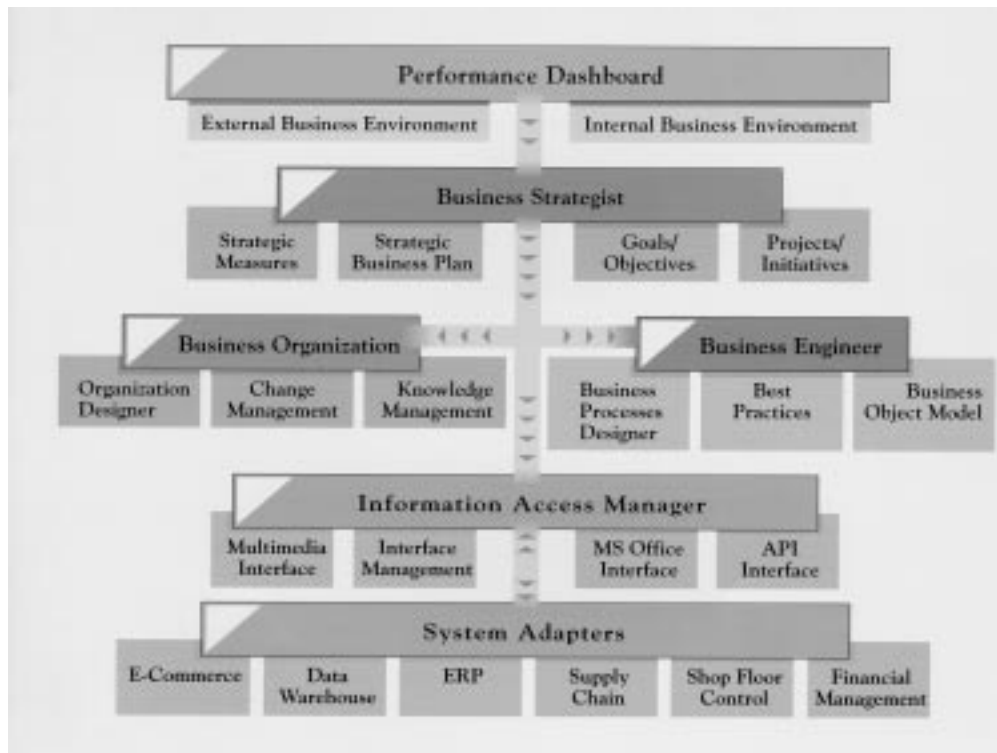
Strategic knowledge broadly available within an organization can empower people at all levels to perform better and faster. This empowerment can be achieved by deploying a set of business practices and technologies that focus on the integration, capture, sharing, and re-use of information, knowledge, and the expertise held within the organization and among partners, suppliers, and customers. Ideas and plans can be captured, shared, and turned into measurable processes and concrete actions. Strategic plans can become active components of the operational business in a distributed, strategic collaboration and reinforcement environment. This vision can enable large, complex companies to communicate, reinforce, implement, and evolve their visions and strategies.

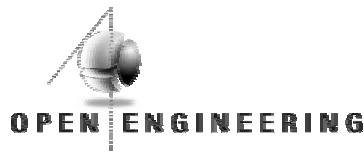
The vision of strategic knowledge management described in this white paper can be fully implemented using the set of logical software components outlined in the figure below. Business strategy is captured using the Business Strategist component. Organizational and operational models are captured using the Business Organization and Business Engineer components. Real-time operational information is captured from legacy information systems using Strategic Business



Components that utilize the Information Access Manager and System Adapter components. Finally, performance measures are extracted and reported using Performance Dashboard components. All of these components are integrated into a knowledge portal and kept in sync with the evolving business using a shared knowledge repository.

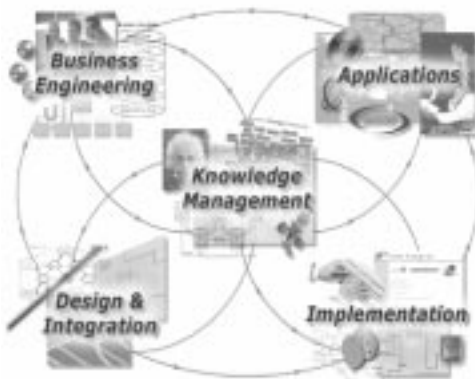
Through a collaboration environment linked with the knowledge portal, business team members are actively engaged in reviewing and commenting on the strategic plan, dialoguing on its impact to their roles, organizations, and core business processes. As the plan and new process designs evolve, team members are notified about changes that impact them. Perhaps more important, the collaboration environment makes it easy for individual team members to relate their achievements to elements of the strategic plan and get recognized and noticed for those contributions, helping to make the strategic intent part of the emotional fabric of the operational business.





