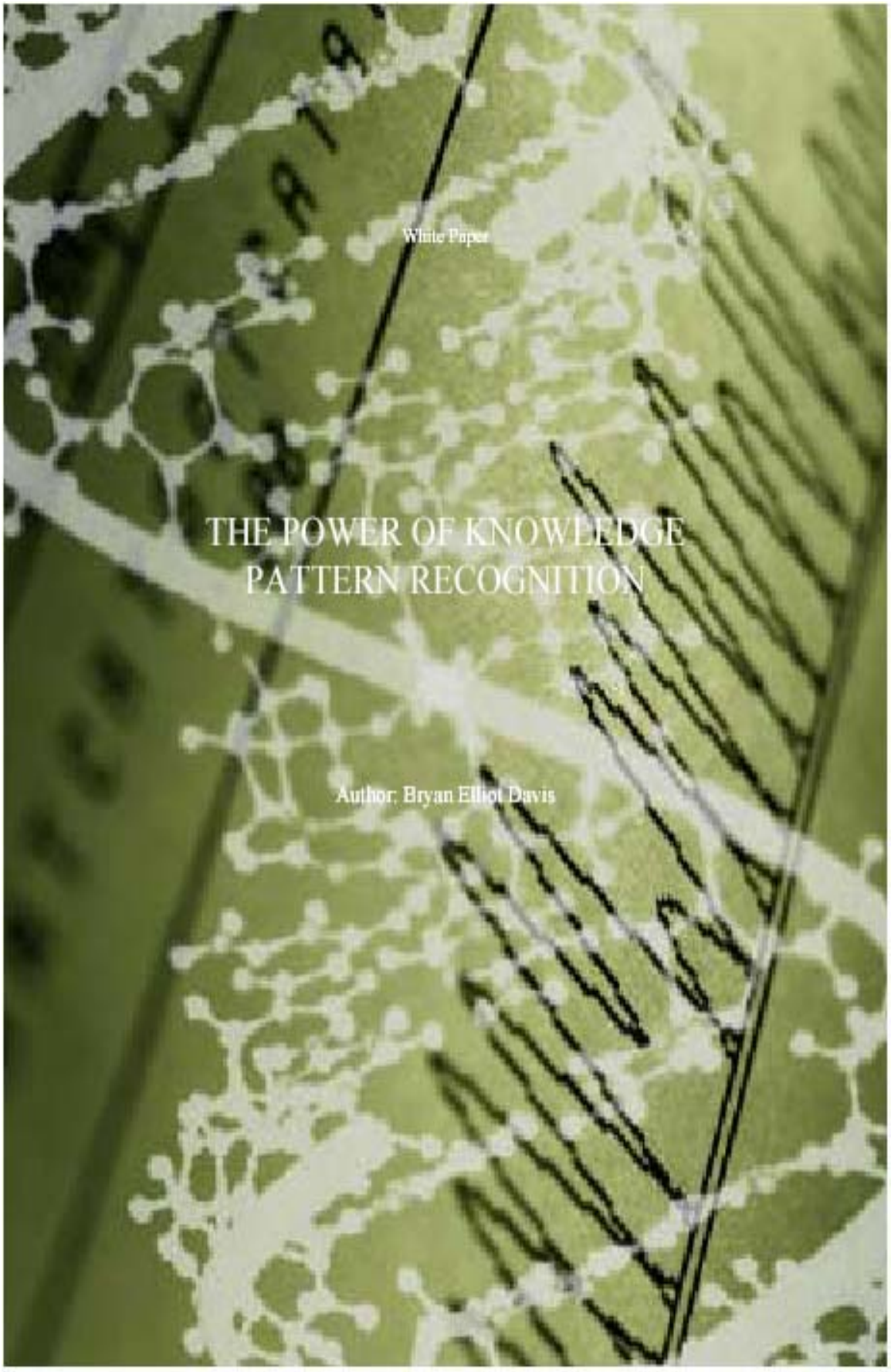
White Paper
THE POWER OF KNOWLEDGE
PATTERN RECOGNITION
Author: Bryan Elliot Davis

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"*To understand is to perceive patterns*." - Isaiah Berlin

Introduction

"*Given the fast-changing and ever increasing complex nature of the world, gaining insight into how patterns are forming and structures are developing represents the most powerful way of managing in the new economy*" Winslow Farrell, How Hits Happen.

In the rapidly emerging knowledge-based economy, knowledge is a fundamental factor input, and it is big. Knowledge is an awesome new resource for value creation. Accordingly, we have be-gun to pay more attention to knowledge as a fuel. It is now too precious to waste. Too important to leave to ad hoc management. A new discipline knowledge management, has begun to evolve related to the methods, tools, and strategies for harnessing knowledge, intellectual capital, and intangible assets. Many schools of thought exist in relation to how knowledge can be successfully harnessed for productive uses. The problem is, that with all the hype, the clamour and the noise, how does one make sense of the dissonance, and begin to clearly understand the tested and proven pathways to knowledge success? We think that growing an understanding of knowledge patterns, and internalizing the inner logic of these frameworks, is a great way to move forward. Phil Jackson the famous basketball coach, gets it right when he observes:

"*The idea was to code the image of a successful move into my visual memory so that when a similar situation emerged in a game it would seem, to paraphrase Yogi Berra, like déjà vu all over again*."

We have come to the **conclusion** from our research, that knowledge pattern recognition, is an especially critical and requisite skill, for smart, innovative knowledge strategy. This is a key strategy for making better sense of the growing knowledge puzzle.

Pattern Recognition

Pattern recognition, has proven itself to be a seriously powerful tool for guiding action in many other fields. In the military domain, pattern recognition can be used to identify enemy submarines by their acoustic signature the particular pattern made by their propulsion systems. In the Gulf war, we saw vivid pictures of the tomahawk cruise missile in action. It's guidance system is programmed with an image map of the target. It locks onto this pattern in the precise delivery of its payload. In modern fish plants, pattern recognition is used to sort fish by type. In some ply-board manufacturing plants, sheets of board are graded and sorted by their pattern. Financial services companies, use software equipped with pattern recognition technology, to spot anomalous trends and thereby intercept impending fraud. Other typical applications are automatic sorting of bank bills, recognition of a speaker by his or her speech, recognition of abnormal electro-cardiograms signals, optical reading of written documents, visual inspection of manufactured products for quality control. Today after the September 11 terrorist attacks in the United States there is a growing deployment of facial recognition technology to

enhance security at airports and border check-points. Pattern recognition therefore, has had a proven efficacy across a wide spectrum of human activities. The double helix of DNA is a pattern that we have decoded and now plays a major role as we map the intricate secrets of the human genome. In the knowledge management field, it is our contention that there is a great future for using such an approach. With it, one can decode a specific business context and deliver the appropriate application precisely on target. We now use just such **a framework for conducting knowledge assessments**, and assisting our clients with the crafting of innovative knowledge strategy.

