Preface

Mason and Mitroff brought Churchman's (1971) inquiring systems into the mainstream of information systems research with their landmark article in *Management Science* in 1973. Yet, today they write in this volume: "To say that Singerian and Churchmanian systems are underrepresented is putting it kindly. They are virtually nonexistent." This book hopes to take at least modest steps toward remedying that deficiency.

Some steps in this direction began with a paper entitled "Inquiring Organizations" presented in the first Philosophical Foundations of IS (PFIS) mini-track at the Americas Conference on Information Systems in 1996 (Courtney, Croasdell & Paradice, 1996). Inquiring organizations are learning organizations that generate knowledge based on one or more of Churchman's inquiring systems. The basic concepts were refined, extended, and presented at a workshop on philosophical aspects of information systems at Wollongong University in Australia in 1998. This paper was published in the *Australian Journal of Information Systems* later that year (Courtney, Croasdell & Paradice, 1998) and republished in the electronic journal *Foundations of Information Systems* also in 1998 (http://www.bauer.uh.edu/parks/fis/fis.htm). These concepts were also extended to knowledge management (Malhotra, 1997), decision support systems (Courtney, 2001), and Perspectival Thinking (Haynes, 2000).

In this book, we emphasize ethical organizational behavior and make a move toward the explication of organizational wisdom (although Chauncey Bell's chapter eloquently disputes organizational wisdom as a possibility). As Churchman (1982) put it in *Thought and Wisdom,* "wisdom is thought combined with a concern for ethics" (p. 9).

Inquiring Systems, Organizations, and IT Support

Churchman defines five inquiring systems based on the epistemologies of Leibniz, Locke, Kant, Hegel and Singer. The five inquirers and organizations and information systems based on them are described briefly below. For a more complete discussion, see the papers cited in the foregoing paragraph. Features of each inquirer and organi-

Table 1. Summary of Inquiring Systems

	Leibniz	Locke	Kant	Hegel	Singer
Input	None	Elementary observations	Some empirical	Some empirical	Units and standards
Given	Built-in axioms	Built-in labels (properties)	Space-time framework Theories	Theories	System of measurement
Process	Formal logic Sentence generator	Assign labels to inputs Communication	Construct models from theories Interpret data Choose best model	Construct theses, antithesis Dialectic	Strategy of agreement Sweeping-in
Output	Fact nets Tautologies Contingent truths	Taxonomy	Fact Nets	Synthesis	New standard Exoteric knowledge Simplistic optimism
Guarantor	Internal consistency	Consensus	Fit between data and model	Objective Observer	Replicability Hegelian over-observer

zation are summarized in Tables 1 and 2, respectively, and supporting information technologies are summarized in Table 3.

The Leibnizian Inquirer

A Leibnizian inquirer is a closed system with a set of built-in elementary axioms that are used along with formal logic to deductively generate more general fact nets or tautologies. The fact nets are created by identifying hypotheses with each new hypothesis being tested to ensure that it could be derived from, and is consistent with, the basic axioms. Once so verified, the hypothesis becomes a new fact within the system. The guarantor of the system is the formal logic used to derive new knowledge and is reflected in the internal consistency and comprehensiveness of the generated facts.

An organizational application of the Leibnizian approach may be observed when the policies, goals, ideas of purpose, and core values, established by the organization's designers, serve as Leibnizian axioms. *Truth* is determined in a procedural manner with a focus on structural or procedural concerns and with error detection and correction being a direct consequence of comparing inputs with the accepted axioms of the system (i.e., organization). The organization's basic theorems, so defined, must be mutually consistent, lending themselves to rote memorization and direct application. Furthermore, new ideas, plans, and visions, (i.e., hypotheses) developed within the organization must be compatible with the existing policies, goals, and core values of the organization. As creative tension is exercised to bring the organization closer to its vision, this test of consistency must be continuously reviewed. Military organizations exhibit these properties.

Despite being closed systems, Leibnizian organizations are still capable of learning by using formal logic to create knowledge. Many expert systems operate with a static set of rules. Interrogation of the system results in suggested course(s) of action for problem resolution. Unlike a database, an expert system can draw upon its rule base to make inferences. Some of these systems learn by updating the knowledge base as new situations are encountered.

