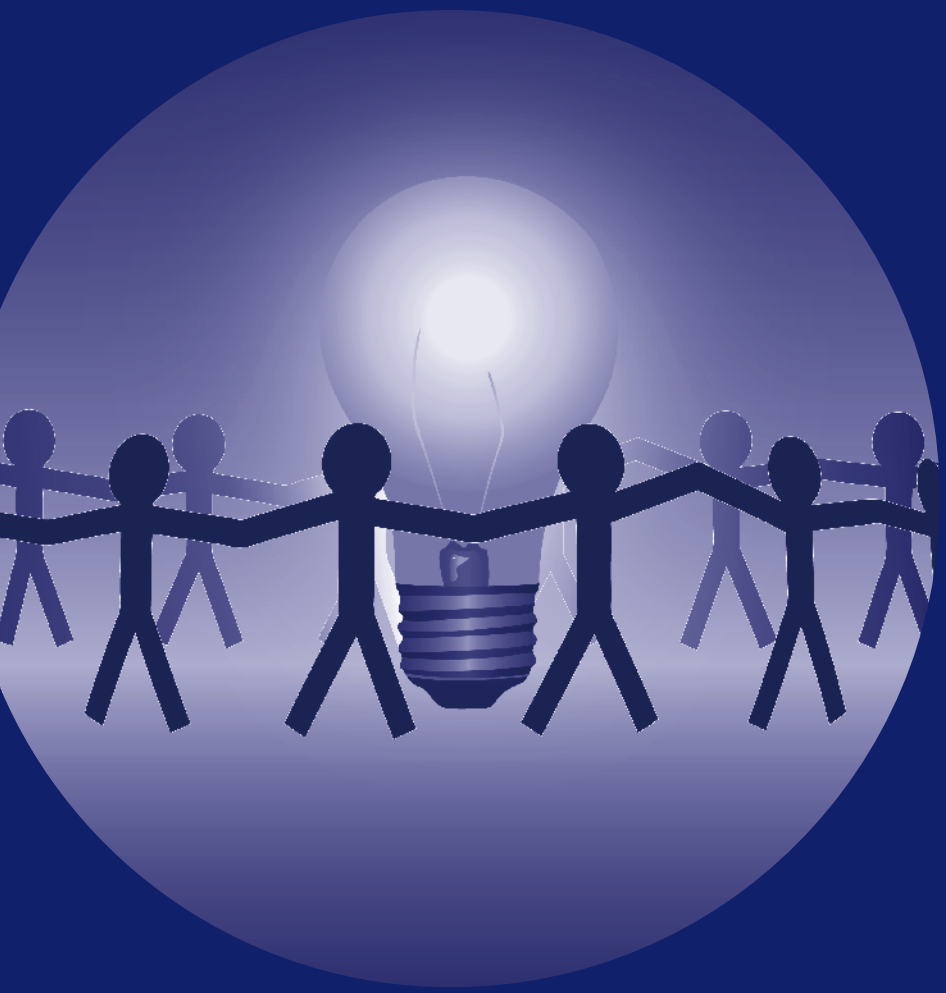
# Making Knowledge Work – The Arrival of Web 2.0

By Jon Husband and Jim Bair



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# Introduction

SINCE THE first *Making Knowledge Work* report was published in 2004, there has been an enormous amount of implementation of KM-oriented technology, both with respect to systems architecture and the integration of KM-oriented capabilities like enterprise search, taxonomisation, document management and such. One can also imagine the sheer volume of structured and relatively unstructured information that has been poured into databases and subjected to parsing, analysis, applications of metadata, etc., all over the world in companies large, medium-sized and small.

"Advanced technologies will continue to improve the transformation of knowledge, overcoming the limitations of language and the loss of context that inevitably occurs when knowledge is captured and stored. It is a simple truth that an expert can only interact with a limited number of people, so if that expertise is to be shared it must be represented in some form outside the expert's head.

The roots of KM are deep, going back to Stanford University in the 1960s. KM was born out of the vision that computing is for more than operational data crunching – it can enable each knowledge worker, team, organisation, enterprise or group of enterprises to act more knowledgeably in an increasingly complex universe. That vision is consistent with the future of IT: to continue to add value to enterprise computing, leveraging the huge investment firms have made in information technology. The next generation of IT will be KM, whether it is called KM or not."

