



The Knowledge Between Us
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Preface: The Equation of Value

Three concepts serve as this essay's foundation:

1. We are an undeniable part of the technology that connects and sustains our personal and professional lives. Consequently, to improve our information systems, we must understand the relationships between the people that built them. In short, the systems are a mirror of those relationships.¹
2. The second principle, in abbreviated form, is an understanding of the fundamental difference between a commodity-based economy (19th and early 20th century) and an information-based economy (late 20th century): in an information-based economy, the value of a piece of information is increased when it is shared, rather than hoarded.
3. The third foundational theorem is based on Metcalfe's Law: that every node on a network increases the value of the network to which it is added, where every phone adds to the usefulness of the phone network, and every accurate fact adds to the value of the library in which it is housed.²

This "equation of value" implicit in these principles suggests that organizations are nurtured by systems that connect them in meaningful ways.

This essay examines the essential knowledge that exists between our institutions and organizations, knowledge that can best be harvested through the creation of teams and systems that are designed to exploit (rather than limit) cross-institutional collaboration, allowing us to share what we know with others that may benefit from it. These multi-enterprise collaborative environments, or "multi-prise knowledge networks"³ offer a range of cultural, economic, and civic benefits that offer exceptional potential for growth in the coming years.

We will identify three fundamental errors in the growth of the existing Knowledge Management industry, and propose behavioral alternatives that contain, within them, the key factors that could lead to a "second era of knowledge management" in the

¹ For an expanded examination of this analogy: "The System is a Mirror: Turbulence and Information Systems," Stuart Robbins, 1995, Association for Computing Machinery.

² I have been challenged to address the extension of Metcalfe's Law to libraries, when a poorly organized or mismanaged library system might decrease in "value" as new items are added to it, however, I maintain that the cultural value (the act of adding works to the library, as an institution) is explicit but can be impacted, as all things, by inadequate human response to that value.

³ Dr. Romesh Wadhvani, June 12, 2001.

information age. We will identify the significant relationship between the use of knowledge technologies and innovation, and how these theories of innovation could be applied to our current socio-economic environment in a manner that could enrich our understanding of the role of technology in our lives.

Finally, in response to new global and federal initiatives on Capitol Hill, we will introduce the concept of a “digital multiplier” to address our knowledge plague known as the digital divide, and explain how a cooperative framework for knowledge-sharing will enable our knowledge economy to bridge – for people – what we have not been able to accomplish with technology alone.

1. Defining the Undefinable: What is Knowledge?

For complex issues, I prefer the simple descriptions.⁴ During the design phase of our data warehousing initiative at Synopsys five years ago, we elected to market the terminology of our CIO’s “Ladder of Business Intelligence” which I, later, found so aptly defined by Davenport and Prusak in Working Knowledge: How Organizations Manage What They Know.⁵ As we did at Synopsys, they define their terms in graduated stages:

DATA -> INFORMATION -> KNOWLEDGE

Data, in its simplest terms, is best defined as individual facts stored in databases, one element per field in a table. An example would be a street address. By itself, unrelated to any other pertinent data, it is just a number combined with some words.

However, when you relate that piece of data to another individual element – for example, my name - the two facts combine to form *Information* about me. By itself, unrelated to any additional pertinent information, it is nonetheless just a name and an address, one of millions. However, when you add a third element of information to the two previous pieces – that I have a five-year old son, you begin to intuit a great deal about me. Knowing who I am + where I live + the fact that I have a young son allows you to postulate many things about me (i.e., buying habits or personal concerns). If you, too, are a parent of a young child, you add what you know (your personal experience) to what you have learned about me, and you can begin to develop *Knowledge* about me, actively deduced in your effort to comprehend the data/information you have been given.

Davenport and Prusak rightly emphasize that the central element which differentiates knowledge from data or information is the role of the human mind in its formulation: knowledge is something we actively and organically create, nurture, and provoke. It is not simply the overlapping of three related pieces of information that allows you to know

⁴ I have implemented knowledge management systems in numerous companies with modest results and am, therefore, humbly and thoroughly familiar with how difficult it is to explain ourselves, when we talk about institutional knowledge.