The Lockean Inquirer

Inquiring systems based on Lockean reasoning are experimental and consensual. Empirical information, gathered from external observations, is used inductively to build a representation of the world. Elementary observations form the input to the Lockean inquirer, which has a basic set of labels (or properties) that it assigns to the inputs. The Lockean system is also capable of observing its own process by means of reflection and backwards tracing of labels to the most elementary labels. Agreement on the labels by the Lockean community is the guarantor of the system. A community of Lockean inquirers learns by observing the world, sharing observations, categorizing new knowledge into existing labels, and creating a consensus about what has been observed.

The Lockean organization's culture or subculture (a Lockean community) determines the nature of learning and the way in which it occurs. Equivocality refers to the multiple, varied, and conflicting interpretations about an organizational situation. The Lockean inquirer attempts to reduce equivocality by building consensus among team members. Agreement by Lockean communities helps to establish new direction, agreement, and organizational knowledge.

The Lockean organization is able to support both adaptive and generative learning. Lockean systems are open to outside influences and have no built-in preconceptions of the world. These characteristics enhance the firm's generative learning by fostering new ways of looking at the world and preventing rigid adherence to existing standards and ideas. By accepting observational inputs without a biased view, the Lockean organization may see more clearly not only how events occur but also the systems that control the events. This is critical information to facilitate generative learning. The Lockean system, with its ability to observe its own process and trace back any label to the most elementary set of labels, supports this need.

Several technologies have been developed to support consensus building among team members. Information technologies that aid Lockean decision makers include Group Support Systems (GSS), Computer-Supported Cooperative Work (CSCW), the World Wide Web, Computer Networks, and Distributed Databases. These technologies provide mechanisms to bring decision makers together, giving them access to information online to support the decision making process. Some of these systems allow anonymous participation to encourage nonbiased and unencumbered input.

The Kantian Inquirer

The Kantian system is a mixture of the Leibnizian and Lockean approaches in the sense that it contains both theoretical and empirical components. The empirical component is capable of receiving inputs, so the system is open. It generates hypotheses on the

Table 2. Properties of Learning Associated with Churchmanian Inquiry

	Leibniz	**Locke**	**Kant**	**Hegel**	**Singer**
System	Closed	Open	Open/Closed	Open	Open
Learning Style	Behavioral Single loop	Consensual Generative	Cognitive Generative	Generative Double loop	Generative Double loop
Learning Mechanism	Simple error detection and correction	Reduction of equivocality	Knowledge scan Model matching	Synthesis by objective mediator	Trial and error Agreement and partition
Learning Level	Low	High	Multilevel	High	Multilevel
Learning Framework	Procedural	Strategic Architectural	Procedural Architectural	Architectural	Procedural Strategic
Learning Source	Syntactic	Pragmatic	Pragmatic Semantic	Semantic	Syntactic Pragmatic
Learning Orientation	Normative	Developmental Capability	Developmental Capability	Developmental	Developmental
Developmental Orientation	Apprentice	Specialist Generalist	Specialist Generalist	Renowned	Renowned

basis of inputs received. A clock and kinematic system are used to record the time and space of inputs received.

Perhaps the most unique feature of Kantian systems is that the theoretical component allows an input to be subjected to different interpretations. This occurs because the Kantian theoretical component is comfortable with alternative models of the world (alternative worldviews). Representations and interpretations are based on an *a priori* model of the world, often containing causal connections maintained in models. Translations from one *a priori* view of the world to another are possible, allowing multiple interpretations of the world to be accommodated. The theoretical component contains a model building constituent, which constructs Leibnizian fact nets. It tests the alternatives by determining the best fit for the data, and the guarantor in this approach is the degree of model/data agreement. The use of alternative models permits, for example, one piece of economic data to be interpreted differently by different econometric models (e.g., competing models proposed by different political parties). Additionally**,** an executive routine turns the Kantian models on and off and can examine their outputs in terms of the degree of satisfaction with their interpretations. Thus, if a model is not producing satisfactory results, it can be turned off, while those which are more successful proceed.