Jim Bair's concluding paragraphs from the Executive summary of the 2004 edition of *Making Knowledge Work* were far-seeing – and it seems that the next generation of IT applied to workplace collaboration and productivity will carry forward the fruits of previous KM theory and implementation into an integration of Web 2.0 capabilities; collaborative platforms, wikis and blogs, instant messaging and unified communications, social networking analysis and visualisation of expertise, all integrated with enterprise security, versioning, archiving, search and retrieval.

The rebirth of knowledge management (KM) has given way through the 2001 bust and the emergence and growth of Web 2.0 to a growing wave of massive change in the enterprise IT market. Today information flows and sharing knowledge are the lifeblood of a knowledge-based economy, and the notion of collaboration is becoming the foundation of knowledge work. Knowledge has always been important to enterprises, but new drivers have made key aspects of KM a non-negotiable necessity: corporate governance and the new regulatory environment; the need for joined-up intelligence in response to terrorist threats, applicable to industry as well as to government; the increased multinational distribution of enterprises, especially in pharmaceutical research; and, outsourcing, not only of manufacturing, but also of service functions that require a high level of knowledge sharing.

Web 2.0 represents the emergence of technologies and applications that make KM easier and less expensive for the enterprise. Today the capabilities found in most Web 2.0 applications have been created for bloggers and web surfers (consumers) and have not (yet) benefitted

from significant integration with portals, secure integrated systems, databases and enterprise search engines, etc. However, this is changing very quickly, as we hope this report will show. The most recent releases of new collaboration platforms from the major vendors, the growth of SaaS and the refinement of workplace-targeted social software tools are clearly aiming at enabling, facilitating and supporting link-and-tag driven collaboration.

The field of enquiry, exploration, experimentation and increasingly, implementation, has come to be called Enterprise 2.0. For purposes of clarity and consistency we will use the term Enterprise 2.0 in this report to refer to the workplace environment in which social computing tools are integrated with KM programmes and information systems architecture. We will augment that term from time to time with reference to 'social computing'. Social computing tools are increasingly integrated with the existing KM architecture for capturing, storing and handling information and knowledge. Once adopted, social computing will evolve into a new knowledge work ecosystem of databases, enterprise search, security and collaborative capability known as Enterprise 2.0.

The discipline of sharing knowledge has been disrupted by the arrival of Web 2.0. Now Microsoft, IBM Lotus, other major players and a string of start-ups are aiming for corporate 'power to the people' in the form of Web 2.0 software. But can any system managed by the masses be truly effective in the enterprise?

Enterprise-oriented social computing platforms and applications designed for collaboration are claiming they provide what knowledge management systems haven't: easy and secure storage, retrieval, and sharing of valuable documentation within an organisation and around the internet.

But for enterprises, and particularly hierarchical ones not used to open participative work processes and culture, the 'wisdom of the crowd' and the use of 'folksonomies' ('organic' taxonomies generated by users tagging information and knowledge) suggests a knowledge management system gone mad. IT departments have spent the past decade and much money creating infrastructure and systems such as taxonomies to classify documents across the enterprise. While these taxonomies might have been static at times, at least they provided consistency.

Folksonomies are more open and flexible than the information-organising systems that preceeded the new and emerging era now called Enterprise 2.0. For example, earlier rigid hierarchies and less open existing software can make it tough to stimulate employee involvement within the enterprise. The Enterprise 2.0 products that enable folksonomies may not be mature, though recent research into semi-structured tagging showcased at KMWorld 2007 by PARC researchers seems promising. The domain is undergoing rapid development and integration of functionalities (the ease of combining or 'mashing-up' applications is a key characteristic of the fast-emerging environment). Context and filters are still all-important, and Web 2.0 has brought their use further into the mainstream processes of knowledge sharing.

Human issues such as resistance to sharing have long been used as an excuse for mediocre performance in the technological field. But the value of KM is supported by many case studies showing positive returns. We believe that retaining some key aspects of traditional KM is necessary to addressing the always-present problem of resistance to change.

That said, technological advancement and integration has overcome a major performance issue. The integration of the three KM technology families below allow the enhanced collaboration ushered in by Web 2.0 capabilities to emerge:

- Connectivity technology, enabling communication and collaboration across time and space;
- Technology focused on capturing, storing and organising information, to represent knowledge so that it can be re-used at different times and in different situations;
- Information-retrieval technology that overcomes semantics by matching the knowledge needs of the user to that which is stored in the knowledge base or experts.

