MARK E. NISSEN

# Harnessing Knowledge Dynamics

## Principled Organizational Knowing & Learning

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# Foreword

"Remember that information flows, but that knowledge grows" is what I once told the graduate students in the PhD seminar on knowledge management that I co-taught at USC with my colleague Dr. Alexander Hars in the late 1990s. How could one possibly apply a transportation or flow metaphor to something as evolving and capricious as knowledge? And everyone seemed comfortable with that. It gave them a way of thinking about knowledge that captured its organic nature and its distinction from information, and perhaps it also had some intellectual playfulness in a memorable one-liner. I had even exported that image to the Swedish School of Business and Economics in Helsinki, Finland where I co-taught the doctoral workshop on knowledge management in 1997. Even the Scandinavians who are culturally and historically the masters of knowledge sharing and participation accepted that distinction. Furthermore, in 2001, I published a book on redesigning enterprise processes for e-business, and, in it, the link between business processes and knowledge was mainly about increasing the knowledge-creating capabilities around a specific business process. Mark Nissen, with this innovative and mold-breaking book, has elegantly shown that my statement and approach around knowledge growing rather than flowing were limiting. Knowledge too can flow — and regarding it as such has many operationally practical benefits to management, decision making, and the execution of business processes. As enterprises grow to be more knowledge-intensive and knowledge permeates all business processes (even the very mundane ones), Dr. Nissen's view is an increasingly useful one.

The concept that organizational knowledge moves and flows from how it exists and where it is located to how and where it is needed in order to enable work and organizational performance is a very powerful idea in this book. It

heralds the emergence of a school of knowledge dynamics that combines in an operational manner the capriciousness and elusiveness of tacit knowledge with the down-to-earth phenomena of process flow analysis. It also brings to the attention of both academics and practitioners the notion of the "knowledge divide" in terms of the difference between the "haves" and the "have-nots." The book's driving notion is that there are different kinds and levels of knowledge within an organizational setting, and there is a critical need for a principled way of managing this distribution of knowledge in order to enhance organizational performance. This book is both conceptually elegant and operationally useful and is a much needed contribution.

Dr. Nissen gives us solid principles and techniques that we can use to manage knowledge flows, and the 30 knowledge flow principles are practically useful to anyone who would like to understand how to harness knowledge management as a strategic capability for enhancing organizational performance. The principles lead us through the logic and "how to" that explains the unevenness of distribution of knowledge and how it must flow for organizational performance, the criticality of tacit knowledge, and what drives the flow of knowledge. It unearths some very new and previously untreated issues, such as the tendency of knowledge to remain at rest, the relationship between workflows and knowledge flows, and how knowledge flows lie on the critical path of workflows and, hence, influence organizational performance. The principles take into account how knowledge flows and organizational change are linked in multidimensional ways and the role of information technologies in enhancing and managing knowledge flows. The 30 actionable principles are a treasure chest for understanding, diagnosing, and enhancing knowledge dynamics and organizational performance.

The second section of the book has the application cases that test the mettle of those principles and provide ways of relating to a variety of organizational contexts that help managers apply these principles to their own organization or enterprise setting.

Dr. Nissen weaves the phenomena in this book like a probing doctor who identifies medical pathologies with a knowledge flow stethoscope, and yet he anticipates future issues like a skilled urban planner who needs to better allocate knowledge as a public good. The book brings together the conceptual richness of a new way of diagnosing knowledge flows with the practical operational how-to of linking that to organizational performance and the requisite organizational change for long-term competitive advantage. It identifies archetypes of knowledge flow patterns that help diagnose and uncover problems, but also directly links that with management interventions.

Finally, the book does something that will, in my opinion, becoming increasingly important in the coming years: It sets the stage for better management of real-time organizations. As the environment continues to speed up, techniques for real-time management will increasingly influence organizational performance. Knowledge dynamics is at the heart of managing real-time enterprises and organizations, and Dr. Nissen's book is showing us the way of the future and how we can apply it now.

I think my new pseudo-rhyming one-liner should now be something like, "Comatose knowledge flows help you diagnose where organizational performance goes..."

I am honored and proud to write the foreword to this mold-breaking and immensely useful book.