⁵ Thomas Davenport and Laurence Prusak, Working Knowledge, Harvard Business School Press, 1998. pp. 3-5.

a great deal about me from a small bit of text. Rather, it is your own intelligence and reasoning at work.

Our intellectual wrestling match with the information invests it with meaning - it is this invested meaning that best describes the alchemy of knowledge.

That alchemy – an understanding of human knowledge and its relationship to other disciplines – is not an invention of Silicon Valley. Indeed, the hubris that has been prevalent in the “Knowledge Management” industry excludes a much broader framework from which to understand knowledge, and define it in meaningful ways.

Knowledge did not suddenly become an asset during the past twenty years, as we entered the computer age and as our economies entered the information-based era. Knowledge has been a fundamental aspect of most cultures’ value systems for centuries, and some of the best metaphors – serving to underscore and elaborate upon the central themes of this essay – are distinct from recent technology advances.⁶

Human knowledge has many categories: analytic, scientific, phenomenological, empirical, hermeneutic, self-reflective, professional and technical. The discussion of its qualities and composition has been central to the history of philosophy beginning with Emmanuel Kant, followed by Hegel and Marx and Habermas, and continuing today.

It is a broad and remarkable discipline.

To exclude that historical discussion from an effort to define “knowledge,” even in an institutional context, is understandable: few of us can confidently embrace these immense concepts and themes of the philosophy of knowledge, and yet, it has been a substantial error in judgment on the part of an industry that is based squarely in its midst.

We must, even if only in reference, acknowledge that this complex discipline is relevant, and our (admittedly minor) efforts to create useful taxonomies or design reliable methods for the navigation of technical and business information are only a small part of that history.

Rather than overlooking the historical discussion (of which we are the latest variation), we should understand that the commodification of information (an economic stage of

⁶ The Memex, proposed by Vannevar Bush, “As We May Think.” *The Atlantic Monthly*, July 1945: The Director of the Office of Scientific Research and Development penned a visionary article in 1945, in which he proposed a series of possible new “inventions” based upon the work of more than six thousand scientists whose work he coordinated during the war. While many of his notions have become legendary and revolutionary products in the modern era, one of the most interesting is the Memex, Dr. Bush’s name for a “desk” that had many of the features needed today in a technology-based office, with flip-top computer terminals, database access points, fingertip tools automating many of the worker’s daily tasks. This furniture that enables remote access to information (so similar to the most recent efforts of IDEO and Steelcase to design the optimal workspace) is the essence of an information-based approach to office/work.

development) and the automation of selected data sets (a technological stage of development) are steps in that evolution of knowledge, and that any definition of KM terminology, therefore, must include these fundamental considerations. In much the same way that current NASA research is based upon aerodynamic principles prototyped at Kitty Hawk, our technical efforts to create usable and leverageable knowledgebases on the Internet are solidly rooted in the history of information management, traceable to Dewey's decimal system and the library sciences that have been the framework of the non-digital world of knowledge management for decades.

Error #1: Our exclusion of our "knowledge heritage" has been an essential error that has handicapped our capacity to build artful and useful knowledge management products.

Therefore, any successful definition of institutional knowledge (the sum of corporate experience, intellectual assets, data/information frameworks, technical expertise, customer profiles⁷), is best served by comprehending our current solutions as a cycle in the evolution of humankind's ongoing effort to master the world around them – our dictionaries, encyclopedias, databases, and search engines, and our capacity to use them effectively in our professional and personal lives. Only then can we concentrate upon definitions that are meaningful, yet targeted in scope.

2. Defining the Impossible: What is Management?

The *management* of institutional knowledge is never a simple task because it involves people.

Unlike the elements of metadata in our databases, or the transactions in our ERP systems, the comprehension of that data-to-information flow that creates knowledge is necessarily human in dimension, that alchemical transformation in which the primary catalytic agent is an individual's intellect.

Since it is the value added by people – context, experience, and interpretation – that transforms data and information into knowledge...the roles of people in knowledge technologies are integral to their success.⁸

And yet, this fundamental role of people in the creation of systems has been, on the whole, unaddressed by Knowledge Management vendors and system integrators, during the past decade. Millions of dollars have been spent configuring a variety of software features, yet little attention has been paid to the key business processes that must be transformed for the benefits of KM initiatives to deliver their promised return-on-investment projections.