Today's Enterprise 2.0 layer of functionality typically sits on top of the older technology layers in enterprises. When orchestrated as a single system, the resultant KM-oriented architecture will more effectively meet user needs, supporting the enterprise communication network by connecting people with expertise and stored information whilst also enabling the free flow of exchange, discussion and dialogue essential to the social construction and use of knowledge.

More confusing than the dichotomy between 'old' technology and 'new' is the incredible span of applications that stake a claim to the Enterprise 2.0 domain. These include wiki and blog software applications that promote forms of unified communications, but also knowledge and content management tools, RSS-feed capabilities, mash-ups, e-learning, search, social networking, CRM, and telepresence. Even seemingly far afield technologies like shipping expense management software want to be a part of the next wave, and will bill themselves as 'Enterprise 2.0' ready.

There will be more and more cases outlining the architecture of the integration between existing infrastructure and deliberately-acquired Web 2.0 capabilities aimed at supporting collaboration and other KM-oriented functions such as effective retrieval, business intelligence, compliance and so on. What was orthodox KM five years ago is giving way to a landscape where much of the vision of KM will be embedded in work design and the supporting systems, and specialised more intricate and sophisticated technology will continue to develop in specific niches and from time to time migrate into widespread use.

We have synthesised the fundamental knowledge management (KM) orientation of the 2004 edition of *Making Knowledge Work* with the fast-growing understanding that the growth of Web 2.0 collaboration-related software over the past five years will render a reasonable portion of the traditional KM discipline overly formal. Much of the basic KM functionality identified in the earlier report was related to assumptions about more stable structures for using knowledge. However, it's clear that the dynamics of social computing combined with new functionalities like tagging, web-based collaboration and improvements in ease of use are enabling massive change to the ways knowledge is built, distributed and used.

So ... in this edition of *Making Knowledge Work – The Arrival of Web 2.0* we've worked at keeping the fundamentals for understanding the discipline and traditional approach of KM intact in this report whilst weaving in changes where appropriate to point out and explain, in context, impacts stemming from Web 2.0 and its counterpart Enterprise 2.0.

*En route* to the above status, most enterprises and organisations now will have an integrated IT architecture that is aligned (tightly or loosely) with its business processes. They will also be in a process of becoming acquainted with the participative and collaborative forces of the movement of social computing referred to as Web 2.0.

Emerging strategic technologies are those that hold potential for significant impact on the enterprise in the next three years. By significant impact we mean factors that suggest a real possibility of disruption to IT or the enterprise, requirements for significant investment, or the risk of being late to the market. We see several areas where IT developments and the arrival and growth of Web 2.0 are likely to have large impact on enterprises wanting to increase their ability to use and benefit from information and knowledge.

## Social software

The Enterprise 2.0 product environment stemming out of the application of Web 2.0 capabilities to enterprise collaboration and productivity will keep on changing. It's early days now and we believe there will be more new applications and services, much product innovation and more start-ups, and consolidation and convergence amongst large vendors and traditional collaboration vendors. It seems clear now that social software technologies will become mission-critical as the main form of support for collaborative work practices. We see the four following areas of development as especially important.

**Mash-ups and composite applications** – In another three to five years we think web mash-ups will be the main way composite enterprise applications are created. Mash-up technologies will evolve and grow in both ease-of-use and sophistication during that period of time. That evolution and growth should be a key consideration when evaluating how mash-ups have impact and when developing an enterprise mash-up strategy.

**Web platforms** – Software as a service (SaaS) is here to stay. Enterprises should assess how and where service based delivery may provide value over the next several years. Web platforms are emerging whereby users can get direct access to infrastructure services, information, applications, and business processes. These are beginning to be referred to as cloud computing environments. More and more of what we know as IT capabilities and services will be delivered over the web, and enterprises should be considering this seriously, not pretending it will not happen.

**Real World Web** – 'Real World Web' refers to information from the web being useful and used for locations or location-based activities in the real world. It does not replace reality but adds the utility of a service or better richer information to a given real world activity. Typically that information or utility is available when needed and is not something that has been stored for eventual use or archived. There will be more new and pertinent application, new business logic and new sources of revenue streams, and real improvements to business process that will come from discovering what's useful, how best to use it, and how to retrieve or distribute it.

