Lotus

White Paper

Lotus, IBM, and Knowledge Management

January 1998

A Lotus Development Corporation Strategic White Paper

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Executive Overview

In today's fast-changing global markets, success is no longer tied to the traditional inputs of labor, capital or land. The new critical resource is inside the heads of employees: knowledge. What a company knows — and how it leverages that knowledge — has never been more essential for success. Suddenly, it seems, everyone is talking about "knowledge management."

Knowledge management is the new industry buzzword.

But knowledge management is nothing new. It's a different label applied to something that Lotus has been working on for years: how best to help people share and leverage their expertise. It's no accident that the companies at the forefront of this "new" discipline — companies like Buckman Labs, Monsanto Life Sciences, Andersen Consulting and British Petroleum — have chosen Lotus Notes as their knowledge platform. Frankly, we wish we'd thought of the term "knowledge management" ourselves. It's more exciting — and more descriptive of what we do — than "groupware."

Lotus customers have been "doing" knowledge management for some time.

Terminology notwithstanding, we've learned a lot over the years about how to succeed at knowledge management. For one thing, many companies try to do too much. We've found that the biggest payback comes when a company maps its knowledge management efforts — its knowledge strategy — to a key aspect of its business strategy. For most companies, that means focusing on one or more of the following four areas:

Knowledge management seems to have some common critical success factors.

Innovation — Finding and nurturing new ideas, bringing people together in "virtual" development teams, creating forums for brainstorming and collaboration.

Responsiveness — Giving people access to the information they need when then need it, so they can solve customer problems more quickly, make better decisions faster, and respond more quickly to changing market conditions.

Productivity — Capturing and sharing best practices and other reusable knowledge assets to shorten cycle times and minimize duplication of effort.

Competency — Developing the skills and expertise of employees through on-the-job, online training, and "distance" learning.

Specific business goals — innovation, responsiveness, productivity and competency — lend themselves well to knowledge management activities.

Lotus Notes enables each of these critical knowledge management solutions. Notes provides a single infrastructure — a foundation on which a company can build, integrate and link all of its knowledge management applications. Notes *is* the knowledge platform.

Lotus Notes has been a powerful platform for solutions in these areas.

But even a great knowledge management system will fail if no one uses it. Much has been written about the challenge of getting people to share knowledge and change their long-held behaviors. We've learned that people will share what they know and reuse the know-how of others if you *make it easy for them*, and if you *make it worth their while*. We've also learned that knowledge is often as much about *who* you know as it is about *what* you know. By integrating our insights into our products, and working closely with IBM to extend and deepen our solution set, we're helping to ensure that good knowledge management is the norm for our customers, not the exception.

Lotus has learned much about how to make its products more likely to contribute to successful knowledge management efforts.

Knowledge Management: The Next Big Thing?

It is difficult today to pick up a business or technology journal without coming across some mention of knowledge management. This new — or recycled — discipline is being hailed as the next "big thing," perhaps the biggest thing since reengineering. The skeptics among us might note that *big* is often better for management consultants and technology vendors, who can capitalize on the trend, than for their clients. Yet, a cursory view of the literature, not to mention the conversations that we at Lotus have had with our customers, suggests that this excitement may actually be warranted.

Even so, there may be cause for cynicism. Like the other technology and management fads that preceded it, knowledge management is often described as a panacea. It's not. But cutting through the noise and clutter to get to the "so what" can be a challenge.

Many executives with a genuine interest in this discipline are left with more questions than answers after listening to the latest explanation of just what knowledge management is. Sometimes the discourse is more about knowledge itself than business strategy, the solutions suggested are too broad in scope for practical action, or the focus is too narrow (usually the misdemeanor of a product vendor). Still, many executives continue to search for a cogent argument in favor of launching a knowledge management effort — an effort that promises to consume significant fiscal and human resources.

So, it is with an appreciation for the reader's healthy skepticism that this paper examines knowledge management, not from the standpoint of academic theory, but rather with an eye toward the practical, achievable business benefits of successfully deployed or practiced knowledge management That is, what lessons have we learned from our experiences on the front line? And how can a company incorporate those learnings into its own knowledge management efforts?

The Basics of Knowledge Management

The vocabulary and concepts of knowledge management are becoming well known. The same words and notions regularly appear in any knowledge management text or speech. (We provide a list of recommended articles, papers and books in an appendix to this paper.) Some general themes and consistent elements have become evident.

- We hear that knowledge travels through a process that transforms it from tacit (that is, locked inside the heads of information systems, databases and the heads of employees) to explicit (captured and packaged in reusable and searchable form), and back to tacit, where it is learned and used by others throughout the organization.

- We are constantly warned that knowledge management is as much cultural as it is technological, that a culture that does not foster and reward sharing of knowledge cannot expect technology to solve its knowledge challenges.

- We hear the refrain that successful knowledge management depends on the commitment of top management.

- And interestingly, we hear the name Lotus Notes in conjunction with almost every successful knowledge management effort.

