with taxonomies, thesauri, indexes, and the world of textual information retrieval in general.

The bottom line in this new third stage of KM is that information professionals need to make their skills known to the KM community, and the KM community needs to seek out information professionals and bring them more into the KM fold. If that does not happen, there will be much needless reinvention of the taxonomic wheel.

Endnote

For a discussion of the developments through Stages I and II, see Koenig, M. E. D., and Srikantaiah, T. K. (2000). The evolution of knowledge management. In: *Knowledge Management for the Information Professional*, Srikantaiah, T. K. and Koenig, M. E. D., eds. Medford, NJ: Information Today, Inc. for the American Society for Information Science, Chapt. 3, pp. 23–36.

References

Nonaka, I. and Takeuchi, H. (1995). *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation*, New York: Oxford University Press.

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From: Knowledge Management Lessons Learned
- What Works and What Doesn't

Ed. Michael E.D. Koenig
T. Kanti Srikantaiah

(2003)

Chapter 2

Knowledge Management: Birth of a Discipline

Leonard J. Ponzi, IBM

Introduction

The birth of a discipline can be said to occur when researchers become interested in the new idea or problem. Its survival, however, is reflected first by changing patterns of informal communication, then by changing formal communication. Cronin (1982) refers to this as "formalizing the informal."

The growth in formal communications, better referred to as published works, has been observed by Price (1963) and Crane (1972). Price (1963) presented statistical evidence showing, with impressive consistency and regularity, that when a segment of science is measured in terms of its citations the resulting graph depicts a logistic curve. Crane (1972) added that the number of new publications in a specialty would have four distinct stages of growth:

1. An initial formation stage, in which the absolute number of publications is small and the growth rate shows signs of increasing;
2. Emergence of a growth period. During this time the absolute number of publications grows exponentially (doubling the number of publications at regular intervals) and the growth rate is constant and large;
3. A subsequent stage whereby the annual growth of publications returns to being incremental and the growth rate shows signs of decline;
4. The growth rate and absolute number of publication declines to zero.

Countless potential disciplines emerge in the literature on every new publication, and those that survive for any length of time do so against immense odds. Knowledge management is one emerging discipline that remains strong and does not appear to be fading.

Knowledge management was born in the mid-1990s and has been deemed a broad-based concept. A survey of the literature suggests that KM appears to be borrowing theories and practices from such disciplines as organizational science, management science, and management information systems. It also suggests that this amalgamation of literature is aimed at addressing today's need to leverage some mix of business processes, people, and technology to create a competitive advantage.

While much has been published about the concept, only recently has a critical mass of work been published to enable the concept to be viewed from a bibliometric perspective. This perspective is needed because it provides an empirical structure that can be used to describe the emergence of and the contributors to KM. To this end, the objective of this fundamental research is to describe the KM concept using a "structural" interpretation of the 1991–2001 academic and industry literature as represented by three databases.

Methodology and Limitations

The structural approach used in this research identifies published KM works and then reviews citation patterns in the literature. More specifically, this chapter reveals patterns relating to (1) publishing activity by year, (2) disciplinary breadth, (3) journals supporting KM, (4) most influential authors, (5) most cited works, and (6) the metabolic rate of the academic literature.

Source records were retrieved in the Spring of 2002 from three DIALOG files. Two files are considered academic in nature (Science Citation Index, File 34 and Social Science Citation Index, File 7), and the third file is representative of industry literature (ABI Inform, File 15). The selection of these files was based on their broad and comprehensive coverage of the academic and industry literature.

The retrieved records are articles that include the key search phrase *knowledge management* in the title, abstract, or descriptor field of the record. (See the Appendix for DIALOG search strings and commands.) This capture configuration is a more exacting search strategy than simply retrieving any records where KM appears. The assumption made is that retrieved records that include "knowledge management" in these fields represent writings focused on KM.

The capture included 2,240 source records that, in turn, were used to develop the measure mentioned above by specific bibliometric techniques (Table 2.1). Of course, this research is not without limitations. The limitations lie within the use of the three data sources, which restrict this study in five ways. First, monographs

are not included in the collection. As a result, the cited reference may be a book, but the citations are not from books. Second, works indexed in two academic databases are listed by the first author only, leaving second-named authors of multi-authored works unseen and unacknowledged in the intellectual structures. The industry database does not have a "cited" field. Third, none of the databases index papers from research conferences. These technical deficiencies of the sources presently are consistent across all bibliometric research.

Table 2.1 Summary of measure and bibliometric techniques.