Dion Hinchcliffe says something important in the 'State of Enterprise 2.0' article, 22 October 2007 in the online magazine *ZDNet*. He comments on an industry that is in the course of a full transformation ... the world of workforce productivity, learning and collaboration

of 2007. Knowledge management – the deliberate labeling, indexing and categorising of content in taxonomies, and making knowledge objects easy to find, retrieve and use – is rapidly, for the most part, being subsumed in the application of Web 2.0 capabilities and principles inside business and government enterprises. And so we quote him at length:

"Up until recently, the lack of mature Enterprise 2.0 products, good case studies, and feedback from early experiences that successfully dealt with some of the challenges that these frequently disruptive and occasionally subversive tools introduced. This immature state of affairs was often holding back even corporate pilots of highly promising candidate Enterprise 2.0 technologies such as enterprise blogs, wikis and even mash-ups …

It has become clear that we're moving out of the early pioneer phase to a broader acceptance phase. From the production side, a brand new analysis indicates that the business social software market will be nearly $1 billion strong this year and over $3.3 billion by 2011. In these and other ways, such as the growing collection of success stories, Enterprise 2.0 has arrived.

The big question for many of those on the fence now is: (1) Do we now have the right capabilities in terms of ready Enterprise 2.0 products? And (2) Do we generally understand how to apply them properly to obtain good returns on our investment in them?

Knowing the answers to both questions will almost certainly tell us if we're ready for mainstream adoption of adoption of Enterprise 2.0 any time soon."

This report gives new meaning to the term 'hot off the presses'. The above quote is from 22 October 2007 and outlines very clearly the struggle we have gone through in updating the 2004 version of this report for the impact of Web 2.0. While we (the authors) have been watching this phenomenon coming and growing for the last several years, it is just as of October 2007 beginning to reach a tipping point in terms of awareness and initial attractiveness. More and more case studies roll in and as all of the major software vendors are now gearing up to compete in this new more interactive, more dynamic and self-organising environment broadly called social computing for the enterprise.

The truth is that technology is marketed in categories that do not necessarily reflect the underlying functionality. Knowledge of the market segments, the technologies they include and the vendors that position themselves in each category can aid product selection. In keeping with our focus on maintaining a connection with the traditional areas of focus for knowledge management, we have retained the ten KM market segments outlined in the 2004 report, and updated them in terms of how Web 2.0 capabilities have improved or extended functionality: text search plus; portals plus; information aggregators; ontological designers; knowledge aggregators; collaboration products; knowledge synthesis; visualisers; information architects; and, hybrids.

The 2004 report identified three tiers of KM vendors, based on the quality of technology, products, service and business performance, offering products in one or more of these segments. The top-tier vendors have continued to develop, acquire and extend functionality into collaborative platforms, are reliable and have established infrastructure and business processes that guarantee execution. They are, of course, often more expensive and their use can create dependencies and lock-in. The

second tier includes both smaller companies that are higher risk and larger vendors that have offerings tangential to core KM. Many of the smaller vendors, including start-ups, are worth consideration because their innovative technologies can better meet user needs. We have also created a section that identifies and discusses new factors and influences, like mash-ups and recent consolidations or partnerships or analysis.

At a higher level, there are two overall trends here. Most of the features found in collaboration tools today are heading into integration with infrastructure of the horizontal players (Google, Yahoo, Microsoft, IBM/Lotus), or else becoming features inside other industry categories (enterprise search software for example).

We believe we're about to see the same pattern we saw with enterprise applications a decade ago: the rise then fall of stand-alone applications followed by a second wave rise of suites that synthesise the functionality from the stand-alone applications (often aided by consolidation). In the social software space, applications will fuse together to become suites, then both of those configurations being consolidated into larger vendors.

Given the events of the last three months (August, September and October 2007) in the Web 2.0 and Enterprise 2.0 world, it looks like a reasonable forecast.

# Executive summary

THE PRINCIPLES and concepts of knowledge management (KM) have had a lot of impact over the past decade, even though many organisations have been slow to adopt formal programmes. Evolving over a period of more than 30 years, KM became popular in the late 1990s and generated dozens of conferences, magazines, books and consulting programmes related to making it more useful and practical.

Then the investment market collapsed around 2001, interrupting IT innovation and causing many vendors to withdraw KM as a significant part of their market position. But the vendors kept producing products and customers continued achieving investment returns. In addition, what we know today as Web 2.0 began to grow in scope and impact, and in the past two years we have seen key elements of the technologies and capabilities that comprise Web 2.0 migrate into the processes of knowledge work, spawning a domain of experimentation and implementation that is now termed Enterprise 2.0.

Never before has there been such a need for creating, sharing and making knowledge useful – the core of what has been termed knowledge management. And never before have the conditions for doing so been more encouraging and more complex.