Now, resisting the temptation to claim the knowledge management scepter for Lotus, it is worthwhile to examine why Notes is an integral part of these successful efforts. We believe that Notes is an ideal platform for knowledge management because it does two things extremely well. First, it lets people collaborate in ways that add business value. Second, it helps people capture and categorize knowledge and make it available to the rest of the business to leverage.

We believe that the status of Notes as a common underpinning for many, if not most, knowledge management successes gives Lotus a credible perspective on this new business trend not shared by other technology vendors.

Lotus has earned a credible voice in the knowledge management world.

Although Notes is a key part of many successful knowledge management efforts, not every user of Notes achieves the same degree of benefit. Lotus is conducting ongoing research into what factors lead to success, and we will continue to incorporate these insights into our products and services. Knowledge management has become a driving force behind Notes.

*Knowledge management has become central to Lotus products and services strategy.*

# The Lotus Knowledge Management Framework: Structuring the Problem

Companies gain the most from knowledge management when they map their knowledge *activities* to sharply defined *strategic goals*. Lotus and IBM's Knowledge Management Framework identifies four basic business goals that lend themselves to improvement through knowledge management: innovation, responsiveness, productivity and competency.

Innovation. In businesses characterized by rapid technological changes and compressed cycle times, innovation is often the primary source of sustained competitive advantage. The challenge for many companies is bringing employees together across the boundaries of time and geography to brainstorm, share ideas, and co-create new products and services.

> **Innovation**
> **Chat**
> **Brainstorm**
> **Conference**
> **Network**
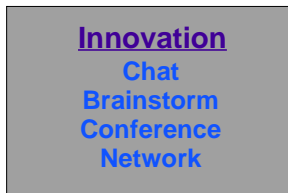
Innovation has been a key objective of collaborative technologies for many years, although most electronic discussion groups veer off course and produce few measurable results. By structuring collaboration to achieve specific objectives or to resolve issues, knowledge management tools drive group interactions beyond the basic interactivity of discussion forums.

Responsiveness. Decades of technology investments have helped companies build systems that manage well-known and well-understood business events. But today's business environment seems to present more unanticipated events — such as the recent turbulence in the Asian financial markets, dramatic changes in technology, or the sudden appearance of nontraditional competitors — for which traditional information technology is necessary but insufficient.

> **Responsiveness**
> **Problem solve**
> **Strategize**
> **Coordinate**
> **Mass customize**
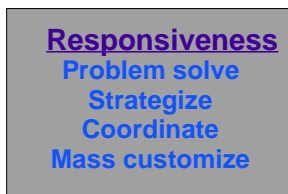
Knowledge management technologies often confer the greatest benefit when they simply help a company sense weak signals and to respond to them by marshaling its human and information resources on an as-needed basis to respond effectively to unexpected events. By identifying the "who, what, where and when" a company can quickly coordinate its activities in response to customers and events. In some instances, a company can "mass customize" its existing assets (both physical and intellectual) by tweaking them to meet specific customer needs.

Productivity. A common lament of executives is "we don't know what we know." Employees are forever re-creating the wheel, failing to leverage learned lessons, best practices and expertise that exist elsewhere in the company. Most knowledge management efforts concentrate on effectively documenting, cataloging and distributing such corporate knowledge assets so that the left hand can learn what the right hand is doing. What organization wouldn't benefit from tapping the expertise and knowledge that resides in its individuals and systems for use in everyday decisions? Or from reusing the knowledge created in one business process in another business process altogether?

> **Productivity**
> **Reuse**
> **Discover**
> **Optimize**
> **Mine**
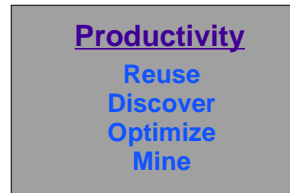
Clearly, productivity depends on how well the knowledge created by individuals and groups can be captured and packaged for reuse by others inside (and outside) the company. More than that, however, knowledge management technologies must provide individuals with the tools to discover and mine corporate knowledge that has already been created. Once people find the corporate knowledge assets they need, they can improve upon those assets by applying them to new processes and problems.

Competency. A company that wants to remain competitive must develop its people — both new hires and existing employees. New hires need to learn not only new skills, but also "how things get done around here." To do so they read as much as they can, get "on the job" training, uncover resources through browsing the corporate web, enroll in a course of study, and even apprentice with mentors and other colleagues. Just as important is building the skills and expertise of existing employees. Anything a company can do to support and accelerate such learning is successful knowledge management.

> **Competency**
> **Read**
> **Browse**
> **Study**
> **Apprentice**

Knowledge management tools and techniques can enhance the discovery and delivery of critical information and training to employees, so that a company can continually improve the skills of its people as a regular part of doing business.

