Developing Inquiring Organizations

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Introduction

It's no secret that organizations today are facing rapidly changing environments. To continue to exist, much less thrive, enterprises must learn to adapt to the changes around them, and perhaps even to try to influence those changes themselves. Arie de Geus, former head of planning at Royal Dutch Shell believes that "The only sustainable advantage in business is the ability to learn faster than your competitors." [1, P. 1] Mark McElroy of Macroinnovation Associates goes farther, saying [1, P. 1] "The only sustainable advantage in business is the ability to *learn sustainably* – who cares how *fast* it is, if it's not sustainable." Hence, organizations must learn to adapt their behavior quickly, and maintain that ability to learn and adapt.

It is interesting to note that, due to the interrelated nature of organizational environments, as one organization behaves differently, it changes the environment of other entities with which it interacts, including competitors, customers, suppliers, shareholders, government agencies, and so forth. Thus as one organization learns and adapts, the need to learn propagates throughout the complex network of relationships. Thus, all parties participating in the system must learn to change, as well.

This paper summarizes work on "inquiring organizations," a kind of organization whose objectives include sustainable learning. Inquiring organizations are based on the theory of inquiring systems as proposed by C. West Churchman [2]. Churchman is a member of the pragmatic school of philosophy, so-named by Charles S. Pierce, considered by many to be one of the greatest American thinkers. Adherents to this school believe that knowledge should be useful in solving real problems, not simply "ivory-tower thinking." Other well-known pragmatists include William James, John Dewey, and Churchman's mentor, Edgar A. Singer.

Inquiry is an activity that produces knowledge. To develop his theories of inquiring systems, Churchman recast the ideas of various philosophers "…in the language of the design of an inquiring system." [2, p.18] In other words, he took a systems approach to knowledge creation. While his thoughts were directed at scholarly creation of knowledge, following Singer [3] and the other pragmatists, his ideas were oriented towards the development of "exoteric" knowledge, or

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knowledge relevant to "the common person." This is in contrast to scientific or esoteric knowledge, which becomes relevant to an increasingly smaller audience as it becomes more refined. This orientation towards common, practical knowledge makes inquiring systems suitable as metaphors for organizational learning, hence the notion of "inquiring organizations." [4]

This paper first reviews Churchman's inquiring systems, describing their relevance to organizational learning and knowledge management. This is followed by a discussion of two examples of inquiring organizations, and how, in general, they may be developed in practice.

Inquiring Organizations

Churchman named his inquiring systems after the philosophers on which they were based, specifically Leibniz, Locke, Kant, Hegel, and Singer. Each approach to knowledge creation is quite different, and is described briefly below, along with a discussion of the implications of each for organizational learning and knowledge management.

Liebnizian Organizations

It is actually somewhat difficult to envision the Liebnizian inquirer as an organizational model because it is a closed, deductive system that begins with a set of axioms and uses formal logic or mathematics to create knowledge. Theorem proving software would be an example of a Leibnizian inquirer. Knowledge is validated through assessing the logical consistency of the process. Organizational management problems, as implied in the introduction above, are anything but closed, and rather, are intimately tied to their environment. Nevertheless, it is useful to consider the Liebnizian approach, as there are lessons that can be learned by examining it.

The Leibnizian system is capable of generating sentences that represent knowledge claims, and can use logic to determine if a sentence is consistent with its axioms, and what the system already "knows." Churchman refers to what the system knows as being stored in "fact nets." [2, P. 19] One might envision fact nets as consisting of a knowledge base of expert system production rules, such as "If A and B are even-numbered integers, then A+B is an even-numbered integer." Or in a business situation, "If AOL merges with Time Warner and I am an AOL competitor, then (perhaps) I should merge with a content owner."