New drivers apparent in 2004 have made KM a necessity, such as corporate governance and the new regulatory environment; the need for joined-up intelligence in response to terrorist threats, applicable to industry as well as to government; the increased multinational distribution of enterprises, especially in pharmaceutical research; and, outsourcing, not only of manufacturing, but also of service functions that require a high level of knowledge sharing. To those critical issues we can add the growing flood of digital-era knowledge workers entering the knowledge-based workplace and the rapidly-growing 'ecosystems' of connectivity and collaboration that, as outlined in Gary Hamel's book *The Future of Work* (released in September 2007) will require organisations and managers everywhere to develop "a new formula for management that resembles Web 2.0 rather than 19th century thinking."

He makes a central point about the massive changes to the definition and design of knowledge work today and its ramifications for the near future:

"Looking forward, though, there's every reason to believe that the internet will change the work of management just as thoroughly as it's changed every other facet of commercial life. Why? Because the internet is an immensely powerful tool for multiplying human accomplishment – a goal that is central to the work of every manager and the design of every management system."

Knowledge management is one of those systems to which he refers, and the emergence of Enterprise 2.0 offers the connectivity and (both synchronous and asynchronous) sharing capabilities that support true collaboration that KM theory has always called for. Happily for the field of KM, the 'layer' of collaboration-enabling connectivity and the ability to create and iterate composite applications for knowledge workers to use to solve business problems with the use of information and knowledge that Enterprise 2.0 enables is complementary to existing corporate IT architectures.

Designing and implementing ways to use ongoing flows of information to construct useful and increasingly 'just-in-time knowledge' is now more practical than ever. It is based on the marriage of traditional structured KM, the flow-based sharing and the weaving together of fragments of knowledge pulled from databases, enterprise search, and the minds of knowledge workers. Today's knowledge workers are increasingly engaged in collaboration-oriented conversations online, whether using the company's intranet or the web.

The identification and ordering of a company's existing knowledge assets and objects – and the recognisance that tacit knowledge must be engaged in order to be useful – are still critical to effective knowledge work. But we are now facing a volatile and shifting mix wherein those responsible in organisations for effectiveness must seek to encourage re-use and leverage of existing knowledge whenever and wherever appropriate whilst also stimulating and facilitating the construction of useful knowledge to support the critical need for responsiveness to dynamic market conditions. Hence we strongly believe that the ways knowledge work is to be managed must undergo fundamental examination with a critical eye.

This revised edition of the 2004 report retains much of the traditional KM methodologies and advice about the implementation of KM programmes, as especially in the interaction of people and new technology it is critical to be disciplined about finding and sharing information and then use social computing to construct and put knowledge to use.

The value of KM has been supported by hundreds of case studies showing positive returns. The difference between information and knowledge is an issue that frequently comes up, and it is indeed important, but seeing how KM adds value to information enables enterprises to leverage existing resources. Users have been quietly dealing with the inconsistencies of PC-based desktop computing, while the web offered tantalising usability which has recently burst into more tangible practical reality. Web-based portals have removed many access barriers to enterprise information.

We maintain, though, that it is necessary to apply core KM principles to help knowledge workers improve the process of stitching fragments of knowledge together in order to make useful sense of the 'infoglut' that is a constant feature of today's workplace landscape. Our list of value propositions lays down the gauntlet, showing what can be achieved if technology is focused on turning information into knowledge. Our 'value wheel' connects detailed efficiencies at the desktop, traditional productivity improvements and increased sharing to strategic competitive advantage.

Human issues have long been used as an excuse for mediocre performance in the technological field. But technological advancement has overcome a major performance issue, that of the integration of the three KM technology families:

- Connectivity technology, enabling communication and collaboration across time and space;
- Technology focused on capturing, storing and organising information, to represent knowledge so that it can be re-used at different times and in different situations;
- Information-retrieval technology that overcomes semantics by matching the knowledge needs of the user to that which is stored in the knowledge base or experts.

KM-technology architecture combined with the ease-of-use and flexibility of tools and services derived from Web 2.0 more effectively meets user needs. The resulting system supports the enterprise communication network by connecting people with expertise and stored information. KM promotes the organisation of information into useful taxonomies and new more flexible (and often user-generated) structures, enabling navigation across heterogeneous information bases. It also helps in overcoming the critical semantic barrier. Indeed, significant advances have been made to overcome language ambiguity. We define such advanced functionality as inter-personalisation, semantic networks, structuring unstructured information and managing social networks, all of which help in overcoming the semantic barrier.