The Lotus Knowledge Management Framework

When we examine these four strategic goals, it becomes clear that they are a function of two dimensions: collaboration and organizational scale. Together, these two dimensions form the Lotus Knowledge Management Framework — and the full domain of knowledge management solutions. Let's look at each dimension more closely.
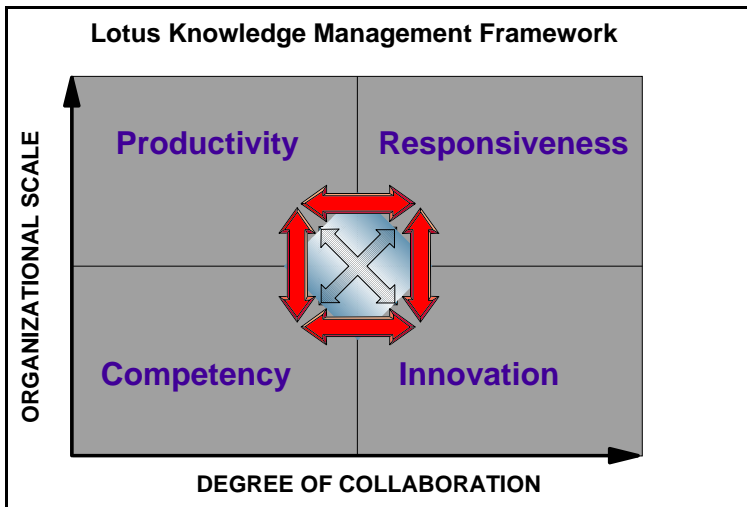
Collaboration. The process of creating, sharing and applying knowledge involves varying degrees of collaboration. Some knowledge activities, such as individual learning (competency) or reusing well-defined best practices (productivity) require *some* collaboration, though perhaps not much. In these activities, employees are more likely to find knowledge resources in documents and databases, rather than through interaction with coworkers. Of course, the degree of collaboration varies *within* a sector itself: an instructor-led course is more collaborative than, say, browsing the Web (even though *both* are competency-building activities). In general, activities related to competency and productivity are relatively low on the collaboration scale overall.

By contrast, knowledge activities related to innovation and responsiveness are much more collaborative. For example, brainstorming sessions (innovation) and strategy planning meetings (responsiveness) are usually highly interactive, involving multiple people. They rank higher on the collaboration axis.

Lotus Knowledge Management Framework

ORGANIZATIONAL SCALE

Productivity — Responsiveness

Competency — Innovation

DEGREE OF COLLABORATION

Organizational Scale. The second dimension of the Lotus Knowledge Management Framework is scalability — that is, the extent to which knowledge management activities and output can be leveraged throughout the organization. Competency building and innovation typically occur on a small scale, at the individual or work group level. For example, people may attend conferences, workshops and training sessions to improve their individual competency; however, what they learn is not easily accessible for use throughout the organization. It is not *scalable* knowledge. Only when the output of individual learning or an innovation is packaged for reuse can the results be leveraged throughout the organization. A company can only perform well in the productivity and responsiveness sectors if it reuses knowledge assets created by individuals or groups and leverages those assets on an organizational scale. For example, in resolving customer problems, a productive organization's help desk might reuse a knowledge base of previously answered questions. It is important to remember, of course, that scale does not necessarily imply a finite limit. Knowledge management is often successful when it is applied *across* and *beyond* organizational boundaries.

This framework implies some interdependencies among the sectors. Without competent individuals, innovation, productivity and responsiveness are difficult to achieve. Similarly, innovation, productivity and competency are prerequisites for responsiveness. To extend the help desk example, a responsive organization might dip into

communities of experts to resolve problems that have never been seen before. To be responsive, the help desk staff need to be more than merely plugged into a repeatable process, they need to be able to leverage the competence and innovation of the organization at large.

At the same time, these sectors are not *wholly* dependent one another. A company doesn't need to reach knowledge management perfection in the competency sector before it can begin tackling innovation and productivity, or achieve excellence in all three before it can become responsive. *There are modest, practical investments a company can make in any sector that can have appreciable returns in the near term.* These investments do not presume complete knowledge management success within the other sectors. Lotus has identified some of these "quick hit" opportunities and has built solutions around them, which we will discuss in a later chapter.

So, how does the Lotus Knowledge Management Framework help a company map its knowledge strategy? One of the vexing characteristics of the entire field of knowledge management is its broad purview: it is difficult to know where to start, and when — if ever — to declare victory. The strategic sectors of the Framework serve as a beginning.

For example, one leading consumer products company competes on product innovation. It must have a constant flow of new "killer products" in its development pipeline to stay ahead of the pack. While the discipline of brand management is well inculcated into staff (through significant investments supporting individual competency) and the methods for manufacturing and managing supply chains are well documented in best practices (heightened productivity), the firm is well aware that the speed with which it introduces new products (innovation) is what gives it a competitive edge. This company chose Lotus Notes as a knowledge platform because of its ability to foster innovation through collaboration (idea generation, sharing) among parties who cannot easily gather together in conference rooms to brainstorm.

The Lotus Knowledge Management Framework provides a useful tool for helping the executive team think about knowledge strategy in the context of how a company competes. The Framework also helps business people communicate with information technology staff about key objectives and tradeoffs, since almost every company will have to decide where its most immediate knowledge management opportunities and need for improvement exist.

Accommodating Organizational Culture

Knowledge management as a discipline has the greatest chance of succeeding when companies apply it to a specific strategic business goal. Of course, concerns about the role of organizational culture remain. Do companies succeed at KM simply because their cultures support sharing and reusing? Will a company without such a culture find itself making massive IT investments in a fruitless pursuit of knowledge?