Straightaway, from these two simple examples, one might notice a couple of things about business rules as compared to rules in mathematical or scientific domains. First, the scientific rule is pretty much "true for all time." The business rule is situational and specific, and has a short life span. If these mergers take place, business marches on to the next set of problems. The old rule may as well be forgotten, or at least archived and not kept on the front burner. Also,

while the mathematical rule can be proven beyond any reasonable doubt, one is much less certain about the veracity of the business rule. The only way to prove the business rule is by "doing," and doing at the risk of great peril! One could test the rule by observing others, but then you incur the risk of falling behind. And falling behind in business today can be deadly. Remember, you not only have to learn fast, but sustainably.

Thus, the Liebnizian organization might be formal, but it can't ignore its environment the way the Liebnizian inquirer does. It is cognitive and logical, but not rule-bound. It must realize the fleeting nature of its knowledge base and keep it updated accordingly.

The Lockean Organization

The Lockean approach is pretty much the opposite of the Liebnizian. Whereas, the Liebinizian inquirer is closed, almost cold-bloodedly rational and logical, the Lockean system is open and inductive. It actively seeks input from the environment, and is communicative and social. Lockean inquirers use the five senses to observe the environment and engage in a discourse with others to develop interpretations and understanding of perceived phenomena. Knowledge creation in the Lockean system is very much a social process. Knowledge is validated by developing a consensus about what has been observed.

The Lockean approach is much more in line with the current writing about how organizational learning occurs, as reflected in work such as that of Argyris and Schon [5], Nonaka and Takeuchi [6], and the KMCI Life Cycle [7], further extended by McElroy [8] and Firestone [9]. Lockean organizations are social, behavioral, personal and intuitive. The Liebnizian is rational, logical and cognitive in its style. Lockean organizations are data-oriented, use information technology to store data, and use groupware to communicate. The Liebnizian uses formal methods and theory that may not be based on data analysis at all.

The Kantian Organization

The Kantian approach [2] combines the Lockean and Liebnizian and adds a time-space framework, to track the time and place at which observations were made. Kantian inquirers apply models to data to gain an understanding of phenomena that have been observed. Churchman describes these systems as having an executive routine that can turn models on or off. Each model has a measure of how well it is doing, such as an "r-square" in regression analysis. If the model is performing well, it continues its analysis, if not, the executive routing shuts it down. This "goodness of fit" measure is used as the validator of knowledge in the Kantian system.

The Kantian system is predominantly rational, and seems to lack the social, interpretive nature of the Lockean system. It is perfectly consistent with the

original concept of decision support systems, which, for example, Sprague and Carlson [10] defined as "Interactive computer-based systems to help decision makers use data and models to make unstructured decisions." It is also consistent with current work in data mining and online analytical processing, which use formal techniques to search very large databases for patterns that otherwise might not be detectable by human observation alone.

The Hegelian Organization

The Hegelian [2] approach takes a considerably different tack from the previous systems. Theoretically, the inquiring system uses Hegel's dialectic, which is based on the belief that the best way to understand an issue is by observing a debate between ardent supporters of diametrically opposed positions regarding that issue. The position of the proponents is referred to as the thesis, and the opposition's position is the antithesis. Churchman refers to the antithesis as the "deadliest enemy" of the thesis. A supposedly "objective" observer watches the debate and forms a synthesis, consisting of the most plausible elements of the thesis and antithesis. Ideally, the synthesis represents a higher order of understanding and "dissolves" the issue once and for all.

In practice, it hardly is reasonable for an organization to promote the "in your face" attitude that is implied by Hegel. Churchman himself, in his later work *Thought and Wisdom* published in 1982, [11] said that he took Hegel too literally in developing the Hegelian inquiring system theory. Pragmatically what is needed is a culture of mutual trust and respect in which organizational members feel free to discuss and debate issues openly and to express opinions without fear of being ridiculed or attacked. Managers must seek win-win solutions when there are opposing sides to an issue, and discourage personal attacks. More will be said about implementing the Hegelian approach in the next section of the paper.