Are Patterns Really All That Important ?

In the quotes below, you can see evidence of the fact that in the minds of leading thinkers and practitioners today, patterns are extremely important. (This is our argument from authority.) Here are a few favourite examples:

"*Recent research on cognition shows that our minds rarely make strictly logical deductions. Instead we rely on patterns and on feelings associated with those patterns*" W. Brian Arthur (A leading Economist from The Santa Fe Institute).

"*Anyone can learn to juggle. It's about breaking down complex patterns and manoeuvres into simple tasks. Juggling is a system of tosses and throws, of different patterns, that once broken down, understood and mastered can be put together to create something magical*." Micheal Moschen (one of the world's greatest jugglers).

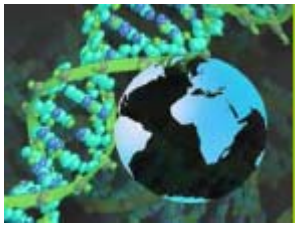
"*The most important lesson I've ever learned is to understand and to trust abstractions. If you can learn both to see and to be-lieve in life's underlying patterns, you can make highly informed decisions every day. For example, everyone in high tech is familiar with Moore's Law, which states that computer-processing power will double every 18 months. Now, Moore's Law isn't a law in any physical sense, but it has driven and will continue to drive our industry's development. Yet very few people and very few companies really take this law to heart because really embracing it leads to seemingly nonsensical projections. Five years ago, when I told people that we'd have the processing power that we have today, lots of them even those who said they believed in Moore's Law thought I was being ridiculous.*" Nathan Myhrvold, former Chief Technology Officer Microsoft Corp.

"*The third revolution is rooted in biology and self-organizing systems the search for a sense of pattern*" James Bailey.

"*What is important is the pattern of relationships and interactions that exists and how they contribute to the system as an integrated whole*" Brian Goodwin, a British Biologist.

"*In any stream of ideas, some kind of pattern will be evident. The trick is to look for patterns.*" Gary Hamel, Management Strategist.
Knowledge patterns therefore, are pathways we should take more seriously. It is amazing that in the knowledge field today, there has been such a lack of focus on the development of knowledge pattern recognition as a core competency.

The Virtues Of Pattern Recognition


DNA

One of the additional virtues of pattern recognition, is the ability to communicate complex moves with tremendous simplicity, clarity, speed, and power. For example, I may tell you about companies that are "built to last", "built to scale", or "built to flip". With a few words, I can communicate to you pictures of three different strategy approaches. These patterns are packed with meaning, and yet are communicated succinctly and with great resolution and economy. They are packed with meaning, because a discernable business model is contained in the description. The same would be true if we spoke about leasing, time-sharing, and outsourcing, as business models. In a few words, the action purpose is also implicit. Therefore, as a diagnostic and assessment tool, as a training tool, as a planning tool, as an alignment tool, as a communications tool, and as a tool for growing awareness, as a guide for action, patterns can have tremendous operational value.

Pattern Recognition & Decision-Making

Pattern recognition also supports effective and rapid decision making. And one thing is a given about the knowledge-based economy. The velocity of change is increasing, amidst greater complexity and chaos. So, possessing a deep understanding of knowledge patterns, can enable critical decision making when-ever knowledge mobilization is an urgent issue. Gary Klein is a cognitive psychologist. He has been described as a cartographer of the human mind. He has spent a lifetime studying how people like fire fighters make split second life and death decisions. He tells a story of a fire fighting commander who suddenly ordered his men out of an inferno they were battling. Klein says, "This incident helped us understand that fire fighters make decisions by recognizing when a typical

situation is developing. In this case, the events were not typical. The pattern of the fire didn't fit with anything in the commander's experience. That made him uneasy, so he ordered his men out of the building." In this particular case, just as the crew reached the street, the living room floor of the house they had been in, caved in. Had they not evacuated, the fire fighters would have been trapped in the basement. In an increasingly changing, chaotic, and complex business environment, understanding and internalizing knowledge patterns is vital, for helping us to make safe, rapid, and effective knowledge supported decisions. "Cognitive scientist Andy Carr of Washington University calls people "fast pattern completers". "We are really wonderful as humans at completing patterns. We get a hint and then fill in the rest. We see a black tail swishing around a corner and we assume it is a cat. We get a wiff of water upwind and we assume there is a spring nearby. Our very survival depends on this way of thinking says Winslow Farrell in How Hits Happen.

What Knowledge Patterns Are There?

Satellite Imagery

One big question then, is what are some of the more fundamental patterns, used in playing the knowledge game. At the Kaieteur Institute For Knowledge Management, we have been asking this question for some time. What patterns can we discern through the smart prism of a knowledge lens? We have derived initial answers from three credible sources. On the one hand, we have analyzed many application case histories with a view to trying to de-code the knowledge pattern in use. On the other hand, we have analyzed knowledge enabling software, which in our view is congealed intelligence pertaining to the "know how" for various functions. A third source of pattern ideas, are the many "schools of thought" each with their own approach to knowledge application. What we have extracted from these combined sources, we think is most instructive. It forms the basis of this paper. In summary, we view best knowledge practices in business applications, knowledge enabling software, and "knowledge schools of thought", as providing important clues about knowledge patterns-in-use. This means also that the taxonomy we have developed as a consequence, is grounded in theory as well as practice.

Meta Knowledge Playbook

Our categories then, are real living patterns-in-use, and not concepts derived just from only a theoretical point of view. Together they comprise a sort of Meta Knowledge Playbook. We have be-gun to integrate this understanding we have achieved of knowledge patterns, into our strategy and practice playbook. As we do so, it will undoubtedly raise the way we play the knowledge game, to a higher level. After all, in sports like basketball, famous coaches like Phil Jackson, formerly of the Chicago Bulls and now achieving success with the LA Lakers, use playbooks in their strategic masterminding of on court action. These playbooks represent codified knowledge of the various discrete moves that can be run. Players rehearse the pattern sequence over and over to achieve a high degree of coordination and fluidity when it comes to rapidly and smoothly implementing one of these plays. The Bulls for example, were famous for their triangle offense. Again, as Phil Jackson tells us. "The triangle offense is best described as five-man tai chi. The basic idea is to orchestrate the flow of movement in order to lure the defense off balance and create a myriad of openings on the floor. The system gets its name from one of the most common patterns of movement: the sideline triangle." This is a sequence of play that has a characteristic pattern to it. It became a hallmark of the Jordan era Chicago Bulls winning performance.