That depends. True, the relatively few KM successes in today's market typically reveal more about a company's cultural preparedness for knowledge management than about the virtues of any one technology. But our real-world experience suggests that technology *can* offset or even overcome some cultural disinclination towards knowledge management. In fact, most companies are *not* hostile towards sharing. Sharing is just not built into the way people work. People share all the time — in the hallway, on the phone, via e-mail, etc. But it isn't systematic. Even though technology can capture all that *tacit knowledge* in a database, the onus is on the employees to input it. But without an incentive — without making it a natural part of the way a person works — employees are unlikely to comply.

Designing Technology to Overcome Barriers

The key is to explicitly design technology to overcome — or at least offset — these human barriers. For example, if you asked employees to keep their resumes up to date so everyone would know where to find needed expertise, chances are they'd let that slip on their to-do lists. But, if the price of entry to a valuable discussion group was that an employee had to submit an updated resume, well, they would probably do that without a second thought. *The immediate reward more than compensates for the effort required.*

Similarly, an employee might regularly save documents to a database without ensuring that everyone is made aware of what was saved and where. But if the system made some simple demands — for key words, categories, etc. — chances are she or he would be happy to comply. And if the system could do a lot of the "housekeeping" for the employee, like refreshing the taxonomy, deleting old/obsolete material, updating a skills/expertise document, then even better. When knowledge management technology is designed with an understanding of human behavior, employees are far more likely to participate in the sharing and reusing of knowledge.

This is the focus of our product development. We are paying careful attention to what makes one document library thrive and another one fade away. What makes one group discussion directed and succinct and another spin off into tangents and irrelevance. How do basic knowledge management activities (e.g., creation of an expertise map) relate to other, high-end knowledge management solutions (e.g., a "war room" application to manage a crisis).

Moreover, we are taking our research findings and using them to enhance Notes as a knowledge management platform and to inform how we develop specific applications and services. Together, our platform, applications and services offer a capacity to deliver immediately beneficial and highly scalable knowledge management solutions that is unmatched in the industry.

Is KM technology successful only when a company has no cultural obstacles to overcome?

Lotus adds unique value to the knowledge management equation by incorporating an understanding of human behavior into its technology.

Users will always ask, "What's in it for me?"

Effective knowledge management technology anticipates natural human behavior, which is biased toward minimizing added work.

*Lotus and IBM are transforming insights into solutions.*

Real World Insights

Lotus and IBM's approach to developing knowledge management solutions is informed directly by the real world successes (and failures) of our customers. Below are four brief case studies of Lotus and IBM customers who applied Notes technology to specific knowledge management challenges linked to core business strategies. We describe them here not so much to demonstrate the current capabilities of Notes to enable knowledge management, but rather to show how Lotus is focused on learning real lessons about the requirements for success in knowledge management with Lotus Notes.

This section describes four knowledge management success stories and the insights that Lotus has gained from each.

Buckman Labs: Competency
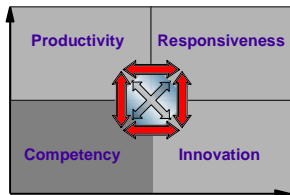
Buckman Labs is a leader in the specialty chemicals marketplace. The source of Buckman's competitiveness is its highly skilled employees. Therefore it is imperative for the company to continually train and educate its people on the latest industry developments and the businesses of their customers. Employees are incented to actively seek out continuing opportunities for competency development.

Buckman Labs depends on highly skilled employees to keep ahead in its market.

Like many companies, Buckman uses on-line training to augment employee education. This allows employees to study at convenient times without interrupting their business and personal schedules. However, Buckman has implemented its training courses in such a way as to maximize real learning. In addition to delivering courseware and other content, Buckman's on-line training is instructor led, which helps ensure that "students" are keeping up with the pace and the assignments. It includes interaction at any level the student desires: privately with the instructor, privately with one or more other students, or publicly with the entire class. The training courses encourage students/employees to work together on assignments. Buckman uses the competency development application for everything from new employee orientation to teaching the industry dynamics of a new customer.

Buckman's distance learning systems are instructor-led, interactive, and confidential.

Insights: By working together, Buckman and Lotus discovered that successful learning depends on several factors:

- student convenience (i.e., study as their schedule allowed)
- the presence of an instructor
- a high degree of interactivity
- and a degree of privacy and confidentiality to establish a level of comfort to promote openness and candor.

These lessons have informed Lotus' development of a Notes distance learning solution called LearningSpace.

Lotus has applied research on distance learning directly into a Notes-based solution called LearningSpace.

Monsanto Life Sciences: Innovation
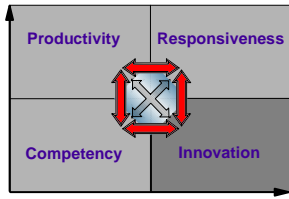
For Monsanto Life Sciences, a division of Monsanto Corp., business success is driven by innovative, value-added products that can be patented. The patent establishes a barrier to entry so the company can generate substantial profit margins on its products — such as Nutrasweet — for a protected period of time. For companies such as Monsanto that focus on innovation, substantial R&D investments are critical to success, even though many initial product development efforts will fail. The typical person hired by the Life Sciences division is highly educated, often a PhD, with contacts among scientists and researchers around the world.