The truth is that technology is marketed in categories that do not necessarily reflect the underlying functionality. Knowledge of the market segments, the technologies they include and the vendors that position themselves in each category can aid product selection. The ten KM market segments are: text search plus; portals plus; information aggregators; ontological designers; knowledge aggregators; collaboration products; knowledge synthesis; visualisers; information architects; and, hybrids.

There are three tiers of KM vendors, based on the quality of technology, products, service and business performance, offering products in one or more of these segments. In addition, vendors often partner to achieve more useful functionality. Of course, the safety of a product purchase is critical – not only whether it will work, but also whether the company will be around to support and improve it. The top-tier vendors are reliable and have good products. The second tier includes both smaller companies that are higher risk and larger vendors whose core focus has not been (or has only recently become) collaboration and the construction of useful knowledge. Many of the smaller vendors, including start-ups, are worth consideration because their innovative technologies can better meet user needs.

A strategic vision of collaboration-based knowledge work and organisations' IT architecture is necessary to encompass the multitudes of perspectives that exist in such an innovative and evolving area. We have found Nonaka's model of KM to transcend traditional, linear thinking. This model is a spiral rather than a process, illustrating how knowledge is transformed from the tacit state in a user's mind, to explicit sharing. This builds applicability and/or meaning in social processes (referred to as social computing). Knowledge is captured where appropriate for re-use by an enterprise's knowledge workers in support of responsiveness, learning and innovation.

Advanced technologies will continue to improve the transformation of knowledge, overcoming the limitations of language and the loss of context that inevitably occurs when knowledge is captured and stored. It is a simple truth that each knowledgeable person can only interact with a limited number of other people. Thus, if knowledge is to be shared it must be accessible and shareable and so must be represented in some form outside of knowledge workers' heads.

The roots of KM are deep, going back to Stanford University in the 1960s. KM was born out of the vision that computing is for more than operational data crunching – it can enable each knowledge worker, team, organisation, enterprise or group of enterprises to act more knowledgeably in an increasingly complex universe. That vision is consistent with the future of IT: to continue to add value to enterprise computing,

leverage the huge investment firms have made in information technology and support the necessary transformation from industrial-era management.

The next generation of IT will be KM-focused, whether it is called KM or not. Managing intellectual capital and enabling the human dynamics that create useful knowledge in social processes is as important as data processing and has the potential to transform the competitive landscape of business and government.

# Biographies

## Jon Husband

Jon Husband is a recognised expert on social software and how it is increasingly making an impact on knowledge work and the networked workplace. He carries out ongoing research into the changing nature of business strategy, organisational structures and work design in the interconnected Knowledge Age.

Jon has been a banker and a Senior Principal for Hay Management Consultants in Canada and the UK. His consulting focus involved work design, organisational design and organisational change initiatives for major Canadian and multinational companies.

Since the late 1990s Jon has also worked as an executive and knowledge management thought leader for several small hi-tech companies. He is currently a co-founder and SVP of a leading blogging/Web 2.0 software company. Over the past several years he has offered workshops or seminars with Athabasca University's Executive MBA program, the CIO Summit in Toronto, at the Banff Centre's Leading Innovation program, and for groups of consultants and researchers in Canada and western Europe.

He writes several blogs about social software, new media and the growing presence of the web in business and our daily lives, and is an active speaker in Canada and internationally about the web's growing impact on enterprises.

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## Jim Bair

Jim Bair, Senior Vice President, Strategy Partners International, has over 30 years of leadership experience in the computer industry including executive positions, board directorships and company founder. He has been the keynote speaker at conferences around the world, receiving numerous awards, and consulted to the largest enterprises and most innovative vendors. As Research Director, Gartner Group, he was responsible for Knowledge Management (KM) technology and founded the KM practice. He has co-founded the Cooperative Systems Consultancy, Knowledgen, Inc., Qumana Software, Inc. and held senior management and technical positions at Xerox, Hewlett-Packard, and Bell-Northern Research. In the 1970s, he was a Senior Scientist at Stanford Research Institute, serving on the team that invented the mouse, hypertext, and windows. He has published three books, chaired several conferences, published over 70 research papers, and delivered keynote speeches on five continents. He has consulted to over 100 enterprises including Microsoft, IBM, Bank of America, PricewaterhouseCoopers, Siemens and AT&T. He has been quoted in numerous professional publications and been interviewed on national television in England and the US. He is Adjunct Professor and Advisor to the Syracuse University School of Information Studies.

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