The Singerian Organization

As mentioned previously, Churchman was a student of Singer, who himself was a product of the pragmatic school initiated by Pierce. The Singerian inquiring system has several features that make it unique. First, it is goal-seeking and idealistic, as Churchman [2, P. 200] says it, "…is above all else teleological, a grand teleology with an ethical base." The goal of the Singerian inquirer is the creation of common knowledge, suitable for resolution of social and public problems, in contrast to the Liebnizian system, for example, which is very much directed at esoteric, scientific knowledge. But social problems, hunger, poverty, homelessness and crime, reside in an environment that is exceedingly complex and highly interconnected. The same can be said for management problems, since business enterprises and any other organization, for that matter, exist within that same environment. Churchman recognized that social problems were

management problems, hence his move to the business school at Berkeley, despite his background in philosophy.

Because of the highly interconnected nature of social systems, the pragmatic school has argued that social problems must be treated holistically and systemically. Whereas science has made great strides by reducing problems to their essence and analyzing behavior of matter at ever-finer scales, management problems don't lend themselves to reductionism. Analytical and mathematical solutions work well for well-defined scientific and engineering problems. They have limited value in dealing with organizational and social problems. A much broader view is required, else the "solution" may turn out to create more problems than it solves. Take, for example, poverty. A Liebnizian view would hold that you can eliminate poverty by giving poor people money. But the way this was done with the U.S. welfare system turned out only to damage individual self-esteem, led to the disintegration of families, and to dysfunctional children who only exacerbated the problem by continuing the poverty cycle.

The Singerian approach also takes the practical view that to solve a problem one should use any means available. In this sense, it will employ any of the other four inquirers as needed to solve a problem. It will "sweep in" variables or methods from any discipline, if that will shed light on a solution. For well-defined problems, or even for well-defined parts of unstructured problems, a Liebnizian approach may suffice. But the Singerian problem solver maintains a view of the system as a whole, and seeks solutions that are ethical and even beautiful.

The Singerian system also places great emphasis on the use of measures. Knowledge is validated through a social process in which a community of Singerian inquirers each takes the same actions (in a scientific sense, replicates the same experiment), and makes the same measurements to see if they agree. If so, the knowledge is validated, at least to that level of refinement of the measures. The Singerian system learns by refining its measurement systems, or "pushing back the decimal places," as Churchman puts it. When readings *disagree,* then learning can occur. Different inquirers "sweep in" new variables to explain the discrepancy in readings. Measures are compared and results interpreted and discussed in Lockean-Hegelian style. New models for action are the result. Learning has occurred.

The Singergian system is perhaps the most powerful of all the inquirers, if for no other reason, it encompasses them all, plus bringing in ethical concerns and an emphasis on practical knowledge. But for this approach to work, it is imperative that organizations provide a nurturing environment in which open discourse can take place. The next section considers how this can be done.

Developing Effective Inquiring Organizations

Inquiring organizations are social entities. To even exist, they depend on cooperation among people. Yet, people inevitably conflict. Thus, organizational managers must foster cooperation, but manage conflict. Differences of opinion, when discussed in the right way, can lead to a greater understanding of the issue by all parties involved. When the debate devolves into personal attacks, it can destroy the cooperative spirit an organization needs. Some guidelines for developing effective cultures for inquiring organizations are discussed below. The discussion will center on Singerian organizations, since this type embraces the four others. Since Richardson and her colleagues [12, 13] found that the vitality of Singerian organizations seems to rise and fall with the quality of the dialectic process, the ensuing discussion focuses on the communication and debate, as also found in Lockean and Hegelian systems.

Build a Community of Minds

Clearly, one of the most basic elements of an inquiring organization is the need to communicate. To do so, organizational members must have a common language and psychological attitude. Also required is knowledge about others in the organization with which to communicate to share observations, inferences, interpretations and knowledge claims. That is, the inquiring organization requires a social network or "community of minds" whose members know one another, and speak the same language. The academic community has designed itself to foster such communication. It makes sense that learning organizations should do so as well.

Thus the inquiring organization should ensure that its members assimilate its cultural attitudes, and that they are trained in the language the organization uses. Moreover, employees should be encouraged to "network" with others and share relevant knowledge and observations. These should be among the objectives of organizational training programs.