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# Preface

Knowledge is power. Knowledge represents one of the few bases of sustainable competitive advantage available to the modern enterprise, but knowledge is distributed unevenly through most organizations. Rapid and reliable flows of knowledge across people, organizations, times, and places are critical to enterprise performance. Unfortunately, the leader and manager have negligible current guidance for assessing and enhancing knowledge flows in practice. A dearth of contemporary research addresses the dynamics of knowledge, which are fundamental to understanding knowledge flows.

For several instances, epistemology has much to say about the nature of knowledge, but it offers little actionable guidance for the leader and manager; information science and information technologies have much to say about flows of information and data, but knowledge is distinct (e.g., it enables action) and exhibits different dynamic behaviors; knowledge management has much to say about organizing static knowledge, particularly knowledge articulated in explicit form, but it remains largely silent concerning dynamics of tacit knowledge; and strategy has much to say about the benefits of competing on the basis of knowledge, but it offers little in terms of how such benefits can be obtained.

Alternatively, emerging knowledge-flow theory addresses the dynamics of knowledge — as distinct from information and data — directly. It also applies equally well to tacit and explicit knowledge. Techniques associated with knowledge-flow analysis enable the practicing leader and manager to visualize flows of knowledge using a multidimensional framework. Such techniques also facilitate diagnosing an enterprise's knowledge flows for problems such as bottlenecks, clumping, source inadequacies, and short circuits. Archetypal knowl-

edge-flow patterns associated with well-understood management interventions (e.g., training, mentoring, communities of practice, experience, technology) can be matched with diagnosed problems to generate practical plans for enhancing knowledge flows.

The knowledge of how to diagnose and enhance knowledge flows exists today. It is ready to emerge from the lab and to inform the leader and manager in a practical way. However, the practicing leader and manager are unlikely to piece together the numerous elements from academic journals and laboratory research. Knowledge-flow theory is emerging still and only beginning to cohere and coalesce into actionable principles. This book condenses, consolidates, and collimates such actionable principles into articulated form that can enable leaders and managers to depart from the prevalent current practices of trial and error and imitation. Trial and error represents a well-known approach to organizational knowing and learning: It is known well for being very slow and inefficient as well as error-prone. Imitation also represents a well-known approach to organizational knowing and learning: It is known well for copying the many mistakes of others as well as their occasional successes. In contrast, our principled approach to organizational knowing and learning can enable leaders and managers to directly identify and solve problems with knowledge flows. Through such principled intervention, an organization can set the standard to be envied and imitated by its competitors.

This book builds upon theory but targets practice; it takes knowledge known only by a few researchers and shares it with many leaders and managers. It translates what is arcane and controversial today into managerial guidance that is sophisticated yet practical. It complements the many extant management books on strategy, technology, knowledge, and systems while addressing a well-recognized and significant void. This book provides 30 principles on which to base the most important decisions and actions in an organization: harnessing knowledge dynamics. Such principled approach defines a unique place for and contribution of the book. This book also provides 30 leadership mandates to make actionable the principles and applications presented in this volume. Such integration of principles and applications defines another unique place for and contribution of the book.

The overall objective is to inform the practicing leader and manager about the importance of knowledge flows and to provide practical but principled guidance for diagnosing and enhancing such flows. The mission is to condense emerging knowledge-flow theory and to distill it into actionable form of immediate relevance and use by enterprise leaders and managers. The principal audience is the enterprise leader and manager (e.g., in business, government,

non-profit) with concerns about organizational knowledge. The book provides a set of actionable principles to understand the phenomenon of knowledge flows, and it includes many concrete examples to help ground such principles in the realities of practice. The book also includes several practical illustrations of key principles and techniques. A variety of organizations from the business, government, and non-profit sectors are selected for examination of their knowledge flows. The application cases in Part II offer detailed yet generalizable examples of how principles apply to operating organizations in practice. Such cases provide opportunities to induce new principles as well. Such induction leads to the 30 leadership mandates noted previously.

The academic is also likely to take interest in the book for use in teaching (e.g., on knowledge management, information systems, strategy, organization) and for research. The concise and articulated set of 30 principles for knowledge dynamics appears to be unmatched today in the scholarly literature. Each chapter also includes exercises to stimulate critical thought, learning, and discussion. These exercises are ready for classroom use and allow ample room for instructors to tailor the associated discussions. The references cited in this book point to a rich and integrated literature that remains fragmented largely among several different scholarly fields at present. Such references point to a substantial, growing intellectual basis for understanding knowledge flows and for harnessing the power of dynamic knowledge.