## Enabling Methods and Technologies

**Object-Oriented Business Engineering™ (OOBE®)** consists of an integrated set of methods, techniques, tools, and best-of-practice business object patterns. The OOBE process includes development and use of an enterprise architecture to engineer a business to be better positioned for 21st century growth opportunities. The OOBE framework provides the taxonomy



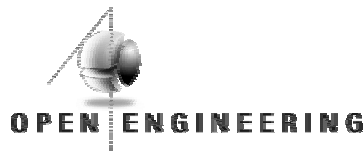
essential to successful knowledge management. In an OOBE engagement, the Enterprise Strategist and Ptech FrameWork tools are used to share and evolve corporate knowledge. These tools have the ability to present knowledge using a corporate intra- or extranet, enhancing communication and collaboration between architecture, design, strategic and operational business teams.



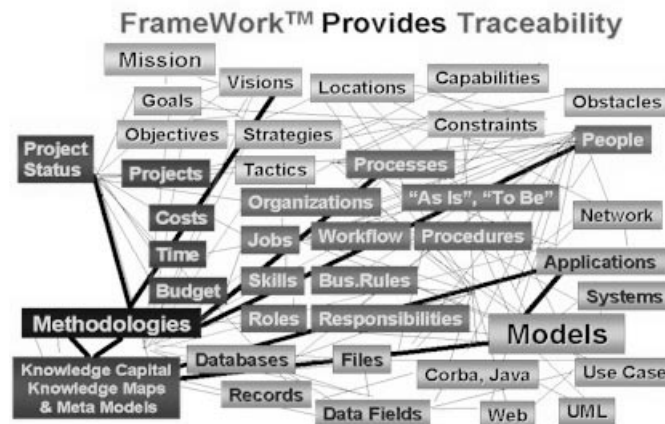
**Enterprise Strategist™** is the first knowledge-aided planning and decision software that helps businesses manage the knowledge, integration, and performance of their enterprise. For decades, businesses have invested billions of dollars in the pursuit of these goals with no real results beyond the limited scope of point solutions.

Today, by enabling a company to capture, communicate, measure, and dynamically change their strategic processes and plan, Enterprise Strategist truly empowers executives, line managers, and employees. The Enterprise Strategist software from OEI partner Enterprise Software Inc., provides a powerful and unique environment to enhance strategic business thinking and measure strategic performance. OEI has integrated the knowledge captured in and reported through the OOBE Ptech FrameWork with Enterprise Strategist, allowing executives to use its rich analytical capabilities. Enterprise Strategist's performance measurement capabilities are also readily integrated with Strategic Business Objects generated from Ptech FrameWork to track strategic and operational business performance.





**FrameWork™** from Ptech is Open Engineering's modeling, prototyping, and code generation tool. FrameWork™ is the most comprehensive, object-oriented, knowledge-based process modeling and prototyping environment on the market. FrameWork offers out-of-the-box support for modeling strategic plans, organizational structures and capabilities, competition, and performance metrics. Ptech FrameWork embodies an extensible meta model that conforms to the Object Management Group's Meta Object Framework (MOF) specification. It supports UML and IDEF styles of diagramming, and



can fully integrate with standard corporate repositories such as Platinum and Unisys's UREP. Using OOBE in Ptech FrameWork, a business professional can generate a prototype application from an object business model to show how data and workflow would look in a re-designed distributed object business process, and how business rules would be enforced to ensure data and process integrity. A developer can prototype deployment of distributed business objects in a CORBA, Java RMI, or WWW distributed environment to obtain rapid feedback and can generate production code for rapid implementation of business object servers and components.

## Conclusion

To achieve the goals of the "new business" — or simply to grow and prosper by any chosen strategies — organizations must keep their shared knowledge available, timely, accurate and usable at all times by all players. Vision, mission, strategies, objectives, measures, must all be tied to comprehensive and correct operational data. Systems supporting operational data and workflow must accurately reflect the process and conceptual structures of the business itself. Both the operational systems and those that deliver and maintain organizational knowledge, as well as the organization itself, must become agile enough to change apace with fast-evolving best practices, markets, business innovations and customer expectations.

<sup>1</sup> The Delphi Group Report, "Enterprise Portals Shape Emerging Business Desktop," 1/26/99. The Delphi Group, Inc., Boston, Mass.