Foster Effective Dialogue

While inquiring organizations need to develop a community of minds, they must avoid developing a community in which members are too like-minded. If so, "group-think" [14] may occur, in which team members fail to recognize important aspects of a problem because all of them are thinking alike. To avoid group-think and to get novel and creative solutions to problems, organizations must foster diversity in thinking and provide an environment that is conducive to open, effective dialogue.

Use of Hegel's dialectic lies at the heart of inquiring organizations [12, 13, 15, 16, 17]. However, the dialectic and positive conflict cannot exist without dialogue. Dialogue is more than just putting forth positions and opinions in a discussion. The concept of dialogue comes from the Greek term *dia* (through) *logos* (meaning), and literally means when a group of people talk with one another

such that the meaning moves through them [18, 19]. Thus dialogue is the basis of dialectic and may be viewed as collective reflection, which leads to learning [6, 18].

Dialogue also involves an attempt to uncover assumptions and beliefs, and encourages the engagement of multiple perspectives. A crucial element of dialogue is the deliberate inclusion of critical reflection and inquiry into basic assumptions [20]. Assumption surfacing is itself a crucial aspect of organizational problem-solving, as it uncovers biases and beliefs that may be incorrect or outdated [20, 21]. Discussion is an attempt to persuade, and is a converging process. Dialogue involves a quest to examine the question, and is a diverging process. When dialogue is effective, greater understanding will ensue, and convergence in the form of a synthesis will emerge.

Avoid Bureaucratic Rigidity

Many authors agree that bureaucracies tend to stifle dialogue and suppress knowledge creation [16] [22]. Addleson [22] says that organization is about relationships and collaboration. Bureaucracies tend to create barriers that keep people apart. But dialogue and learning come about from the relationships among people. Relationships must be fostered, not inhibited. While emphasis is on the importance of community and collaboration, it is recognized that people don't always get along. Conflict will occur, but must be managed and dealt with, not shoved into the background.

Rock the Boat

The Singerian inquirer recognizes a phenomenon not perceived by the other systems, the need for "paradigm shifts." This is tantamount to the organization re-inventing itself, developing a new business model. In a discontinuous environment brought on by rapid changes in information technology, globalization, and social change, the need for re-invention is happening more frequently. It is interesting to compare what Churchman says about the Singerian system, to Kevin Kelly's comments (editor of *Wired Magazine*) about organizations in the network economy. Churchman wrote:

> The spirit of the Hegelian inquiring system on which Singer
> built his theory of inquiry says that when all is going well, and
> data and hypothesis are mutually compatible, that is the time
> to rock the boat, upset the applecart, encourage revolution
> and dissent… This is the only way to reality, then begins the
> adventure to reveal our illusion and puts us back in the black
> forest. [2, P. 199]

Kelly, in describing his twelve rules for organizations in the "new economy,

> Organizations, like living beings, are hardwired to optimize what they know and to not throw success away… There is simply no room in the enterprise for the concept of letting go - let alone the skill to let go of something that is working, and trudge downhill toward chaos… But there is no alternative (that we know of) to leaving behind perfectly good products, expensively developed technology, and wonderful brands and heading down to trouble in order to ascend again in hope. In the future, this forced march will become routine [23].

Science makes major advances through paradigm shifts, brought about by an unusual insight or perspective. For example, Copernicus revolutionized astronomy by realizing that the earth was not the center of the universe, but mistakenly thought that the sun was. But it was 100 years before Newton overturned Copernicus' theory and realized that there is no difference between earthly and celestial phenomena. Today's organizations can't wait that long to build a new model. In the modern economy, things happen to quickly. Re-engineering and innovation must be fostered and encouraged.

Build a Storehouse of Knowledge

Churchman suggests that the community of inquirers must build a storehouse for the knowledge it creates. Clearly the same can be said for inquiring organizations. As the organization develops a community of minds, fosters dialogue and debate, and multiple interpretations of phenomena and issues, tacit knowledge is developed in the minds of organizational members. The dialogue helps individuals explicate their tacit knowledge, making it explicit. The organization should capture this explicit knowledge and maintain it in knowledge repositories, available to all appropriate people in the enterprise. In other words, organizations should develop knowledge management systems (KMS).