The book also includes a relatively large glossary of key terms. Each term is defined and includes a pointer to the chapter in which it is discussed. Although universal agreement on the definitions contained in this glossary would not be expected at this time, by including such glossary, we make explicit the meaning and usage of key terms used in the book. This helps to promote a common lexicon in the field of knowledge dynamics, and it enables one to understand, explicitly, what the various terms in this book are intended to mean. This provides a stark contrast with most books today.

The book further includes an appendix that lists the code of a small, simple, illustrative expert system discussed in the knowledge technology chapter. By including the complete code, the book enables an instructor to leverage the expert system discussion and gives students an assignment to develop a small system of their own. Students can learn much from developing expert systems, particularly when assigned to "knowledge engineer themselves"; that is, when the assignment is for students to make knowledge that they possess explicit. This helps students to better understand their own tacit knowledge, and it reinforces numerous important principles about knowledge from the book.

To harness knowledge, one must understand how it flows through the organization; that is, one must understand the dynamics of knowledge flows. The key to such understanding is knowledge: knowledge about knowledge dynamics. Such knowledge represents the focus of this book. Through its principles, the leader and manager can learn to harness knowledge dynamics.

*M.E.N.*
*Royal Oaks, CA*

# Acknowledgment

As with any undertaking on the scale of a book such as this, the author serves largely as spokesperson for many others who have contributed and helped to refine good ideas. This is certainly the case here. This also explains in part why the words *we* and *our* are used instead of *I* and *my*. The book contains myriad literary citations to acknowledge the sources of good ideas upon which it builds. This represents the standard for acknowledgment in academics. Each of the cited authors should feel proud to know his or her work contributes to an endeavor as important as harnessing knowledge dynamics. Of course, there are others as well. You know whom you are, and I thank all of you, again, warmly. Last and hence first, there could be no book like this without the grace of God, to Whom I am thankful most of all.

*M.E.N.*
*Royal Oaks, CA*

# Knowledge-Flow Principles and Application Cases

For ready reference and as a précis of subsequent chapters, we summarize here 30 knowledge-flow principles addressed in detail through Section I of the book. Each principle is accompanied by a corresponding implication (**emboldened** for emphasis) for managerial learning and intervention.

1. Knowledge is distinct from information in enabling competitive advantage (see Ch. I). **Shuttling *information* around via computers, networks, reports, and communications does not address the flow of *knowledge*, at least not directly or on the same time scale.**
2. Knowledge is distributed unevenly, hence, must flow for organizational performance (see Ch. I). **Knowledge clumps need to be identified, and knowledge flows need to be enabled through the organization.**
3. Tacit knowledge supports greater appropriability for competitive advantage than explicit knowledge does (see Ch. I). **Knowledge managers may benefit from an emphasis on tacit knowledge flows.**
4. Knowledge flows must balance exploration through learning with exploitation through doing (see Ch. I). **Understanding the kinds of knowledge that are important in an organization's particular environment is essential for promoting the most important knowledge flows.**
5. Enhancing knowledge flows requires simultaneous attention to personnel, work processes, organizations, and technologies (see Ch. I). **The four organizational elements of personnel, work processes, structure, and technology operate as a cohesive system and should be addressed as an integrated design problem.**