Patterns Must Fit The Context

In Formula I motor sport, Ferrari has recently been recognized as being very clever about their use of fuel strategy. Depending on the track, the competitive line up at the start of the race, and other related factors, cars may be put on a one, two, or three stop strategy for re-fuelling. A car may be placed on a one stop fuel pat-tern. However, if developments and changing conditions during the race warrant it, this may be replaced with a two stop pattern. The main point here is that in real world changing conditions, the appropriate pattern must be adapted to suit the context. If one's repertoire and understanding of knowledge patterns is limited, it will be hard, to readily sense and adapt to changing knowledge circumstances. In a game, the actual formulation of intelligent strategy is frequently the call of the coach masterminding the game-plan. This has to be clearly and effectively communicated to the active players who will be executing in the field. The process is a dynamic interaction, and requires a multi-dimensional harnessing of experience, judgment, and tacit knowledge. In the game of golf, different clubs are carried in your bag depending on the hole you need to reach and the situation you are in.

So, similarly in the knowledge game, knowledge patterns are in our view, the key "clubs" one has to have in one's bag, and to learn to play. And it will take a lifetime of playing and practice to truly master all dimensions of the game, and to learn to play all available approach shots. So we are not suggesting that applying patterns in practice, is an automatic, static, or exact science. Rather, one has to have a "feel" for knowledge patterns and to internalize an understanding of them, so that knowledge pattern recognition is **fast, fluid, and adaptive**. When one has achieved mastery of knowledge patterns one will have truly become knowledge wise. The opposite is also true. Without such mastery, one is not seriously playing the game, but only fooling around. It is interesting that even in the sports arena today, software is playing a supporting role involving pattern analysis. There was for example, a recent article in Strategy & Business about the attempt by the New York Nicks basketball team, to use new software developed by IBM, named Scout. This software is deployed in order to analyze players' patterns of play. If you can determine that every time player x goes to the basket, he uses his right hand, then that's a pattern of play that could be very useful to know about. The logic of developing a meta knowledge playbook based on well understood knowledge patterns, therefore makes sense, and has exciting application potential. Yet, at the end of the day, the players on the court still have to play the game and execute plays well. The Nicks may have used Scout. However the technology can only enable and assist performance. Insights have to be treated as **suggestive**, not definitive. Using pattern recognition therefore, will never be the whole story to the achievement of championship level performance. However, it can clearly be a highly potent contributor to winning.

The Limitations Of Automated Pattern Recognition

There has been a recent argument about pattern recognition in business, as a key to learning and profitability. The book Profit Patterns by Slywotzy, Morrison, Moser, Mundt & Quella, makes this case in a very compelling way. They argue that "The art of identifying, understanding, and exploiting patterns needs to be-come part of the mental process of every decision maker interested in creating sustained profit growth."
This we would entirely agree with. They also decipher and discuss three forms of knowledge profit patterns. While these are very useful, knowledge patterns are not their main focus. The three knowledge-to-profit patterns they cite are:

- Product To Customer Knowledge – my product business teaches me about my customer
- Operations To Knowledge assets to essence.
- Knowledge To Product – expertise crystallized.

Their analysis does beg for a more exhaustive treatment. Their contribution is nevertheless valuable and insightful. For the purposes of our present discussion, let us simply note and agree, that there can be **a powerful link between the ability to recognize knowledge patterns and profitability**. So, this gives us all the more reason and incentive to pay active attention to the mapping and application of knowledge

patterns in business. A fuller discussion of knowledge-to-profit patterns, are explorations for a subsequent white paper now in development.

Our Knowledge Pattern Taxonomy

We now present the fundamental, underlying knowledge patterns that we have decoded. These categories are not final or exhaustive. We fully expect the list to grow, morph, and evolve as more patterns are decoded and added to the list, or we find better ways to frame them. There is no ranking or priority to the list. The category descriptions are mere sketches and brief descriptions. The main point of the taxonomy, is to demonstrate the range and cross-section of patterns-in-use. It's purpose is suggestive and illustrative. The power of such a simple taxonomy, is that a **Meta Array** of strategic choices are clearly available for deployment, depending of the appropriateness of the context. Our current working core taxonomy of knowledge patterns is therefore as follows:

Figure 4. Knowledge Meta Pattern Array

1. Knowledge Leadership

2. Knowledge Harvesting
3. Story-Telling
4. Intelligent Agent/Knowbot
5. Knowledge Reuse
6. Knowledge Mining
7. Developing Workflow Process Assets
8. Social Network Analysis
9. Competency Management
10. Competitive Intelligence & Time To Knowledge
11. Mind To Market Acceleration
12. Growing Customer Capital
13. Knowledge Substitution
14. Knowledge Network / Knowledge Centre
15. Learning Organization
16. Communities Of Practice
17. Knowledge Aggregation
18. Knowledge Based Engineering
19. Knowledge Environment/Worlds/Ecologies
20. Smart Products & Services
21. Knowledge Mapping
22. Knowledge Arbitrage
23. Intellectual Property Development
24. Reputational Capital
25. IC Measurement / Scorecard
26. Product Knowledge Development
27. Knowledge Representation/Visualization
28. Knowledge Agility/Sense & Respond
29. Ideation
30. e-Knowledge Exchange/Knowledge Market
31. Local or Indigenous Knowledge
32. The Knowledge Toll Squeeze

Description of Our Knowledge Patterns

1. Knowledge Leadership

This attends to the development of teams of highly capable knowledge leaders. It could involve the development of a wide range of positions. Chief Knowledge Officer, knowledge architect, knowledge steward, and so on. It could also involve the nurture of grassroots knowledge activists and champions.

2. Knowledge Harvesting

This approach is one of eliciting knowledge from knowledge workers so that it can be recorded and codified as a corporate as-set. It usually can involve interviewing and

observing a knowledge subject and making explicit, the know-how about how to do a task, that is currently undocumented. A sub-patterns of this technique is called after-action-review and is used by the US Military and others to extract lessons learned from action carried out in the field.