Kantian inquiry acknowledges that inputs received from various knowledge sources may have different interpretations. The Kantian organization is able to use explicit knowledge and implicit knowledge (i.e., hunches, intuition, experience, insights) to consider the many interpretations of inputs. Incoming knowledge is compared to organizational memory allowing the inquirer to consider ways to create and incorporate new knowledge. By considering associations between extant knowledge and new information, the Kantian inquirer establishes new worldviews.

An application of the Kantian approach can be seen in market testing of new advertising campaigns. Different advertisements exploiting different types of cues are often tested to determine which advertising approach generates the best response. Each advertisement alternative provides a different model to be evaluated. Ultimately, one advertisement (or perhaps a few) is selected for general use based on responses from the test subjects. Simultaneously, the company represented in the advertisements and the marketing agency producing the advertisements has an opportunity to learn about the product market. The chapter by Mafouz and Paradice in this volume provides an example of a Kantian retail organization.

Kantian inquiry may be viewed as a method for interpreting inputs to provide direction. In organizations, middle management is responsible for interpreting inputs from upper management and providing direction for lower level organizational members. Middle managers use the resources at their disposal to determine how best to fit tasks into the ongoing operations of the organization. Executive Information Systems, Decision Support Systems, and Group Support Systems that employ organizational models and knowledge sources (e.g., data warehouse, corporate databases, etc.) illustrate ways in which Kantian inquiry could manifest itself in learning organizations. Corporate Intranets and news groups are a rich resource for comparing current issues with past decisions. Paradice's (1987) SmartSLIM system is an application of the Kantian approach.

The Hegelian Inquirer

Hegelian systems function on the premise that greater enlightenment results from the conflict of ideas. The Hegelian dialectic is comprised of three major players. The first player begins the dialectic with a strong conviction about a fundamental thesis. This player or subject, besides holding a strong belief in the thesis, constructs a view of the world in such a way that information, when interpreted through this worldview, maximizes support for the thesis. The second player is an observer of the first subject. The observer generates an opposing conviction to the original thesis. In fact, the observer is "passionately dedicated to destruction of the first subject's conviction" (Churchman, 1971, p. 173). The final player in the Hegelian dialectic is a "bigger" mind and an opposition to the conflict between the thesis and the antithesis. This bigger mind synthesizes a new (larger) view of the world which absorbs the thesis/antithesis conflict. Synthesis generated by the objective bigger mind acts as guarantor of the system. Objectivity is based on a kind of interconnection of observers (Churchman, 1971, p. 149). They promise that "the movement from thesis-antithesis to synthesis is a soaring to greater heights, to self-awareness, more completeness, betterment, progress" (Churchman, 1971, p. 186).

Hegelian organizations rely upon the dialectic to resolve diametrically opposing viewpoints, the thesis and antithesis. In the Hegelian component of an inquiring organization, arbitration is used to evaluate and synthesize contributions from opposing viewpoints resulting in a larger mind which absorbs the thesis/antithesis conflict. Knowledge gained through Hegelian inquiry may result in an entirely new strategic direction for a given organization, as Mason (1969) has shown in his work on dialectical planning systems. Labor negotiations and an adversarial court system, when undertaken in good faith by both parties, provide an example of a strict interpretation of the Hegelian approach.

Hegelian inquiry in organizations has little structure or formal mechanisms to guide it. Group support systems that include negotiating and arbitration elements assist organizations in Hegelian inquiry. Conklin and Begeman (1988) designed gIBIS (graphic Issue Based Information Systems) to facilitate argumentative dialog among stakeholders in order to help them understand the specific elements of each other's proposals. Mason (1969) demonstrates strategic planning as another example of Hegelian inquiry within organizations. Hodges's (1991) Dialectron system can manage the dialog necessary to generate synthesis between problem domains incorporating thesis and antithesis by characterizing the dialectic as two parallel disputations.

The Singerian Inquirer

Two basic premises guide Singerian inquiry (Churchman, 1971, pp. 189-191). The first premise establishes a system of measures that specifies steps to be followed in resolving disagreements among members of a community. Measures can be transformed and compared where appropriate. The measure of performance is the degree to which differences among group member's opinions can be resolved by the measuring system. A key feature of the measuring system is its ability to replicate its results to ensure consistency.