Measures		Methods
Publishing activity by year	⇒	Annual Counts
Disciplinary breadth	⇒	The number of disciplines contributing to a field
Journals supporting KM	⇒	Ranked journal names in both academic and industry databases
Influential authors	⇒	Ranked cited authors
Most cited works	⇒	Ranked cited references
Metabolism rate of the literature	⇒	Ranked cited year

The fourth limitation of the study is the lag time when works are indexed and when they are uploaded. As a result, the research activity captured quantitatively by the method in early 2002 might not fully reflect information published in 2001.

Lastly, while these data sources have proved to be important in the development of the bibliometric techniques used in this study, the absence of a proven cross-indexing mechanism is another limitation. This research required that monographs and journal names from ABI Inform be coded into ISI (formerly known as the Institute for Scientific Information) Subject Category Codes. To control for this variable, coding was performed by two independent coders. Each coder was given a list of ISI Subject Category Codes and scope notes, both provided by ISI.

Results

Next we report on the results of each of the bibliometric measures. Each subsection includes a brief review of the measures and the findings from this study. An interpretation and a brief discussion of the results are given in the next section.

Publication Activity

Publication activity is time-series data of occurrences. In this case, it is the KM search phrase charted by year to form a life-cycle curve similar to that of a "product life-cycle curve." The y-axis is measured this way in article counts; the shape of this type of curve offers insight into the amount of discourse surrounding a concept.

Figure 2.1 diagrams 2,240 source articles, with more than 98 percent concentrated in the six-year period from 1996 to 2001. In fact, KM remained relatively flat until 1995. Then, in 1996, KM expanded rapidly from 26 articles to its peak of 584 articles in 1999. In 2000, the publication occurrence of KM decreased by almost 20% then rebounded to about the same level in 2001.

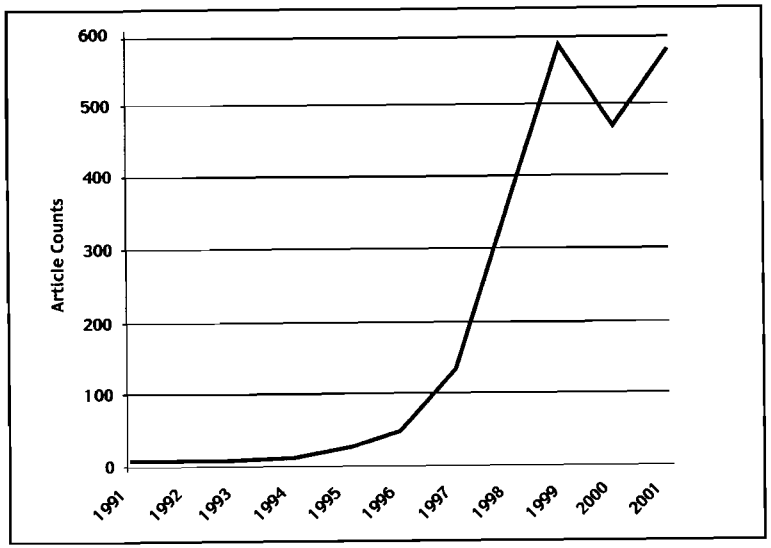

Figure 2.1 Knowledge management publication activity life cycle, 1991–2001.

Disciplinary Activity and Breadth

Disciplinary activity and breadth are interdisciplinary measures that indicate how many and which disciplines are contributing theories or methods to the development of other disciplines (Ponzi, 2002).

The method used to address these measures allows for the inclusion of all three databases by ranking the journal-name field of KM source articles. This list was then coded into ISI Subject Category Codes by two independent coders.

Assuming a threshold count of three or greater, Table 2.2 shows the proportion of disciplinary affiliation of journals over time. The threshold is justified because three co-occurrences dramatically reduce the number of random counts in journals and indicate the concentration of publication activity. This is a partial view of the activity surrounding KM.

Table 2.2 Disciplinary breadth, 1996–2001.

Discipline		1996	1997	1998	1999	2000	2001
Computer science		35.7%	43.1%	42.0%	38.8%	28.7%	36.2%
Business		21.4%	16.9%	32.4%	25.6%	18.0%	20.7%
Management		42.9%	7.7%	5.3%	12.8%	13.2%	17.2%
Information and library science			15.4%	10.6%	7.9%	16.9%	14.2%
Engineering			10.8%	4.3%	8.6%	13.6%	7.7%
Psychology			6.2%	5.3%	1.7%	1.8%	1.5%
Multidisciplinary sciences					2.0%	4.0%	
Energy and Fuels					0.7%	3.7%	0.7%
Social sciences							1.7%
Operations research and management science					1.0%		
Planning and development					1.0%		
	Total	14	65	207	407	272	401
	Breadth	3	6	6	10	8	8

Journals Supporting KM

The growth in the literature can be described by the type of contributing journal. This is of interest because it further narrows disciplinary activity by indicating whether activity is of academic or industry origin.