Monsanto focused its knowledge management efforts on innovation by leveraging the talents of these highly skilled professionals. Using electronic discussion forums to help bring its people together to share ideas and brainstorm, Monsanto created fertile ground for innovation. What was Monsanto doing right with this technology, and why have discussions at other companies so often turned into nothing more than waste-lands or productivity sinkholes?

Insights: Lotus' extensive research shows that companies that consistently succeed at innovation follow a specific process.

- Team members generate as many good ideas as they can.
- They then select from those ideas the one that seems to be the most likely to succeed.
- Then they return to the idea generation stage, except they focus on good ideas about this one good idea.

We have also learned that discussions are more open and interactive when partici-pants are familiar with each other and when there is someone leading or in charge of the brainstorming session.

Lotus has applied this insight directly to its development efforts, and has dramatically improved the basic electronic discussion forum to make it less likely to be abused and more likely to result in innovations and real results. Enhancements to Notes discussion forums will allow participants to indicate their role, expertise and interest in the discussion and to "vote" for particular ideas or suggestions. Moreover, a new role of moderator keeps the discussion on track.

Andersen Consulting: Productivity
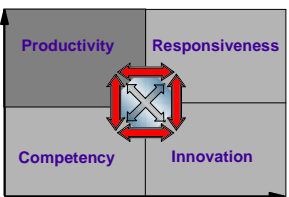
Management consulting firms are the poster children for knowledge management. More than in any other industry, the competitors in this field compete directly on the basis of knowledge: what do their people know, and how can they share it with their clients? It is no secret to any of them that the efficient creation and distribution of knowledge assets (analysis, best practices, lessons learned) is critical to their ability to better service clients and win new business. Like all of the leading manage-ment consultancies, Andersen Consulting has invested heavily in its knowledge management practices.

Monsanto depends on innovative products to generate profit and deter competition.

Monsanto has had better success with collaborative discussion forums than most other companies.

Good innovation follows a regular brainstorming "cycle."

Lotus has applied this new notion of a "discus-sion" to the next generation of its basic discussion database application.

Andersen Consulting has made the reuse and leveraging of lessons learned a corporate imperative.

Andersen Consulting understood that to make its knowledge repository useful and to keep it fresh, it would have to be more than a dumping ground of documents. Instead of looking like somebody's attic, it needed to look like a library — complete with librarians. Andersen spelled out specific job requirements for knowledge professionals. These employees are subject matter experts who cull through documents to ensure quality, relevance and currency. They make sure that documents are appropriately categorized and summarized. They make particularly worthwhile "gems" easy to find, and eliminate redundant or obsolete content. In this way, Andersen ensures that the company's most relevant and current knowledge is not only captured, but reused. Andersen has dubbed this role *knowledge integrator*, which is also referred to as a *knowledge steward* in some knowledge management literature.

Insights: Lotus has learned from the experience of Andersen and others that a knowledge repository is only as good as its ability to make good knowledge easily available. This includes:

- consistent categorization
- the surfacing of valuable content
- and the ongoing "uncluttering" of the library

Lotus has invested heavily in new features that make the categorization of documents automatic and almost transparent, and other features that promote or demote content based on how frequently (or infrequently) it is used.

British Petroleum: Responsiveness
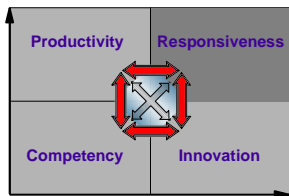
When British Petroleum constructs an oil production platform in the North Sea, it brings together the combined knowledge of its own experts and an extended community of construction subcontractors. BP understands that the complexity of these projects demands a massive coordination effort to avoid expensive delays. Project remoteness and unpredictability add further complications. One recent construction project brought together a BP office in Teeside, England, another office in London, a subcontractor in London, and another subcontractor in Aberdeen, Scotland.

BP used a Notes-based project management system that allowed each of the parties to contribute progress reports, to identify bottlenecks, and to quickly resolve hot issues (e.g., delays due to weather, emergency shuttling of employees to and from the construction site). Now, project management is not the equivalent of knowledge management. However, BP found that its Notes-based project management databases also served as a well-defined catalog of expertise. When an unexpected event occurred, BP used the roster of employees and contractors to quickly determine who should respond to that event (e.g., managers, geologists, finance staff, foremen, ferry services). What's more, BP found that connecting these "players" through video-conferencing often helped to establish familiarity and to take advantage of nonverbal communication among meeting participants. This "war room" approach allowed BP to resolve urgent issues quickly before they impacted a tight schedule by gathering the right people at the right time and by providing them with a medium to communicate with the least loss of information.