Table 3. Summary of IT Support of Inquiring Organizations

	Leibniz	**Locke**	**Kant**	**Hegel**	**Singer**
Input	None	Goals, decisions, standards, policies, and procedures	Knowledge Sources Organizational Memory	Mission Statement	Units, Standards
Given	Standards operating procedures Rule base	Organizational history Organizational structure and culture	Tacit & explicit knowledge Working theories	Opposing Views	System of Measures
Process	Cause and effect analysis Inference	Negotiation Communication Consensus building	Knowledge scanning Association building	Arbitration	Sweeping-in variables to overcome inconsistency
Output	Simple error detection and correction Suggested course of action	Equivocality reduction	Integrated, timely knowledge	Conflict resolution Enlarged perspective New strategic direction	New measures Exoteric knowledge
IT Support	Expert systems	WWW Database GSS Networking	WWW Knowledge and model bases EIS, GSS, DSS	GSS Dialectron	Expert systems WWW Objects

The second principle guiding Singerian inquiry is the strategy of agreement (p. 199). Disagreement may occur for various reasons, including the different training and background of observers and inadequate explanatory models. When models fail to explain a phenomenon, new variables and laws are "swept in" to provide guidance and overcome inconsistencies. Yet, disagreement is encouraged in Singerian inquiry. It is through disagreement that worldviews come to be improved. Complacency is avoided by continuously challenging system knowledge.

The Singerian model is thus teleological, yet places great emphasis on ethical behavior. Furthermore, Singerian organizations seek the creation of exoteric (common) knowl-

edge, as opposed to the esoteric knowledge created by the other systems. The papers in this volume place special emphasis on ethical behavior and its relationship to wisdom.

The Singerian organization has the purpose of creating exoteric knowledge for choosing the right means for one's end. Knowledge must be connected to measurable improvements. Measures of performance are judged not only by organizational standards but also by what is good for all of society. A company has to know the kind of value it intends to provide and to whom. Knowledge is generated to be useful for all. In this regard, Singerian organizations model contemporary management trends where employees are empowered to contribute in the decision-making process. Working environments stress cooperation with fuzzy boundaries where teamwork and common goals are primary driving forces. Anyone may act as designer and decision maker.

Applications of Singerian inquiry are evident in standards making bodies, such as IEEE, ISO, and open-source software systems like Linux and Apache. Finally, Singerian organizations keep one eye turned to the needs of society to measure what is possible against what is good for humankind.

Systems and organizations that use metrics practice Singerian inquiry. Accounting systems are perhaps the *sine qua non* of measurement, as every enterprise must have one. However, accounting systems measure only the financial health of the firm. To understand and explain the organization fully, it is necessary to sweep in variables from a wide variety of sources both inside and outside organizational boundaries. Managers in a Singerian organization should develop measurement standards, continuously compare organizational performance to those standards, and modify models of performance as is required to achieve the standards.

Numerous examples of metrics exist in information technology. Telecommunications standards, reuse libraries, code generators, objects, and software metrics all incorporate standards and systems of measurement. The metrics and standards are constantly evolving due to the rapid pace of emerging and improving technologies. Organizations who become complacent can lose in a competitive marketplace. Other organizational elements that fit a model of Singerian inquiry include training offices and marketing departments. Training provides a forum for creating and measuring knowledge necessary for workplace activities. Marketing departments assign and evaluate sales quotas used to measure the success of organizational members. Richardson, Courtney & Paradice (2001) provide two detailed examples of Singerian organizations.

The Internet and World Wide Web serve as resource and dissemination agents for Singerian inquiry. During the sweeping-in process, inquirers are able to use the Web to gather and assimilate information that helps refine variables and reduce inconsistencies in the system of measurement. Once defined, new measures and standards can be posted to the Web and distributed to all interested parties. In this way, the exoteric knowledge goes forward to be useful "for all men in all societies" (Churchman, 1971, p. 200).

Organization of the Book

The book is organized into 16 chapters within four sections. In Section 1, Chapter I by Hall and Croasdell describe each of Churchman's inquirers as a process and how each can be perceived as an organizational form. By combining the forms suited to each inquirer, they show how an integrated organizational form founded on the inquirers can support an entire inquiring organization. Furthermore, they show how this form may be used to facilitate organizational learning and the creation and management of knowledge.