KM is really about people interacting with people...This isn't about installing one-size-fits-all software and waiting for the magic. This is about understanding the complex and often very subtle ways that groups of people interact and

⁷ Doug Kalish, "Knowledge Management Across the Enterprise," Scient Corporation, 1999.

⁸ Davenport and Prusak, p. 129.

collaborate when pursuing a common goal—and designing processes that better support such interactions.⁹

Once again, this second error of omission is quite understandable.

Technology companies would much prefer to develop new algorithms than new ways of talking to people. IT consultants are frequently more adept at data analysis and schema design than they are in the subtleties of organization development, decision-making processes, and conflict resolution. And executives are more inclined to invest money in systems that can be capitalized (purchased) or expensed (leased) than they are inclined to confide (to outside parties, or even to their own employees) their company's inadequate inter-departmental cooperation, or the fact that the senior management team does not communicate well with vendors, partners, or customers.

The issues cannot be separated. The correct KM solution must involve the key components of an institution: the people, as well as the systems they build and the data they gather. If the systems are viewed as troublesome, it is a reflection of the broken relationships in the corporate structure – and to improve those systems (and improve the quality of information contained within them), you must start with an effort to improve the relationships between the people who construct, support, and use those systems.

There are many factors that lead to dysfunctional relationships within hierarchical organizations – it is beyond the scope of this monograph to identify an inclusive list. Most certainly, one of the core factors underlying the entire list of “enterprise problems” is the issue of trust: how it is established (or not), nurtured (or not) and embedded, in our corporate cultures and in our tools. People trust people, not the technology that exists between them.¹⁰

There are many reasons for the absence of trust within and between our institutions:

- Key values – the heart of corporate culture – are not established early in the development of the institution
- Companies believe that moving at “Internet speed” is good reason for under-emphasizing clear communication with employees, customers, and partners
- Confusion between policies regarding legitimate concerns for privacy, intellectual property, and “unique advantage” spreads into areas of potential collaboration
- “Breach events” (broken agreements, layoffs, missed expectations) are not addressed candidly and directly
- Sophisticated management of workers’ very human concerns are beyond the reach of inexperienced executive teams until a crisis (breach event) occurs

⁹ Sheldon Laube, CEO, Centerbeam. “On the Beam – May 2000”

¹⁰ Batya Friedman, Peter Kahn, Jr., Daniel Howe, “Trust Online,” Communications of the ACM, December 2000, p. 34-35.

Error #2: It is not possible to create IT systems to enhance collaboration in an environment that does not nurture collaborative behavior. The systems, alone, will not elicit change. There must be direct and constant intervention, at every level of the organization, in the ongoing growth of a “knowledge culture.”¹¹ A knowledge culture is a culture of trust. That culture, fueled by senior executives (who practice what they preach¹²) and driven by cross-functional teams empowered to utilize matrixed methodologies, is threaded by values that encourage the sharing of institutional data-information-knowledge, rather than the hoarding of those critical assets. That knowledge culture, enriched by candor and rigorous thinking, replaces individual ego and win-lose competitive strategies with a tapestry of insight that is created by the people who thrive in such an institutional culture and seek, in each task and project, to embody the principles of the knowledge culture throughout the extended enterprise

Undue secrecy between partners, win-lose negotiating, and an insistence on exclusive supplier/partner relationships characterize outmoded industrial-economy thinking.¹³

KM vendors and system integrators have not addressed this fundamental and very human behavior, and many are unskilled or unwilling to do so. This second error of omission has severely limited the ultimate value of KM systems, and that diminished value propels itself (self-fulfilling prophecy) as does any unaddressed prejudice, diminishes the value of a piece of information embedded in an inadequate system or framework.

A knowledge culture, reflected in the IT systems that mirror its values and processes, increases its value every day. It is the essential element – the heart and mind – of an information-based economy.

There are well-documented success factors for any major IT project, and the absence of any one of these can become a barrier to that success. The root cause of most project failures can be traced, not to the inadequacy of the software or the inability of the system integrators to properly configure the systems, but to the incapacity of the teams and organizations to properly adjust their business practices to accommodate the methodologies being introduced into their workplace. This chasm, between the application functionality and the business processes it should enable, is a failure of leadership.