3. Storytelling

Storytelling is an ancient communication art. We have used it to share knowledge with others throughout history. It is used as Moliere says, to simultaneously please, instruct, and educate. As a tool for the socialization and externalization of all aspects of knowledge, it can be most effective. David Snowden from IBM's Cynefin Centre For Organizational Complexity is a leading proponent of the use of storytelling. He suggests that the combination in stories of the use of metaphor, pictures, and images is a more enduring way to build common understanding and focused thinking in a knowledge management program, than other linear and literal communication methods. Steve Denning has also championed the use of story-telling with great effectiveness at the World Bank.

4. Intelligent Agents/Knowbots

This involves the use of artificially intelligent software agents as surrogate knowledge agents. There are many types of agents available for use.

5. Knowledge Reuse

This is an approach whereby knowledge is codified, shared and made available for reuse. The benefit to an organization is that time can be saved by not having to reinvent the wheel. It eliminates redundancy. It can also be used to lift competencies across the organization by spreading know-how where it's strong, to areas where capabilities could be strengthened. Examples of organizations with application case histories where this has proven to be effective, would be Texas Instruments and IBM. At Texas Instruments over 80% of the software code written, was reported as being reused. At IBM templates for responding to Requests For Proposals, cut down dramatically on the time and resources needed for sales people to respond to potential customers.

6. Knowledge Mining

Knowledge mining is the analysis of large amounts of transaction data and information contained in knowledge bases for the extraction of useful insight in the form of developing trends, patterns, exploitable opportunities, or anomalies.

7. Developing Workflow Process Assets

This would involve the mapping and embedding in software of rules, roles, and routing paths associated with a particular process. This process knowledge then becomes a

process asset, a production script that is a part of an organization's infrastructural capital.

8. Social Network Analysis

This approach is based on insights drawn from the field of anthropology. It is predicated on the notion that there are informal social networks through which much important peer to peer knowledge sharing occurs. Attempts are made to understand the trusted networks and lines of influence that are normally hidden from view. This is important for nurturing change that does not run afoul of these hidden networks. A leading proponent of this technique is Karen Stephenson of Imperial College, London. There is also beginning to emerge, complimentary social network analysis software, which can be used to assist analysts in such a project.

9. Competencies

Competency management, is another tactic that has been used to address the question of what knowledge do we have, or do we need. In this approach job positions are profiled in terms of the knowledge requirements for various positions. This can very use-ful for recruitment purposes. You can have a better basis for matching people with required skill sets. Internally, it can be used to locate people who have knowledge that can useful to other areas of the enterprise. It can pinpoint corporate knowledge strengths, and magnify gaps that exits. It can be used to help plan for meeting future needs. It can also give a clearer idea of areas where training should be funded and encouraged. Increasingly ERP software systems such as SAP, PeopleSoft, JD Edwards and Meta4 offer functionality to help HR units to do competency management.

10. Competitive Intelligence

Competitive Intelligence, has been described as one of the fastest growing new departments among the Fortune 500. Competitive Intelligence is growing as a discipline and as a profession, ac-cording to the Society Of Competitive Intelligence Professionals. (http://www.scip.org) It is ultimately centered on effective knowledge acquisition. It focuses on scanning a company's competitive landscape for threats, opportunities, risks and advantages. Information is gathered in a coherent fashion, analyzed, and interpreted in a way that will support strategic decision making. There is special use software developed for assisting this function such as Knowlede X, (which was purchased by IBM), Cipher's Knowledge Assist, and Wincite Systems, Wincite. There is also special software being developed to support the building of war rooms, storyboarding, and the running of simulations. Larry Ka-haner's book Competitive Intelligence is a basic primer covering this field. (The following Radar Chart gives an example of how an organization's Knowledge Pattern capabilities can be repre-sented graphically.)

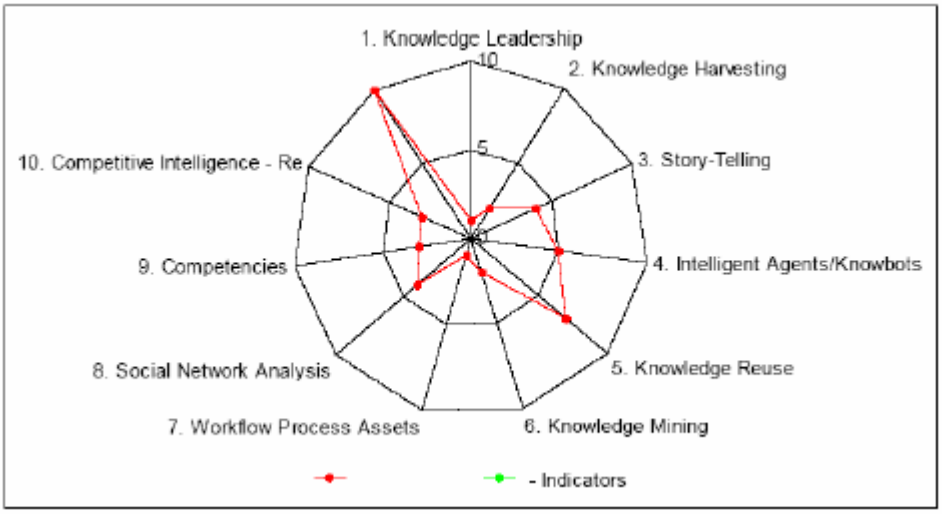


Figure 5. Radar Chart - Knowledge Performance Indicators – Group A..

1. Knowledge Leadership
2. Knowledge Harvesting
3. Story-Telling
4. Intelligent Agent/Knowbot
5. Knowledge Reuse
6. Knowledge Mining
7. Developing Workflow Process Assets
8. Social Network Analysis
9. Competency Management
10. Competitive Intelligence

Other Knowledge Patterns we have decoded are:

11. Mind To Market Acceleration

This approach works on streamlining, innovating, if not revolutionizing, the paths by which ideas go from concept to product or service and on to the customer. Roger D. Blackwell's book called "From Mind To Market" (1997) is one excellent treatment of this approach.

12. Growing Customer Capital

Knowledge of customers is now being recognized as a key to maintaining loyalty and meeting their ongoing needs. Unique customer knowledge and insight can be tremendously valuable. Don Peppers and Martha Rogers have successfully argued that having 11 knowledge of the customer can be golden. Customer knowledge, is not only

about anticipating and serving their existing needs. It can also be the foundation for capturing insight into future needs for goods and services.
Moreover if one has a high degree of customer interaction and intimacy, the customer may be willing to lend their knowledge to the project of co-creation of new products. So, from the stand-point of continuous improvement and innovation, there can be a significant competitive advantage to having the customer within your business web. Customer Relationship Management software, which has been evolving rapidly, can be harnessed to the project of growing customer knowledge capital.