In Chapter II, Chae, Courtney, and Haynes demonstrate how Hegelian inquiring systems may be applied to "wicked" problem situations and knowledge work and how Hegelian inquiring organizations are well suited for the discontinuous environments of the new world of business. This chapter is based upon a multiple perspective pluralistic approach.

In Chapter III by Kienholz, Singerian Inquiring Organizations are further developed as the most appropriate type of inquiring organization for moving from knowledge management to wisdom by elaborating on the original knowledge management concepts and framework proposed by Croasdell, Courtney, and Paradice (1998). Finally in Chapter IV, Mafouz and Paradice discuss the Kantian inquiring system and apply it to an organization in the retail industry—Walmart.

In Section 2, Chapter V by Lichtenstein, Parker, and Cybulski argues that the real promise of organizational communication technologies may lie in their potential to facilitate participative discourse between knowledge workers at all levels in distributed locations and time zones. Their chapter presents a case study of a Singerian Inquiring Organization which illustrates how a fluid dynamic community of employees can use e-mail to build knowledge, learn, make decisions, and enhance wisdom through a cycle of knowledge combination (divergence) and knowledge qualification (convergence).

Chapter VI by Hall and Guo examines the issue of technological support for inquiring organizations and suggests that the complexity of these organizations is best supported by agent technology. Accordingly, a multiagent system to support inquiring organizations is introduced.

In Chapter VII, Murray, Case, and Gardiner observe that many modern organizations have attempted to create knowledge by using technologies such as Data Mining and Knowledge Discovery in Databases (KDD). Although quite powerful, these technologies depend heavily on the skill and insights of the analyst. They propose that the role of the analyst in the application of these technologies is poorly understood. To advance our understanding in this regard, they dedicate the first part of this chapter to describing the KDD process and relate it to the five philosophical perspectives of organizational knowledge acquisition, as originally discussed by Churchman (1971). In the second part of the chapter, they draw parallels between the process of knowledge acquisition via KDD with the concept of information foraging (Pirolli & Card, 1999).

Lastly for Section 2, Chapter VIII by Lundin and Vendelø examines one of the oldest themes in information systems research: the relationship between developers and users of information systems. They suggest that the problematic developer-user dynamic can be addressed by introducing an inquiring practice approach to information sys-

tems development. Consequently, this chapter conceptualizes a new way of understanding information systems development through the lenses of inquiring practice, Socratic dialogue, and the uncovering of exformation.

Chapter IX in Section 3 by Mason defines epistemological myopia as a kind of nearsightedness that limits what and how the organization knows and how it learns. For the underlying theme of the organization as an inquiring system, he draws from four distinct areas of study and develops ways of overcoming myopia: systems theory, organizational knowledge and learning, the organization as a learning community and community of practice, and linguistic relativity. The potential solutions to epistemological myopia include deliberate nurturing of cultural diversity, the institutionalization of Singerian approaches to inquiry, and the fostering of managed risk in experiments that do not guarantee success.

In Chapter X, Haynes articulates that Tacit Knowing critically contributes to the sustainable growth and future direction of an organization through its connection with (1) intuition (2) holism, and (3) ethics. As an example of Tacit Knowing, particularly in terms of ethics and intuition, a sixth Inquiring System is proposed, namely, a Heideggerian Inquiring Organization.

In Chapter XI, Fielden argues that mindfulness is an essential quality of integrated wisdom within inquiring organizations. A holistic, rather than a scientific, view of knowledge is adopted. The discussion is also underpinned by a pragmatic approach that incorporates rational, emotional, psychological, and spiritual perspectives. She provides a plan for developing mindfulness within organizations, which is described including consideration of multilayered development and ordered, unordered, and disordered organizational arenas.

For Chapter XII, Bell explores the ways that wisdom and wise action appear in the work of organizations and asks how systems can be designed to support that. Building on Churchman's thought experiment with five philosophers about how to improve the design of systems, the author asks and brings fresh answers to the questions, "What is wisdom?" and "What is wisdom in organizations?"