It is a people problem, not a technology problem, and it begins at the executive level.

3. A Framework for Community

¹¹ McKinsey Quarterly, “Creating a Knowledge Culture.”

¹² It is worthwhile to note that the issue of “Trusting Technology” (Ibid.) identified many factors that bear upon creating and maintaining trust in eCommerce, including well-documented studies of tools which nurture trust more than others, yet none of the scholarly articles identify the key role that the institutional leaders play, by embodying the principles, or undermining them.

¹³ Donald Tapscott, Digital Capital, p.178.

One effective response to this problem, for any system implementation, is to create (if one does not already exist) a pluralistic framework for decisions within companies and between teams – in the simplest terms, a cross-functional team composed of empowered representatives from each functional area (in a Knowledge Management project, all functional areas should be represented). That team must determine how it will govern.

Institutional governance is not complex, when it is structured properly. However, it is rarely structured properly. Decision-making models are rarely defined, and ownership of decisions often remains ambiguous. In some cases, this may be due to the inability of the management team to risk making mistakes. In other cases, it may be due to the executives who thrive in the chaos of last-minute, crisis management.

While many types of projects can survive the vacuum of diminished IT governance, a KM project cannot prevail. The nature of institutional knowledge requires that the framework for decision-making be addressed early.¹⁴

This is Phase 0 – the formation of a cross-functional and inter-departmental team (or, in the case of cross-institutional knowledge projects, a hybrid team composed of each institutions key contributors) in order to address how it will be governed, the processes and vocabulary of that governance, and the roles and responsibilities of various team members. In some cases, such a team may never have existed within the company before, and many of the managers could be unskilled in the matrixed style that is required. Each of these business processes must be directly addressed – in advance of any discussions about the institutional assets to be managed by a new software tool, or the function/feature set of the tool itself.

Phase 0 is the beginning of a community, the result of a knowledge culture strengthened by a clearly-defined socio-political framework.

Such communities can assume many forms. Business webs, professional associations, customer advisory boards, collectives – each with a unique culture bounded by a framework and a clarified set of objectives. This is the “extended enterprise” applied to a varietal marketplace, and the lingua franca of these communities is the intellectual capital that is exchanged between the members of such communities.¹⁵

From this perspective, Knowledge Management can be defined as a strategic approach to the maximizing of intellectual capital within and between communities, with real and implicit value to be derived by the larger institutions that sponsor them.

¹⁴ “...at a recent human-computer interaction conference, a colleague attributed failure of collaboration between two remote groups to the “problem of establishing trust”...But further dialogue revealed that a major problem arose because members in one group couldn’t identify the official authority in the other group and were frustrated seeking the appropriate person to sign off....It is increasingly important that we not conflate trust with other important aspects of social interaction.” Communications of the ACM, December 2000.

¹⁵ Donald Tapscott, Digital Capital, p. ix.

Ultimately, it is the ability of the institution's leadership (the executive teams and initiative sponsors) to create and nurture an environment in which a trusted exchange of information/knowledge exists. That exchange must be rooted in a framework of behaviors that are the genesis of community, and provide the autonomy and creativity such communities aspire to promote.

4. Changing Institutional Behavior

How does a vendor change a customer's institutional behavior?

This question was posed by a noted venture capitalist, in the final stages of funding consideration for a knowledge management company that no longer exists. Despite the company's ability to identify a unique market, create a technology framework for that market, and articulate a commercial value proposition, the executive team's inability to answer this single question of behavior – in fact, their awkward discomfort in the face of the dilemma – led the venture firm to deny any funding for the company.

This koan-like question is not easily resolved, however, the “equation of value” suggests that any institutional behavior can be adjusted when the vested interest of that institution is engaged.

To do so, the vendors must demonstrate those behaviors – in other words, the vendor must set a compelling example (practice what they preach, show rather than tell) and then must identify clear benefits that are available to the customer if/when the institutional behavior is changed.