Insights. Two important aspects of knowledge management surface in this example. First, it is useful not only to have access to documents, but also to know who the right people are to include in a decision. An "expertise map" can be invaluable knowledge asset. Second, real-time collaboration significantly enhances the value of the shared knowledge of project participants. It engenders trust, communicates some information more fully, and makes consensus building faster. Lotus and IBM have applied the lessons of this successful use of Notes and real-time communication to new product development, including real-time collaborative capabilities. And the notion of expertise maps is the focus of a Notes-based project called Expert Network. BP's experience is also a good example of how knowledge management is not bound to a single organization, but in fact is of particular benefit when coordinating the efforts of multiple companies.

The thoughtful blending of real-time communications with traditional collaborative technologies magnifies the value of both.

A Vision for Knowledge Management

In each of the four cases described above, Lotus Notes served as the foundation for the companies' knowledge management efforts. Although these involved other critical success factors — culture, management support, and highly skilled staff — it is clear that Notes brings something unique to the knowledge management party. Lotus has learned much from these and other customers, as well as from our extensive research into knowledge and learning theory — and these insights are informing the our current product and service development efforts.

Lotus' vision as a company is based on the premise that connected communities shrink the world and that access to ideas expand the world. To deliver on this vision, Lotus and IBM understand that to remain at the forefront of knowledge management, we must continue to focus on solutions. Solutions, of course, go beyond features and functions. Our approach to knowledge management solutions is to deliver a powerful platform with advanced services and features, to create specific knowledge management applications built on top of that platform, and to provide services to help introduce and institutionalize knowledge management practices.

The Notes Architecture

To understand the value that Lotus brings to the knowledge management equation, it makes sense to identify the fundamental aspects of the Notes platform and how Lotus is extending that platform and building solutions and services around it. There are several basic aspects of Notes that naturally lend themselves to knowledge management.

Document database. All content in Notes — from reports to discussions to resumes — is captured in a document, a format that is familiar and intuitive to most users. This format is also useful because it helps put information in context, which for many is the definition of explicit knowledge. These documents can be managed so that users can easily find the right document at the right time. First, they are indexed for full text search. Second, they include user-defined fields (e.g., keyword, industry, topic area) so that a collection of documents can be sorted and viewed by meaningful criteria. Last, each document includes information on things like author, creation date, revision date, and size so that they can be managed and viewed according to these criteria as well.

Security. Knowledge sharing does not imply that all knowledge and all users are equal. Also, innovation and learning thrives when contributors and students can begin a thought or a question within a known and trusted community before sharing it more broadly. Notes security is flexible, so that different documents within a single database, or even different sections of a single documents, can be secured at a variety of levels. This function is essential because it allows the technology to map to the culture and dynamics of a group, a division, or an entire company.

Enterprise Integration. A fundamental goal of knowledge management is to leverage corporate data and information — much of which resides in transaction systems. Notes has long shown its value in combining its strength in automating business processes with the data management strengths of back-end ERP systems such as SAP, Peoplesoft, JD Edwards, Baan and Oracle Financials and data warehouses built on DB2, Oracle and other RDBMSs.

Lotus Business Partners have created countless business process applications (e.g., sales force automation, human resources, customer service, retail management, health care management) that tie into the back-end transactional systems. Notes has also been used to extend the value of off-the-shelf, third-party business process applications by augmenting them with messaging and with desktop productivity tool integration for tasks such as proposal generation. Notes gathers all sorts of data and information together in context, and puts that knowledge in action through collaboration, messaging and workflow applications.

Notes is not an island. Integration with other information solutions is central to its architecture.

Application development and deployment. Knowledge management is purposeless unless personal and organizational capital is put into action. Notes' infrastructure not only helps companies create, capture and share knowledge, but its application development environment allows customers to apply that knowledge to real business results. These applications are often best practices captured in automated workflows. For most Notes applications, the collaboration that occurs in them does not represent a fundamental change in corporate culture, but rather reflects or becomes a part of an employee's natural way of getting things done.

Notes applications move knowledge around so that it can be acted upon.

Notes is a single, unified infrastructure. As a *platform* for knowledge management, Notes gives an organization flexibility. It allows a company to begin knowledge management on a small scale and to grow that investment without constantly investing in separate, point solutions. It provides a company with a launch pad from which to respond to shifts in the market without having to start from scratch.

Notes is a single infrastructure — no assembly required.

Extending the Notes Architecture for Knowledge Management

With the insights Lotus and IBM have gained from research and customer experiences, Lotus is developing new features that are specifically designed to anticipate and overcome common cultural barriers to knowledge management.

New Notes features will make knowledge management more likely to succeed.

Search. There are two aspects of search that the next version of Notes will support. First, users don't always know the domain or the source of what they are looking for. That is, the "stuff" they want might exist in one or more Notes databases, on the public Web, in an e-mail message, and/or in a relational database. The search capabilities of Notes will allow a user to conduct a single search across some or all of these domains.

Notes will conduct a search on all documents opened within a specified time.

Second, users spend most of their search time looking for items they have already seen. That is, they know there was a piece of information that they have seen in the last day or two, but they can't remember *where* they saw it. Notes will allow users to search against all documents opened (Notes documents, Web pages, e-mails, etc.) over a certain period of time.