Finally in Chapter XIII, Wickramasinghe considers knowledge a compound construct, exhibiting many manifestations of the phenomenon of duality such as subjectivity and objectivity as well as having tacit and explicit forms. Her thesis is that a full appreciation of the phenomenon of duality is necessary to enable inquiring organizations to reach the state of wisdom and enlightenment.

In Section 4, Hermeneutics, Transformations, and Abstractions, Chapter XIV by Dickey and Paradice uses cultural hermeneutics as a lens for understanding philosophies of inquiry in distributed work groups. The authors suggest that philosophies of inquiry can be ascertained through hermeneutic analysis of written texts created by distributed workers using computer-mediated communication systems.

In Chapter XV, Warne, Hasan, and Ali examine social learning at the Australian Defence Organisation (ADO). They identify factors that enable knowledge generation and transfer in organizations and contribute to the creation of an organizational culture that supports continuous learning. The chapter concludes with a description and suggested application of the Cynefin Model which offers a pragmatic and conceptual alternative to the orthodoxy of scientific management.

Finally in Chapter XVI, Kilov and Sack show how crucial aspects of organizational knowledge and organizational inquiry can be exactified using a relatively small number of abstract concepts common to various areas of human endeavor such as (exact) philosophy, business management, science, and technology. Exactification is achieved, first and foremost, by creating and using ontologies—business and organizational domain models with precisely defined semantics.

In summary, we believe that the chapters offered in this book constitute considerable coverage of the issues that underlie and parameters that extend Inquiring Organizations as inspired by C. West Churchman's work. It is our fervent hope that these 16 chapters provide a sufficiently broad theoretical foundation and, consequently, a solid enough *springboard* for future researchers and practitioners to pursue and to develop in their own *local colors*.

James F. Courtney, Orlando, Florida, USA

John D. Haynes, Orlando, Florida, USA

David B. Paradice, Tallahassee, Florida, USA

June 1, 2004

References

Churchman, C. W. (1971). *The design of inquiring systems: Basic concepts of systems and organization.* Basic Books.

Churchman, C. W. (1982). *Thought and wisdom.* Intersystems Publishers.

Conklin, J., & Begeman, M. L. (1988). gIBIS: A hypertext tool for exploratory policy discussion. *ACM Transactions on Office Information Systems, 6*(4), 303-331.

Courtney, J. F. (2001). Decision making and knowledge management in inquiring organizations: Toward a new decision-making paradigm for DSS. *Decision Support Systems, 31*(1), 17-38.

Courtney, J. F., Croasdell, D. T., & Paradice, D. B. (1996, August). Inquiring organizations. *Proceedings of the Americas Conference on Information Systems* (pp. 443-445). Phoenix, Arizona.

Courtney, J. F., Croasdell, D. T., & Paradice, D. B. (1998). Inquiring organizations. *Australian Journal of Information Systems, 6*(1), 3-15. Reprinted in *Foundations of Information Systems: Towards a Philosophy of Information Technology.* Retrieved September 1, 2004, from *http://www.mis.fsu.edu/philosophy/pfis/*

Haynes, J. D. (2000). *Perspectival thinking: For inquiring organisations.* New Zealand: ThisOne and Company.

Hodges, W. S. (1991). *Dialectron: A prototypical dialectic engine for the support of strategic planning and strategic decision making.* Unpublished doctoral dissertation, Texas A&M University.

Malhotra, Y. (1997). Knowledge management in inquiring organizations. *Proceedings of the Third Americas Conference on Information Systems*, 293-295.

Mason, R. O. (1969). A dialectical approach to strategic planning. *Management Science, 15,* B403-B414.

Mason, R. O. & Mitroff, I. I. (1973). A program for research in management information systems. *Management Science, 19*(5), 475-485.

Paradice, D. B., & Courtney, J. F. (1987). Causal and non-causal relationships and dynamic model construction in a managerial advisory system. *Special Issue of the Journal of Management Information Systems on Knowledge-Based Decision Support Systems, 3*(4), 19-53.

Richardson, S. M., Courtney, J. F., & Paradice, D. B. (2001). An assessment of the Singerian approach to organizational learning: Cases from academia and the utility industry. *Special Issue of Information Systems Frontiers on Philosophical Reasoning in Information Systems Research, 3*(1), 49-62.