13. Knowledge Substitution

Knowledge substitution would for example attempt to swap smart logistics for physical product storage. By knowing the timing required to service an operation, one can choreograph a movement of goods or services to minimize holding patterns. Essentially inventory is replaced by real-time or just-in-time knowledge.

14. Knowledge Network or Knowledge Centre

This type of knowledge pattern usually is found in professional services firms. The idea is to have centralized repositories or pointers to knowledge resources so that the firm can harness all it knows in response to client needs. It is an integrating technology network, usually supported by an intranet or portal. It functions as a clearinghouse for connecting knowledge seekers with knowledge providers. Approaches used, methodologies, case histories, lessons learned, are collated so that they may be readily available to all members of the firm.

15. The Learning Organization

The stock of knowledge in the world is now doubling every three years or less, according to some experts. Every organization is being challenged to ensure that it's people learn continuously, in order to keep up, and to stay ahead of the competition. A learning organization strategy is one where leadership is assigned responsibility for coordinating learning efforts. Every attempt is made to foster a culture of active learning, and to provide learners with the technology, financial resources, and time, to engage in learning that supports the mission of the company. Every effort is made to ensure that acquisition of new knowledge, and knowledge sharing and is appropriately enabled and supported. As Charles Handy says, "The learning organization can mean two things; it can mean an organization which learns and/or an organization which encourages learning in its people. It should mean both" The Age Of Unreason.

16. Communities Of Practice

These are informal peer networks of knowledge workers who connect around common group needs and goals. The idea is to cultivate a culture where learning is socialized, and tacit plus explicit knowledge can be exchanged in a trusted community net-work. The

World Bank for example, has deliberately nurtured the spawning of such Communities, in recognition of their ability to socialize knowledge. Inherent in the idea of communities of practice are the principles of self-organization, networking, and learning.

17. Knowledge Aggregation

Knowledge aggregation involves the building of a deep knowledge base that can serve to attract, serve, and sustain members of an on line community. Amazon.com for example began by aggregating and organizing knowledge about books including where they could be found, and what members thought about particular books.

18. Knowledge Based Engineering

This type of knowledge approach is most to be found in manufacturing environments. Knowledge about engineering design and what was done on a particular project is documented in a knowledge base, so that this knowledge is not lost when people leave. It is basically the codification of specialized and complex engineering knowledge in shareable repositories.

19. Knowledge Environments/Ecologies/Worlds

This approach focuses on surrounding the knowledge worker with environments that are conducive and supportive in doing knowledge work.

20. Smart Products & Services

A smart product or service is one which is intelligent. It contains congealed know-how. There is wide spectrum of such products and services. A bookseller who uses a permission based approach to profile customers and then alerts them when a new book on their favourite topic, might be described as pursuing a smart ser-vice strategy. A product such as an Otis elevator equipped with self-diagnostics, which represent the best knowledge the company has available, and dials out to request service help, well before on-site facilities management people are even aware of a developing problem. That might be classed as a smart product. Products that are designed to adapt and learn and give the user feedback using neural network technology might also be deemed to be intelligent. This is a strategy that can be used for varying purposes. To maintain customer loyalty, to better adapt and fit customer needs, to learn from customers, to differentiate one's product from those of competitors, to achieve higher degrees of reliability. These are among the possible benefits.

Service & Support sub-pattern

This approach essentially involves enabling front line knowledge workers to have the right answers for internal or external customers. This may involve the use of diagnostic knowledge bases where the accumulated knowledge about problems is stored for easy retrieval. It could encompass at a more sophisticated level the use of performance support

and buddy systems. The latter are directories to experts who may have the answers to help the knowledge worker resolve a question they are unable to answer on their own.

Figure 6. Radar Chart - Knowledge Performance Indicators – Group B.

11. Mind To Market Acceleration
12. Growing Customer Capital
13. Knowledge Substitution
14. Knowledge Network / Knowledge Centre
15. Learning Organization
16. Communities Of Practice
17. Knowledge Aggregation
18. Knowledge Based Engineering
19. Knowledge Environment(Worlds/Ecologies)
20. Smart Products & Services

Other Knowledge Patterns we have decoded include:

21. Knowledge Mapping

Knowledge mapping, can be a very powerful technique. We view the Human Genome Project whereby all the known genes in the human body are being mapped, as a knowledge mapping project, writ large. Making maps of what knowledge exists in the organization, and where it is can be very a very powerful and useful re-source. It can facilitate understanding, navigation, matching of knowledge seeking with content and content providers. Allied with the use of knowledge portal, workflow, and document management software, or other related types of enablers, the creation of yellow pages, directories, and corporate taxonomies make it easier to identify, locate and reach corporate knowledge re-sources. This can save time, reduce cost, and enhance the quality

of knowledge performance. In London, England, taxi drivers have a guidebook called "The Knowledge" that is a compendium of knowledge about their city that is a time honoured navigational reference resource.

22. Knowledge Arbitrage

"Global firms, on the other hand, form multicultural teams that work across borders and within product lines in order to gain economies of scale and scope. They also engage in what is best called knowledge arbitrage arbitrage: the efficient sourcing and distribution of ideas and products drawing on the best ideas and lowest priced inputs from around the globe. This means looking at the world as one economic unit, not a matrix of business divisions focused on countries and regions." John Thornton was chairman, Goldman Sachs Asia, and was selected as a Global Leader for Tomorrow by the World Economic Forum in 1993.

23. Developing Intellectual Property Assets

The best case where this applies, is where companies hold or are generating significant Intellectual Property assets. Dow Chemical is a well known example of a company that has an extensive patent portfolio. By better identification, organization, classification, valuation and management of it's intellectual capital assets, it was able to use them, to create more value than existed previously. Essentially an intellectual property strategy, is one involving paying more critical attention to intellectual property assets from creation to disposition. It involves taking steps to protect, and ex-tract latent value from such assets. There are software vendors such as Aurigin Systems (now called Micropatents) highly focused on developing enablers to facilitate the management of such assets. The CEO of Aurigin recently co-authored with David Kline a relevant book on the subject book called Rembrandts In The Attic.

24. Reputational Capital

This is an approach where attention is focused on ensuring that the image, brand, and reputation of the firm is carefully developed, enhanced, and maintained.