Error #3: Once again, the KM industry has unknowingly committed a fundamental error. In their effort to project the image of a serious and viable software market, the executives of those companies have overlooked or been unable to demonstrate the value of cooperation as a means of engendering trust, which, in turn, becomes the foundation of successful knowledge cultures. Rather than adopting an “open source” approach to their data models, search engines, and API libraries (which would embody the kinds of behaviors that the vendor hopes to encourage in the customer community), the vendors compete in standard “old economy” fashion for market share. Rewards go to salespeople who “beat the competition” or “steal the account.” Quarter-end analyst meetings involve articulate (though skillfully subtle) competitor bashing.

To help customer communities adopt the behaviors that are most conducive to “knowledge sharing” rather than hoarding, it is critical that the KM vendor community adopts those same behaviors. They must engender trust. They must expand, rather than discourage, the customer's ability to move data/information/knowledge between systems, between institutions, between networks and through firewalls. If the vendors do not exhibit those behaviors (according to the mirror principle noted on page 1), the systems they build will not support them. Most of the barriers to cross-institutional collaboration can be traced to the lack of standardized protocols and connectivity between those institutions, promoted – in large part – by competing vendors who create those barriers to

enhance profitability and are, subsequently, prevented by those barriers from easily supporting initiatives that would massively increase the size of the markets, the value of the infrastructure, and the breadth of the content managed by that infrastructure.

In an information-based economy, the value of an idea is increased when it is shared, and dwarfed when it is hoarded. Hoarding behavior (an “us versus them” approach to competitors) prevents trusted partnerships, and precludes the creation of communities. Intellectual assets, restrained from their broader value, will die on the vine.

We, as vendors, must demonstrate the behaviors we recommend for our customers.

5. The Conceptual and The Real

Constraints upon our organizations are quite real: economic downturns (a breach event which is not easily redressed), cultural differences between merged or acquired entities, budgets that are inadequate to meet the scope of our many demands.

Maximizing success in our constrained environments often means compromise in the areas of effort that are difficult to quantify, difficult to articulate, and even more daunting, difficult to understand. As such, “knowledge initiatives” are often de-prioritized, particularly in institutions where the collaborative instinct is not reinforced at the executive level. The urge to move faster with fewer resources is a massive hurdle for knowledge initiatives to overcome, in part because we have not clearly communicated the equation of value, a portion of which can be stated as:

Velocity + Knowledge = Success

Velocity – Knowledge = Failure

An environment that is capable of moving quickly while leveraging the intelligence of its participants is an environment that enables success. The fundamental reason for that success is that it is built upon innovation.

No organization can move quickly if it is mired in repetitive tasks. Recreating a template because the source file has been lost is a waste of valuable time. Rewriting an entire contract because the previous version cannot be found is a waste of time. The repeat interview, the repeat meeting, the repeat analysis – our corporations and companies are filled with daily examples of intelligent people re-doing something they have done before, rather than spending their valuable time on something new.

Learning Organizations – the ones that are not only capable but adept at adjusting to market changes or new challenges and quickly producing an excellent response – became Learning Organizations because they understood the value of leveraging their resources, of paying attention to their “lessons learned” and teaching those lessons to newcomers. In the end, the value of most “knowledge management” efforts is not (as some have proposed) the creation of an exceptional and useful repository. Rather, it is the dynamic

creativity that can be unleashed, within and between institutions, in those liberated margins of time that allow us to think.¹⁶

6. Concluding Remarks: Proposing a “Digital Multiplier”

On July 11, 2001, meetings were held in Washington DC between the Chief Information Officers of several publicly-held corporations and their counterparts at the World Bank.¹⁷ The agenda was broad in scope, covering a wide array of strategic IT issues, focusing upon the Bank’s charter: ending world poverty through the use of Information Technology. There is a global knowledge-sharing mandate, of great political and economic complexity, yet one theme echoed throughout the day: it is not about technology, it is about the people: any attempt to bridge the international divide that exists between the “First World” and the under-privileged countries must take into account the cultures and unique attributes of the people in those regions.

Later that same day, the corporate CIO team met with members of the Federal CIO Council¹⁸ to discuss ways in which IT executives in the private sector can partner with their colleagues in the public sector to create a public/private dialogue at the IT executive level on topics of strategic interest to the participants. While the charters and anecdotes differed greatly from the World Bank charter, one of the primary conclusions of the afternoon meetings was that the focus of the many new eGovernment initiatives (exemplified by the Lieberman bill, S.803) must be about people, not technology: how to surmount the countless barriers we have created that make a unified approach to technology access almost impossible.