Content Map. Users frequently spend a lot of time just figuring out *where* things are before they even begin to think about *what* they are. That is, they need to have information put into context, alongside related documents. Notes will include a facility that groups documents together into logical "clusters" and then create a visual "map" that guides users through them. For example, a content map might include all the documents that have something to do with the development of a new drug, grouping them into "R&D" and "Clinical Trials" and "Government Oversight" and "Marketing" and "Competition."

Users will have a "roadmap" to guide them through different topic areas.

Headlines Page. Every professional is familiar with the daily flood of information — e-mail, Web pages, calendar entries, ongoing electronic discussions — whose sheer volume can reduce personal effectiveness. The next version of Notes will include a customizable headlines page that surfaces the most urgent and relevant documents to the user's desktop.

Notes will perform triage on incoming information.

Metrics. Today, Notes captures basic information from a document: author, creation date, etc. The next release will also capture the "living history" of the document: how many times has it been opened, who has opened it, when was the last time it was opened. This will give knowledge stewards the ability to more easily identify the gems and junk, and to build rules that automatically promote and demote (or delete) documents.

New usage metrics will give companies hard information on what knowledge is useful and what has grown stale.

Metrics will also help management identify which employees are particularly adept at sharing, creating, innovating and shepherding knowledge. This can be a useful tool in helping to introduce new incentive and reward policies.

Packaged Knowledge Management Applications

The Notes platform, as it exists today and with the above enhancements, is an enabling technology. In the proper context, it has been used profitably for knowledge management. Of course, many companies will benefit from a packaged solution that focuses on one of the key business strategies of competency, innovation, productivity and responsiveness. Together, Lotus and IBM have developed a set of solutions that are applied to specific knowledge management challenges.

Lotus and IBM are building packaged applications that support knowledge management goals.

LearningSpace is a tool for developing, deploying and delivering courses and for augmenting classroom training. In our research, it became clear that adult students do not apply themselves to a new course of study without some external stimulation, such as the presence of an instructor who defines — and grades — assignments. Therefore, LearningSpace course materials include not only a class schedule and links to readings, but also assignments and quizzes. We have also learned that learning is more rapid and complete when there is interaction between a student and the instructor, and among students themselves. LearningSpace encourages interaction through its facilitation of discussions among each other and with the instructor. Students work in teams and participate in public and private discussions. To help students "break the ice" and to foster interactivity, LearningSpace requires students to create a "home page" of information about themselves. Readers can learn more about LearningSpace, which is currently available, on the Lotus Web site: www.lotus.com/learningspace

LearningSpace is used for distance learning.

Domino.Doc. Domino.Doc is an application built upon Lotus Domino. It provides content management for any kind of object (output from word processors, as well as audio, video, etc.). Domino.Doc ensures that individuals and teams that collaborate on documents over a network are working with current documents, that they are working in context, that no unauthorized person has access to the documents, and that they will not be wasting time editing documents that are being edited by others in their workgroup.

People create, update and manage shared documents using Domino.Doc.

TeamRoom. TeamRoom is the next generation of a Notes discussion database that adds structure and direction, and was designed for teams that come together for a specific project that has a defined endpoint. Teams use TeamRoom to define a shared mission. TeamRoom is also a repository to store common information such as business plans, reports, procedural information and meeting minutes. It can be used for discussions, brainstorming, and problem solving. Used as a planning tool, it aids a team in focusing on critical issues prior to a meeting. It can also be used for task management, such as assigning action items, tracking issues, and managing joint work on reports or presentations. The TeamRoom application is currently available for download off the Lotus Web site (www.lotus.com/home.nsf/tabs/institute).

Lotus Institute designed TeamRoom to structure the team process — from forming and storming all the way to performing the task at hand.

In addition, Lotus is conducting research and development into a number of other knowledge management solutions, described below.

Team Network is a project under consideration that is designed to support the work of multiple teams who work in a similar field of practice and already share a relatively similar set of categories and concepts (e.g. client engagement teams in a practice area; product development teams working on phases of the same product). Team Network will also support managers who manage multiple teams and who need a rapid way to scan across teams to assess work status and flag urgent issues.

Team Network identifies relationships across multiple Teamrooms.

SolutionSpace is a Notes-based R&D project which supports continuous innovation in teams, departments and entire organizations. The project borrows from more than forty years of research into the process of innovation. For example, successful innovation seems to occur in groups that suggest many ideas at once, and then select the "best" from among these ideas. SolutionSpace accelerates the creation of new ideas. Solution Space reduces the quantity of content by archiving conversation threads automatically.

The SolutionSpace project is a discussion forum with specific features to aid innovation.

Expert Network is a set of tools and applications that Lotus is researching and developing to automate the generation of profile listings of individuals' expertise. These profiles can be used to create visual "social networks" that show connections and overlaps in interests, work history and expertise. This will enable large organizations to locate the right people to quickly respond to business opportunities.

Expert Network will generate a "map" of individuals' expertise.