25. Intellectual Capital Measurement Scorecard

The balanced scorecard is an approach articulated by Kaplan and Norton. It is one performance measurement approach that moves beyond the gap that results when only traditional indicators are used. In this scheme knowledge is included as a factor in organizational metrics. It's based on the concept that what is measured, gets done. Therefore by having a measurement system for organizations which also takes into account their effectiveness in terms of their use of intellectual and human capital, it's designed to ensure that there is a consistent alignment in the way attention is paid to harnessing knowledge, along with other factor inputs. Several vendors have developed software to help companies monitor their business performance using a balanced scorecard approach.

Examples are Open Ratings Inc and Corvu.

26. Knowledge Discovery & Innovation

Knowledge discovery involves the generation and production of new knowledge from R&D explorations, or from synthesizing new lessons from business performance in one domain which can be ported to another knowledge domain.

27. Knowledge Representation/Visualization

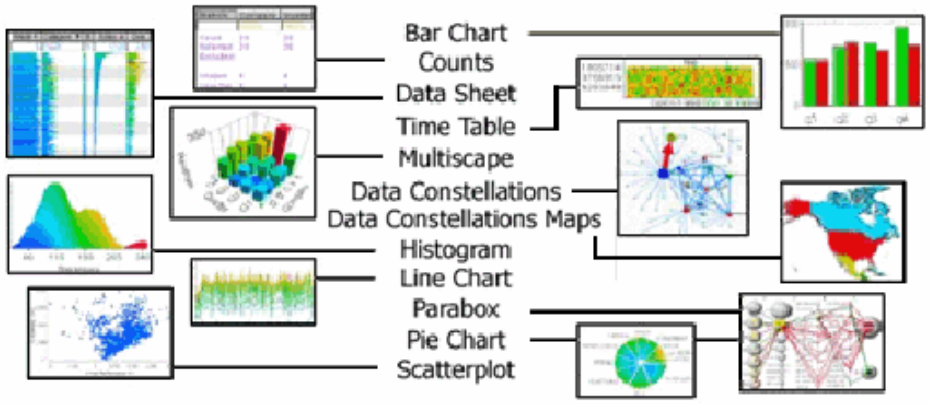


Figure 7. Examples of various modes of visualizing Information (source: http://www.visibledecisions.com)

We increasingly face challenges where the data set we are trying to analyze is too large (or small) and complex for us to readily make immediate meaning of it. Interpretation and navigation can often be facilitated by having information in a knowledge base presented in a visually more meaningful way. Software can be used for example to dynamically help the viewer to "helicopter" through data and so a better understanding of its implications.

28. Knowledge Agility-Sense & Respond

Because of the chaotic and fast changing nature of many markets, some organizations are being designed based on an agility paradigm. They are equipped with a flexible sense and respond adapt-able metabolism. To be able to quickly and fluidly process in-coming knowledge from customers and the business environment, the enterprise is enveloped in a smart technology matrix. "Patterns of interaction between companies and their customers are changing profoundly, and the interpenetration or overlap is be-coming ubiquitous. This requires an Agility of thought in seeing the new patterns, responding to ever-changing conditions, and in being able to discard a successful product, service, or way of working to make room for the new." (Dr. Charles Savage)

29.Ideation

Ideation, is the label we give to a group of approaches that have in common – peering into the future. This involves imagineering, running scenarios, conceptualizing future states and how the company will be able to anticipate, prepare, and exploit new emerging developments. Scandia for example, under the leader-ship of Leif Edvinsson set up Scandia Future Centres. These were playgrounds for testing ideas about how the future might evolve and conceptualizing how the organization could better anticipate, visualize, get ready for, and create an advantage in the market-place by knowing more and seeing more clearly. It is a combination of effective knowledge creation and knowledge acquisition. Software for mind-mapping, mind-scaping, visualization, modeling, and simulation is increasingly available to assist such efforts.

30. e-Knowledge Markets

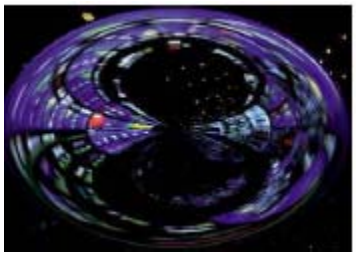


Figure 8. Knowledge flows dynamically through e-markets
(source: Kaieteur Institute 2004).

The knowledge market approach explicitly recognizes that there is a de-facto marketplace for knowledge and ideas. It is a way of better organizing and supporting the trade or commerce in knowledge and intellectual capital. It is the 'e-Bay for ideas' model. There are many variations on the knowledge market theme. Sub- patterns include such models as the knowledge store, the e-learning exchange, the question and answer exchange/experts ex-change, the intellectual property exchange, the talent exchange, the knowledge auction, the investment knowledge exchange, the community knowledge or social capital exchange. These approaches are so potentially revolutionary in their significance, that they may yet come to represent a disruptive technology innovation, in relation to the future management of knowledge. This rapidly evolving domain is profiled at our "Meta Portal to e-Knowledge Markets" at http://www.kikm.org.

31. Local or Indigenous Knowledge

This is the conservation, extraction and harnessing of intimate knowledge of the local environment or culture which could be extremely valuable. Ethno-botanists are frequently focused on this realm. Desert Knowledge Australia is an excellent exemplar (see http://www.desertknowledge.com.au/).

32. The Knowledge Toll Squeeze

This is a pattern whereby a company tries to hold a monopolistic or dominant position in a field of knowledge and to extract a fee for access to and use of this knowledge.

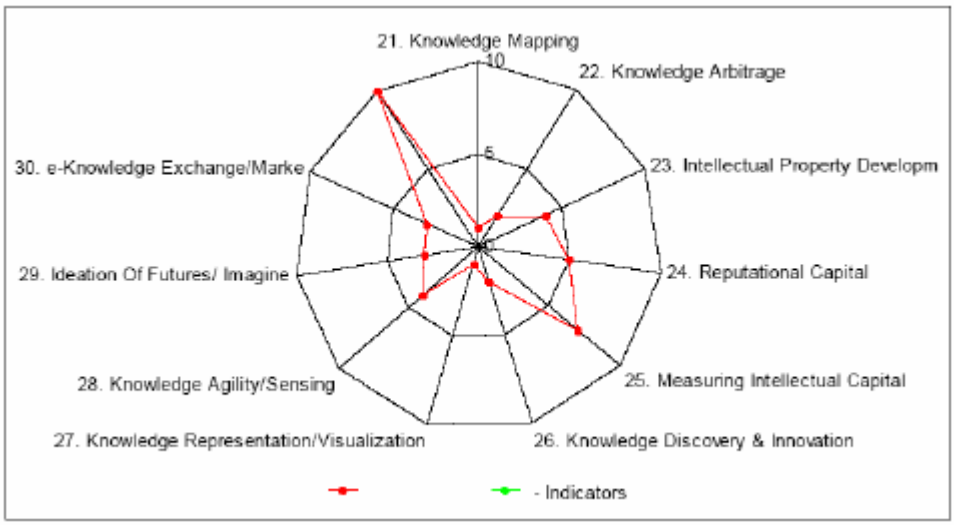


Figure 9. Radar Chart - Knowledge Performance Indicators – Group C.