6. Knowledge enables action directly, whereas information provides meaning and context for such action (see Ch. II). **Understanding whether flows of data, information, or knowledge are required in a particular situation depends upon what needs to be accomplished (e.g., resolving uncertainty, deriving meaning, or enabling action, respectively).**
7. Data, information, and knowledge flows are interrelated dynamically yet distinct *mental* processes (see Ch. II). **People play the critical role in flows of data, information, and knowledge.**
8. Flows of knowledge require supplementary flows of information, data, and signals (see Ch. II). **Every flow (data, information, and knowledge) from signal interpretation through knowledge creation requires some kind of knowledge.**
9. *Explicitness* represents a very discriminatory dimension for evaluating the uniqueness of knowledge (see Ch. II). **Moving knowledge through tacit vs. explicit flows represents a management decision in many cases, a decision which has implications in terms of power.**
10. Information technology supports principally flows of explicit knowledge (see Ch. II). **The nature of knowledge represents a critical factor for determining where IT can be expected to enhance knowledge flows.**
11. Knowledge exhibits some properties of inertia such as *tendency to remain at rest* (see Ch. III). **Knowledge-flow processes represent direct focuses of leadership and managerial action.**
12. Experiential processes contribute principally toward workflows (doing), whereas educational processes contribute principally toward knowledge flows (learning; see Ch. III). **Changes to workflows demand changes to knowledge flows, and vice versa.**
13. Knowledge flows always lie on the critical paths of workflows, hence, organizational performance (see Ch. III). **Knowledge flows should be planned and managed like workflows are.**
14. Time-critical workflows must wait for enabling knowledge flows to run their course (see Ch. III). **Most knowledge flows must complete their course before critical and dependent workflows can begin.**
15. *Knowledge* is a multifaceted, dynamic, and multidimensional concept (see Ch. III). **Managerial efficacy through intervention can be increased by learning the principles of dynamic knowledge.**

16. Information technology is helpful and necessary but not sufficient for knowledge management (see Ch. IV). **The manager needs to employ non-technological interventions to enhance knowledge flows.**
17. People — not information technology — are central to tacit knowledge flows (see Ch. IV). ***One cannot manage tacit knowledge without managing people.***
18. Information technology plays supportive roles in organizational work routines, whereas people play the performative roles (see Ch. IV). **Most IT plays a supportive role in the organization, whereas people play most of the performative roles.**
19. Expert systems, software agents, and like "intelligent" applications address and apply knowledge directly (see Ch. IV). **"Intelligent" applications can play a performative role in the organization.**
20. Simulation technology can enhance knowledge flows in addition to workflows (see Ch. IV). **Simulation represents a different class of IT, one that facilitates learning as well as doing through virtual practice.**
21. Knowing reflects knowledge in action (see Ch. V). **Knowledge must be put to use through action in order to be useful.**
22. Learning reflects knowledge in motion (see Ch. V). **Learning both uses and increases knowledge.**
23. Knowing and learning beyond the individual offer the greatest potential for knowledge superiority (see Ch. V). **The impact of KM increases in direct proportion to the reach of knowledge flows through an organization.**
24. Knowing and learning are dynamic, mutually reinforcing activities (see Ch. V). **Promoting knowing promotes learning, and vice versa.**
25. Knowing and learning are path-dependent, enabling both competencies and rigidities (see Ch. V). **An organization's knowledge inventory both enables and inhibits what actions it can take.**
26. Knowledge management involves organizational change (see Ch. VI). **The knowledge manager has much to learn from business process re-engineering and like change-management approaches.**
27. Knowledge inventory can be used to assess an organization's readiness to perform its work processes effectively (see Ch. VI). **The manager needs to measure the knowledge inventory for every organization.**

28. When estimating the value of knowledge, it is often better to light a candle than to curse the darkness (see Ch. VI). **Knowledge value analysis provides an approach to measuring the relative value of knowledge associated with various organizational processes.**
29. Culture, trust, and incentives affect organizational learning, hence, performance as much as process, technology, and training do (see Ch. VI). **Every organizational process should improve its performance over time.**
30. Computational modeling is useful for knowing and learning about organizational knowing and learning (see Ch. VI). **Computational models of knowledge flows provide an approach to mitigating the risk inherent in KM programs.**

We also list the nine application cases to which such principles are applied in Section II of the book.

1. In the chapter on business organizations, we look first at an advanced-technology company involved with new-product development (see Ch. VII).
2. The discussion turns then to examine an independent production company involved with a feature film (see Ch. VII).
3. The third case involves a technology-transfer project between a university and a microelectronics company (see Ch. VII).
4. In the chapter on government organizations, we look first at a military organization involved with maritime warfare (see Ch. VIII).
5. The discussion turns then to examine a federal government agency involved with a knowledge management program (see Ch. VIII).
6. The sixth case examines a public service organization involved with large-scale IT integration (see Ch. VIII).
7. In the chapter on non-profit organizations, we look first at a national youth soccer organization (see Ch. IX).
8. The discussion turns then to examine a local tennis club (see Ch. IX).
9. The final case examines a nondenominational community church (see Ch. IX).