Lotus and IBM Knowledge Management Services

The **Lotus Institute** is a Lotus R&D group whose mission is to create solutions to help organizations address broad business trends for optimal performance. These solutions are based on best thinking, practices and tool development pilots shaped by work with the Institute's affiliated partners, industry thought leaders, academic institutions and customers. Lotus Institute's unique, integrated expertise in areas of information technology, business process and organizational behavior inform our solutions research and development work.

Lotus Consulting has been helping Lotus' largest and most innovative customers accelerate business results from Lotus technology investments. With the largest dedicated Notes/Domino consulting team in the world, Lotus Consulting is involved in some breakthrough knowledge management engagements, ranging from innovation applications developed five years ago, which are still delivering competitive advantage, to the latest knowledge commerce communities, where packaged knowledge can be traded at going market values.

Lotus Business Partners are the source of most Notes-based solutions, from functional areas such as sales force automation, human resources and customer service to vertical markets such as banking, insurance, pharmaceuticals, manufacturing, government and education. Many of these solutions represent the state-of-the-art in knowledge management today, and Lotus is working closely with its Partners to foster specific knowledge management innovations and solutions.

IBM Consulting has a long history of working with large-scale customers to provide solutions in a wide variety of business problems. IBM Consulting brings vast expertise in multiple technologies, including groupware and Lotus Notes, and has been a pioneer in leveraging Notes and other technologies for knowledge management solutions.

Appendix — Suggested Reading

This white paper was written specifically to address the business value of knowledge management, and discuss the role of IBM and Lotus technologies and services. For a broader perspective on knowledge management, we recommend the sources below.

- In their book *Enterprise One to One*, Don Peppers and Martha Rogers provide a compelling argument for the need to create customer knowledge using technology. The authors discuss how to be responsive to customers and to develop a mass customization model.

- *The Knowledge Creating Company*, by Ikjiro Nonaka and Hirotaka Takeuchi, is the book that got the whole knowledge management movement going in the 1990s. A good place to start to cover the basics.

- *Competing For The Future*, by Gary Hamel and C. K. Prahalad, discusses in business terms the core concepts found in the Lotus Knowledge Management Framework: innovation, responsiveness, productivity and competency.

- *Jamming: The Art and Discipline of Business Creativity*, by John Kao, argues that competitive advantage can be found in the unleashing of the creative power of workers. It suggests that innovation activity requires a special form of semi-structured collaboration — like improvisational jazz.

- *Intellectual Capital: Realizing Your Company's True Value by Finding Its Hidden Roots*, by Leif Edvinson and Michael Malone outlines the process for developing, nurturing and measuring intellectual assets. It shows Skandia's first attempt in 1995 to provide to its shareholders an intellectual capital annual report.

- Thomas Stewart's work of a similar title, *Intellectual Capital: The New Wealth of Organizations*, makes a compelling argument that an organization's success will be determined by its ability to develop, measure and sustain its knowledge resources.

- *Working Knowledge*, by IBM's Laurence Prusak and Thomas Davenport, provides vivid examples of how companies are beginning to manage what they know through the creation of new processes, organizational roles and uses of technology. As long time consultants in this area they have a first hand look at what works and what doesn't. Prusak has also compiled an anthology of articles, *Knowledge in Organizations*, that discuss knowledge management from a variety of perspectives, including sociology, economics and management science.

- *5th Generation Management*, by Charles Savage, posits that the new enterprise requires processes for co-creation through virtual enterprising, dynamic teaming and knowledge networking.

- In his book, *Meeting of the Minds*, Vince Barabba, General Manager of Corporate Strategy at General Motors, argues that market leadership is attained by transforming information into shared knowledge, which then becomes embedded in core decision processes in the enterprise.

- Harvard Business Review has several articles that condense many of the knowledge management themes in the above titles. "A Note on Knowledge Management," by David Garvin and Artemis March, traces the history of the knowledge management practices of Andersen Consulting and of Ernst & Young. Both cases describe in detail the use of Notes as a technology foundation.

- Sloan Management Review published a series of articles in Summer 1996 that fall under the heading of knowledge management, including "Improving Work Processes," by Thomas Davenport, Sirkka Jarvenpaa and Michael Beers. The authors observe that "The most promising technologies for knowledge management are tools such as Lotus Notes or the World Wide Web." In the same issue, "Three Cultures of Management: The Key to Organizational Learning," by Edgar Schein, examines the clash of differing philosophies of management and its impact on knowledge management.

- The American Productivity and Quality Council (www.apqc.org), a non-profit trade association, has published its own white paper, *If We Only Knew What We Know*, which describes some of the knowledge management activities of four companies, including the use of Lotus Notes.

- The Ernst & Young Web site (www.ey.com/knowledge) has an impressive set of documents on knowledge management, including a number of case studies in which the use of Lotus Notes is mentioned.

- There are also a number of Web sites that serve as knowledge management clearinghouses, including the Business Researcher's Interest (Brint) web site (www.brint.com/OrgLrng.htm), the University of Texas at Austin (www.bus.utexas.edu/kman), Massachusetts Institute of Technology (learning.mit.edu) and the Stanford Learning Organization Web (www-leland.stanford.edu/group/SLOW).

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