21. Knowledge Mapping
22. Knowledge Arbitrage
23. Intellectual Property Development
24. Reputational Capital
25. IC Measurement / Scorecard
26. Product Knowledge Development
27. Knowledge Representation/Visualization
28. Knowledge Agility/Sense & Respond
29. Ideation
30. e-Knowledge Exchange/Knowledge Market

Conclusions

These are therefore some of the fundamental patterns we have observed in our research. They encapsulate major intellectual capital strategy choices in playing the knowledge game. We have argued that these patterns can be very powerful for aiding under-standing, communication, training, and alignment. However, they can also be very powerful as a diagnostic and assessment tool. This is what we work with, in completing our knowledge assessments and knowledge strategy assessments for clients. In our audits, we ask the question how adept a particular organization is, at recognizing and using these patterns. Each question is scored out of 10. We then have a clear idea where there may be great potential for strategic investment and improvement. The beauty of this approach is that while it is simple, fast, and easy to use, yet it's calibrated to measure an organization's

knowledge strengths where it's known to count, based on the experience of others. The three radar charts above are examples of the kind of visual knowledge pattern profiling we produce of an organization's knowledge strengths and weaknesses. It provides senior management with a clear baseline metric for understanding, and for taking further action. In Knowledge Management, it is important that we begin to better understand, recognize, internalize and harness the fundamental knowledge patterns applicable to the game. Knowledge pattern recognition is now a critical skill and core competency. Our Knowledge Assessment and Knowledge Strategy services, based on our ongoing knowledge pattern research, are a low risk, high benefit, intelligent, rapid, and affordable way to move forward.

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Jackson, P., Delahanty, H. (1995). Sacred Hoops Hyperion. New York.
Kahaner, L. (1996). Competitive Intelligence. Simon & Schuster, New York.
Kline, G. (2000) In: Fast Company. Issue 38, p. 296.
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Myhrvold, N. (1998) In: Fast Company. Issue 18, p. 93.
Rivette, K. G., Kline, D. (2000). Rembrandts In The Attic, Harvard Business School Press, Boston.
Slywotzy, Morrison, Moser, Mundt, Quella (1999). Profit Patterns. Times Business (Random House), New York.

Appendix

Related Resources :-

1. Knowledge Leadership
Entovation Global Knowledge Leadership Map
[http://www.entovation.com/kleadmap/index.htm]
Amidon, D. The 7 C's Of Knowledge Leadership.
[http://entovation.com/whatsnew/leadership-7cs.htm].

2. Knowledge Harvesting
Larry Todd Wilson is a cognitive psychologist and one of the leading practitioners in this field. http://www.knowledgeharvesting.com/

3. Story-Telling
http://www.stevedenning.com/
Denning, S. (2000). The Springboard: How Storytelling Ignites Action in Knowledge-Era Organizations. Butterworth Heinemann: October, 2000.
David Snowden of The IBM Cynefin Centre For Organization Com-plexity, is another leading theorist and practitioner. He has developed a series of pioneering methods, including the use of anthropological tech-niques for knowledge disclosure through the ASHEN model, the use of stories as an advanced form of knowledge repository, and the Cynefin model of formal and informal communities."
See also, The Knowledge Socialialization project At IBM,
[http://www.research.ibm.com/knowsoc/]
The Storytelling Centre – [http://www.storytellingcenter.net]

4. Intelligent Agent/ Knowbot
Software Agents Group, MIT Media Lab, [http://agents.media.mit.edu/]
Botspot, [http://www.botspot.com/]

5. Knowledge Reuse
Software, [http://www.cerebyte.com]
Quality Information and Knowledge Management, 1/e Kuan-Tsae Huang, Pleasantville, New York Yang W. Lee, Brighton, Massachusetts
Richard Y. Wang, Chestnut Hill, Massachusetts Published October, 1998 Prentice Hall PTR (ECS Professional)
http://www.phptr.com/ptrbooks/ptr_0130101419.html

6. Knowledge Mining
VxInsight from Sandia Labs, [http://www.cs.sandia.gov/projects/ VxIn-sight.html]
Knowledgist TM, is a comprehensive Knowledge Mining Tool.
Knowledgist is a powerful personal semantic processing tool that dra-matically reduces the amount of time people spend looking for relevant information on the Web, an Intranet, or their own computer.
http://www.invention-machine.com/

7. Workflow Process Assets
WARIA – [http://www.waria.com/]
INSEAD-
[http://www.insead.fr/CALT/Encyclopedia/ComputerSciences/Groupware/Workflow/]
WFMC – [http://www.wfmc.org]

8. Social Network Analysis
The International Network for Social Network Analysis
http://www.heinz.cmu.edu/project/INSNA/
Karen Stephenson is a Professor Of management and Corporate An-thropologist,a and is one of the leading luminaries in this field, [http://www.netform.com/]
Valdis Krebs is another leading practitioner of Organization Network Analysis, [http://www.orgnet.com/]

Linked The New Science Of Networks – [http://www.nd.edu/~alb/]

9. Competency Management
USNavy – Workforce Planning –
[http://www.chips.navy.mil/archives/02_spring/index2_files/workforceplanning.htm]
Agilience software [http://www.agilience.com]
Meta4 software [http://www.meta4.com]

10. Competitive Intelligence
Society For Competitive Intelligence Professionals
[www.scip.org]
Competia [http://www.competia.com]
Fuld & Company Inc [http://www.fuld.com]
11. Mind To Market
Roger Blackwell [http://www.rogerblackwell.com/]
Commercializing New Technologies: Getting from Mind to Market
by Vijay K. Jolly
See M2M – [http://www.m2m.ca]
Harvard – Mind Of The Market Laboratory
[http://www.researchmatters.harvard.edu/program.php?program_id=13]
Case: Real-World Knowledge Management: What's Working for Hoff-man-LaRoche
http://www.businessinnovation.ey.com/mko/html/case_studies.html
See Small Business School – [http://www.smallbusinessschool.org]