We list further the set of 30 leadership mandates induced through practical application in Section II of the book.

1. Realistic expectations, shared vision, and appropriate people participating full-time represent the preconditions for success that are absent or insufficient most often in KM projects (see Ch. VI).
2. Reliance upon external expertise, narrow technical focus, and animosity toward staff and specialists represent the preconditions for failure that are present or sufficient most often in KM projects (see Ch. VI).
3. Knowledge representation, attention to tacit knowledge, and focus on organizational memory represent unique considerations that merit particular attention in KM projects (see Ch. VI).
4. Measurements of how people perceive a KM project (e.g., using measures such as *pessimism, affective commitment,* and *normative commitment)* can indicate KM readiness (see Ch. VI).
5. Knowledge audits can help organizations that do not know what they know (see Ch. VI).
6. Knowledge value analysis privileges tacit knowledge appropriately (see Ch. VI).
7. The greater the use of automation at the beginning of a process, the lower the improvement rate (see Ch. VI).
8. Performance improvement reflected by learning curves involves more than just individual knowing and learning (see Ch. VI).
9. Knowledge can be lost and found (see Ch. VI).
10. Trust cannot be bought (see Ch. VI).
11. Using computational models, organizations can be designed and tested virtually, in a manner similar to the design of airplanes, bridges, and computers (see Ch. VI).
12. Specialist and generalist knowledge represent (imperfect) economic substitutes for one another (see Ch. VI).
13. Knowledge-flow vectors can be used to represent dynamic knowledge requirements (see Ch. VII).
14. It is essential to plan how knowledge technologies will be used by people (see Ch. VII).
15. The learning curve measures knowledge flows through OJT (see Ch. VII).

16. Socialization and acculturation represent viable approaches to enhancing tacit knowledge flows (see Ch. VII).
17. Trans-organizational collectives (e.g., communities) may have greater influence over employee knowledge, culture, and performance than leadership and management do (see Ch. VII).
18. Knowledge flows critical to enabling critical workflows center on tacit knowledge (see Ch. VII).
19. An organizational process without consistent improvement over time suffers from knowledge clumping (see Ch. VII).
20. Members of a team must learn to work with one another before knowing how to work together on a project (see Ch. VII).
21. Ten unique knowledge-flow processes are required for military task force efficacy (see Ch. VIII).
22. OJT involves knowledge flowing at two different speeds: knowledge application through doing is fast; knowledge creation through learning is slow (see Ch. VIII).
23. Given the time-critical nature of warfare, most tacit knowledge must already be in place when the officer first reports for duty (see Ch. VIII).
24. Systematic storytelling can increase the reach of this time-honored and effective approach to sharing tacit knowledge (see Ch. VIII).
25. Socialization, teamwork, and acculturation must interconnect to enable healthy knowledge-flow circulation (see Ch. VIII).
26. Leading by example and evangelism represent viable approaches to enhancing acculturation knowledge flows (see Ch. IX).
27. Once one understands a relatively small set of key knowledge-flow processes, he or she can analyze any knowledge flows — healthy or pathologic — in any organization (see Ch. IX).
28. The key to self-organization is having people enjoy what they do together (see Ch. IX).
29. The ability of different people to work together on teams is just as important as the individual skills and experiences they bring individually (see Ch. IX).
30. Leaders who are concerned about acculturation knowledge flows must address participants' beliefs. (see Ch. IX).

# SECTION I:
# INTELLECTUAL BASIS

*True knowledge exists in knowing that you know nothing.*

*Socrates*

*Cogito ergo sum.*

*Descartes*

*We have much to say about this, but it is hard to explain because you are slow to learn.*

*Heb. 5:11*

The intellectual basis of this book centers on emerging knowledge-flow theory. This involves the growing body of research addressing questions regarding how knowledge "moves" through an organization. Knowledge is required to perform knowledge and information work effectively, and such work drives organizational performance directly. Hence, knowledge drives organizational performance through the work it enables. To the extent that organizational knowledge does not exist in the form needed for application or at the place and time required to enable work performance, then it must flow from how it exists and where it is located to how and where it is needed. This is the concept *knowledge flows*. As explained in this book, the concept *knowledge flows* represents more than just a metaphor: It explains the phenomenon of how knowledge moves through an organization.