Hall [24] is working on the architecture of a KMS for inquiring organizations (see Figure One). The model emphasizes knowledge for decision-making, and follows Simon's [25] well-known intelligence-design-choice model. It is too complex to describe in detail here, but is based on an analysis of the characteristics of each of the inquiring systems, and contains modules that support all the processes found in the inquiring systems taken together. Unlike many traditional support systems that emphasize choice, the emphasis in an inquiring system is on knowledge creation, information acquisition/discovery, and accurate and timely opportunity/problem detection and definition (intelligence phase), followed by decision support (design and choice phases). In an inquiring system, the intelligence phase is an ongoing phase that performs the actions necessary to update the existing knowledge base, detect an opportunity or need, structure the problem, and define a desired state.
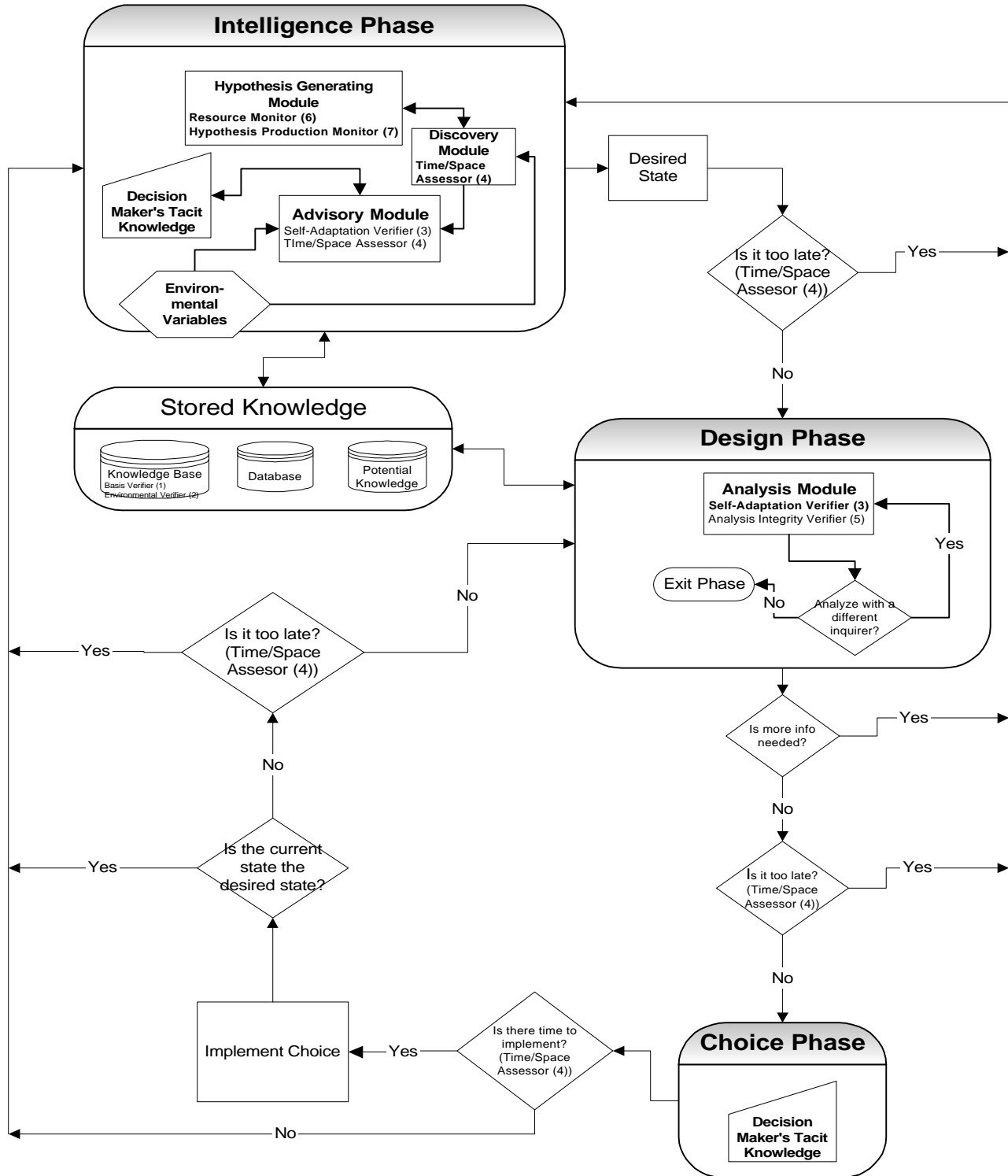
Intelligence Phase