12. Growing Customer Capital
Don Peppers & Matha Rogers
http://www.1to1.com/
CRM Forum
http://www.crm-forum.com/

13. Knowledge Substitution
Dell's Build-To-Order Business Model – see Harvard Working Knowl-edge Article
[http://hbswk.hbs.edu/item.jhtml?id=3497&t=dispatch]
Mary Eisenhart -New Spin On The Supply Chain
[http://www.kmmag.com/articles/default.asp?ArticleID=346]
Knowledge-Based Logistics
[http://www.almc.army.mil/alog/issues/mayjun/ms047.htm]

14. Knowledge Network/Knowledge Centre
Buckman Labs - Knetix
http://www.knowledge-nurture.com/
Business Week Article – Spread The Know How
[http://www.businessweek.com/2000/00_43/b3704051.htm]
Radio Interview: Why knowledge management is smart, according to Brooke Manville, partner at McKinsey & Company
http://www.pc-radio.com/otr/strategy.html

15. Learning Organization
Peter Senge & Society For Organizational Learning
[http://www.solonline.org/aboutsol/who/]
Stanford Learning Organization Web
[http://www.stanford.edu/group/SLOW/]
David O. Ulrich, Professor of Business Administration
[http://execed.bus.umich.edu/main/faculty/doulrich.asp]
http://www.sumtotal.com
http://www.skillssoft.com/

16. Communities Of Practice
Etienne Wenger
http://www.ewenger.com/
George Por
http://www.co-i-l.com/
Communities of Practice and Pattern Language James B. Smethurst
http://www.mgtaylor.com/mgtaylor/jotm/summer97/community_of_practice.htm

17. Knowledge Aggregation
Zhu, Hongwei, Michael D. Siegel, and Stuart E. Madnick: Information Aggregation - A Value-added E-Service, Working Paper #106, 2001 MIT
[http://ebusiness.mit.edu/research/papers-author.html]
Brad Hoyt. [http://www.kmnews.com/Editorial/km.htm]

18. Knowledge Based Engineering
Knowledge Technologies International (KTI), [http://www.ktiworld.com]
Unigraphics, [http://www.ugsolutions.com]
Coventry University, Knowledge Engineering & Management Centre,
[http://www.kbe.coventry.ac.uk/]

19. Knowledge Environment/Worlds/ Ecologies
Integrating Spatial, Semantic, and Social Structures for Knowledge Management. - Chaomei Chen Department of Information Systems & Computing, Brunel University, Uxbridge, UK.
Davies, J. Knowledge Management Research, BT Laboratories, Mart-lesham Heath, Ipswich, [http://www.labs.bt.com/library/ ar-chive/hicss_99_1/]
Arian Ward - Work frontiers International
Victoria Ward, [http://www.poolonline.com/archive/issue8/iss8fea5.html]
Can The Design of Physical Space Influence Collaboration?

20. Smart Products & Services
Stan Davis [http://www.stanmdavis.com]

21. Knowledge Mapping
Know Map magazine, [http://www.knowmap.com/]
Denham Grey - Knowledge Mapping :A Practical Overview
Mitre - http://www.mitre.org/pubs/edge/april_00/damore.htm
Inspiration software
Mindjet.com - MindMan Mind-mapping software

22. Knowledge Arbitrage
E-Employment - Is It Time to Change the Way We Work?
Compelling Arguments for the Next Internet Revolution
by Ron Messer, MBA, CMA, CA
[http://www.wfs.org/messer.htm]

23. Intellectual Property Development
http://www.aurigin.com/
Rembrandts in the Attic: Unlocking the Hidden Value of Patents (Hard-cover)
Author(s): Kevin Rivette ; David Kline
http://www.hbsp.harvard.edu/hbsp/prod_detail.asp?8990

24. Reputational Capital
Thought Leader : Charles J. Frombrun
http://www.reputation.org/
http://www.reputationinstitute.org/

25. Intellectual Capital Measurement
Institute For Intellectual Capital Research -
http://www.business.mcmaster.ca/mktg/nbontis/ic/
The ICM Group - http://www.icmgroup.com
http://www.know-net.org/
Case: IC At Scandia - http://www.fpm.com/cases/el3.html

26. Product Knowledge Development
http://www.sopheon.com/
Coopers & Edgett -Product Development Institute - http://www.prod-dev.com/
http://www.pdinstitute.com/

27. Knowledge Representation/Visualization
http://www.inxight.com
Smart Maps - http://www.smartmoney.com
http://www.idiagram.com

28.Knowledge Agility - Sense & Respond
Rick Dove Chairman, Paradigm Shift International Senior Fellow, Agil-ity Forum
Dr. Charles Savage - http://kee-inc.com/agility.htm

Sense and Respond: Capturing Value in the Network Era Author(s): Stephen P. Bradley ed.; Richard L. Nolan ed.
Adaptive Enterprises - Creating and Leading Sense-and-Respond Organizations Stephan H. Haeckel
http://www.hbsp.harvard.edu/products/press/books/adaptive.html

29. Ideation
Dr. John Kao -http://www.jamming.com/
Peter Schwartz - Global Business Network - http://www.gbn.com/
Joey Reiman - http://www.brighthouse.com
David Siegel - Futurize Now
Leif Edvinsson - http://www.future-panel.com/theses/theses2.htm
http://www.ericsson.se/accessmagazine/english/article/nov_brain.html

30. e-Knowledge Exchange/e-Knowledge Market
Kaieteur Institute Meta Portal to e-knowledge markets See Taxonomy Of Sub-Patterns & & Links at
http://www.kikm.org/portal/page2.htm

31. Local or Indigenous Knowledge
Shaman Pharmaceuticals was engaged in trying to leverage ethno-botanical knowledge :- - eg see http://www.netsci.org/Science/Special/feature11.html
http://www.shaman.com/A_Shaman.html

32. The Knowledge Toll Squeeze
Celera Genomics, a private enterprise may be in a control position with regard to knowledge of the human genome for which it may be able to squeeze a toll for access to that knowledge base
www.celera.com

Contact Information:

Bryan Davis
Kaieteur Institute For Knowledge Management
67 Alberta Avenue,
Toronto, Ontario,
M6H 2R7

Tel:416-651-1837
E-Mail: bdavis@kikm.org
Web Site : http://www.kikm.org

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