It is not about the technology, we said again and again, it is about the people.

At the fulcrum of these broad-ranging initiatives, at the very heart of our efforts to bridge the digital divide both within and outside of our domestic boundaries, is the central proposition that knowledge-based economies throughout the world must benefit from a massive shift of methodology and technology, toward a knowledge-sharing and community-based framework. Collaboration and connectivity will allow rugmakers in East Africa to sell their wares directly into the homes of America, birthrates in small villages will improve dramatically when the midwives in those villages are able to communicate to their colleagues in the western world, and the awe-inspiring successes of such small pilot projects offer models and lessons of value in many directions.

¹⁶ This does not mean that information systems will ease our workload, establish a saner workweek, etc. In fact, the opposite may be true: by creating an environment in which innovation can occur, new ideas and new projects will emerge and be nurtured. In fact, it may create more work (not less) but that work will be additive, rather than repetitive.

¹⁷ Attendees of the World Bank meetings included executives from Ziff Davis Media, Quantum Corporation, KAMERA Corporation, Acorre, Inc., Ticketmaster/Citysearch, The International Monetary Fund, the International Finance Corporation, and the World Bank, among others.

¹⁸ Attendees of the Federal CIO Council meetings included executives from InfoTech Strategies, the Federation of Government Information Processing Councils, the CIO Collective, and representatives from the Departments of Commerce, Treasury, and Education.

At the core of the next decade's progress, both within the United States and beyond its borders, is our capacity to implement what we have, until now, only tried to implement between the departments of our corporations - a cross-functional approach to the leveraging of intellectual assets, an ability to disseminate "best practices" not only within our companies, but between our state and federal institutions, and between our international agencies and their constituencies in Ghana, Turkistan, Korea, and Columbia, etc.

If we, as a community of executives and business leaders, can extend our enterprise in the broadest context, we can institute systems and processes that create a "Digital Multiplier." That multiplier will enable the transfer of knowledge from a successful pilot program (it worked in a village in Pakistan) to the streets of East Oakland or the small towns of Appalachia, and the transfer of knowledge from the successful eGovernment initiatives in the State of Washington to the most remote regions of Eastern Europe, where technology is now being viewed as a pathway to the future.

In some cases, these institutions are not corporations seeking profit (though they, too, will benefit). Sometimes the institutions are government agencies, trade unions, international associations, universities, research facilities, hospitals. When the institutions are international agencies responsible for delivering food to a starving population or negotiating peace between warring tribes, those collaborative systems have the potential for service of the highest of human callings – in such cases, I propose that the systematic improvement of cross-institutional collaboration can have profound effects upon the quality of our lives.

In short, the "equation of value" in the extended enterprise is more than a business proposition.

For example, if the Chief Information Technology Officer of the White House in Washington could be enabled to work more closely with a cross-functional team that includes technologists at The World Bank and its recipient countries, in order to collaborate on the success of urban redevelopment in Pakistan or medical research in Argentina across the Internet, our systems become the tools that enrich the qualities of life in those countries.

In some cases, one might even argue that the collective international community of Chief Information Officers and Chief Knowledge Officers has the capacity to function more collaboratively, toward common objectives, than their political counterparts in these distant countries. Indeed, such goals may be more easily achieved by Information Technology professionals in the coming decade than by any other profession.¹⁹

If we can take what we learn in Asia and implement it in Harlem, and if we can take what we learn in South Chicago and implement it in Zambia, we can begin a wave of

¹⁹ See Part 6, p. 11-12, of this essay for an examination of the "equation of value" in terms of the Digital Divide.

productivity and innovation far beyond what we have witnessed in Silicon Valley, Redmond, and Boston - it is the creation of a sense of community, a community supported by processes and technologies, a community of communities.²⁰

This is the promise of Knowledge Management in the 21st century, the delivery of a Digital Multiplier that has the potential to bridge our digital divides by enabling knowledge-sharing focused not upon technology, but upon the people served by that technology.

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(8/15/01)

²⁰ See “The KM Conundrum,” by Maggie Law (KMERA Corporation) for an expanded discussion of “the community of communities” concept.