Hypothesis Generating Module
Resource Monitor (6)
Hypothesis Production Monitor (7)

Discovery Module
Time/Space Assessor (4)

Decision Maker's Tacit Knowledge

Advisory Module
Self-Adaptation Verifier (3)
TIme/Space Assessor (4)

Environ- mental Variables

Desired State

Is it too late? (Time/Space Assesor (4)) — Yes

No

Stored Knowledge

Knowledge Base
Basis Verifier (1)
Environmental Verifier (2)

Database

Potential Knowledge

Design Phase

Analysis Module
Self-Adaptation Verifier (3)
Analysis Integrity Verifier (5)

Yes

Exit Phase

No

Analyze with a different inquirer?

No

Is it too late? (Time/Space Assesor (4)) — Yes

Yes

Is the current state the desired state?

No

Is more info needed? — Yes

No

Is it too late? (Time/Space Assessor (4)) — Yes

No

Implement Choice — Yes — Is there time to implement? (Time/Space Assessor (4))

No

Choice Phase

Decision Maker's Tacit Knowledge

Figure One -- Architecture of a Knowledge Management System for Inquiring Organizations

The design phase is responsible for analysis of the problem and the desired state, utilizing any one or more of the five inquirers implicit in the system. A decision maker is then able to use the results of the analysis from the design phase, in combination with tacit knowledge, to choose an action that will begin the movement from the current state to the desired state. Throughout the system are a number of loops that provide feedback and time/space analysis on the course of the chosen action toward the goal of the desired state.

It is important to remember that the model is not designed to represent a fully automated system. It is highly dependent on the decision maker(s), who in turn must be cognizant of the availability of the knowledge base and experiential knowledge available within the organization. The knowledge base itself is dependent on frequent communication between organizational members, during which some element of tacit knowledge is often articulated and becomes storable. While supporting the decision maker(s) by providing some element of analysis, the system is not independent of human interaction. Individuals ultimately will determine the desired state, interpret environmental variables, make temporal considerations, select a solution, and determine checkpoints at which to determine progress toward the desired state. The individual will have benefited from the system's support and can react more effectively and quickly than otherwise might be possible. When used as an integral part of the organization's operations, the system should provide for sustainable learning, as well. Ultimately, the comprehensive knowledge management system (KMS) for inquiring organizations is a system of individuals and advanced technology that might include transactional systems, decision support structures, expert systems, data warehousing, data mining, and collaborative software.

Summary

Organizations will have to learn quickly and sustainably to survive in the dynamic environments of the 21st century. The inquiring systems described by Churchman have undergone centuries of development, and have served the scientific community well as knowledge-creation systems. The Leibnizian approach provides rationality and logic, the Lockean brings in social intercourse, the Kantian multiple perspectives, the Hegelian, the dialectic and dialogue, and the Singerian, sweeping in them all and also adding a search for common knowledge.

Developing an inquiring organization involves building a community of minds, fostering effective dialogue, avoiding bureaucracy, occasionally rocking the boat and reinventing the organization, and building a storehouse of knowledge, that is, a knowledge management system. It seems to make sense that organizations may be able to adapt inquiring systems to their needs, especially if artificial knowledge management systems can be developed to make their operation

faster and more sustainable. Efforts will continue in the development of both the theory and practice of inquiring organizations in search of that goal.

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