Contributions to the literature can occur in one of three ways. In the first, one or several events are popularized in the field, for example, an announcement of a new product that is later reviewed by trade journals. This type of event generally would be reflected in the industry literature. The second event that could have an impact comes from theoretical developments or seminal research. These developments often are debated through formal communications and would mainly appear in academic journals. The third possibility is a combination of the two. The most common occurrence is an academic journal reporting research conducted on industry followed by trade journals popularizing the work. At granular level, the life cycle of KM can be divided into academic (DIALOG Files 7, 34) and industry (DIALOG File 15) sources (Figure 2.2).

In the 1995–2001 publishing period, 639 source articles were found in the academic literature and 1,562 source articles in the industry literature. Figure 2.2 reveals that while the academic literature showed steady growth, the industry literature

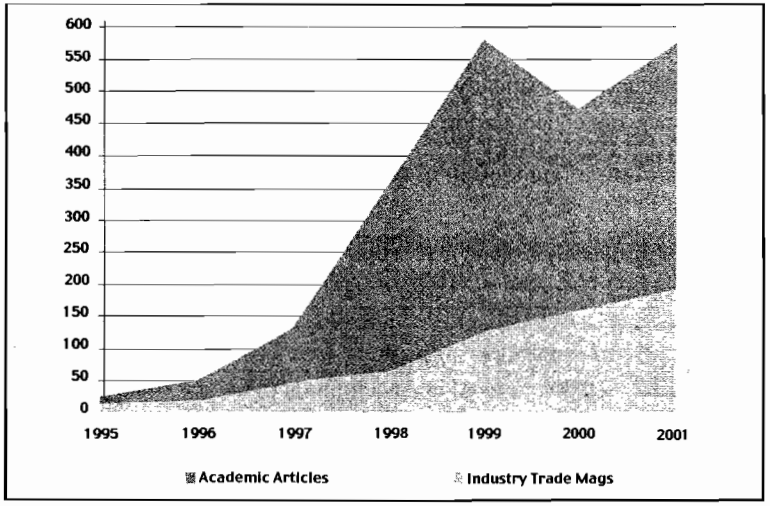

Figure 2.2 Knowledge management by source type, 1995–2001.

experienced exponential growth between 1997 and 1999 and is the focal point for the 2000 contraction seen in Figure 2.1.

The amount of KM content published by any one particular journal can be measured easily by ranking the source articles by journal name. In this research, industry and academic journals are ranked separately and then compared.

Applying a threshold of greater than 0.5 percent, Table 2.3 shows the top 44 industry journals that have published KM information during its growth period. The top five industry journals, which represent 20.8 percent of the total KM publication count, are *InformationWeek* (5.6 percent), *ComputerWorld* (4.5 percent), *CIO* (4.2 percent), *InfoWorld* (3.3 percent), and *Information World Review* (3.1 percent).

Table 2.4 shows the top 25 academic journals that publish KM research. The top 5, which represent 44.6 percent of the total KM count, are *International Journal of Technology Management* (15 percent), *Expert Systems with Applications* (9 percent), *Decision Support Systems* (8.9 percent), *NFD Information-Wissenschaft Und Praxis* (6.4 percent), and *Journal of Universal Computer Science* (5.6 percent).

Most Cited Authors and Works

The most cited authors measure ranks cited authors from academic source articles. Herein, a threshold of one or more citations per year, or a total of seven, was selected. This set represented 262 authors and 4,151 citation counts. Authors that

Table 2.3 Industry journals supporting knowledge management, 1995–2001.

Rank	Journal	Counts (%)	Rank	Journal	Counts (%)
1	InformationWeek	5.57	23	British Journal of Administration Management	0.77
2	ComputerWorld	4.48	24	European Management Journal	0.77
3	C/O	4.23	25	Journal of KM	0.77
4	InfoWorld	3.33	26	Software Magazine	0.77
5	Information World Review	3.14	27	Document World	0.70
6	Computer Reseller News	3.07	28	Executive Excellence	0.70
7	Computing Canada	2.05	29	Fortune	0.70
8	InternetWeek	1.98	30	KMWorld	0.70
9	Information Today	1.92	31	Management Review	0.70
10	Chief Executive	1.66	32	Industry Week	0.64
11	Inform	1.54	33	Competitive Intelligence Magazine	0.58
12	Network World	1.47	34	Management Today	0.58
13	Business Information Review	1.28	35	Oil & Gas Investor	0.58
14	Journal of Intellectual Capital	1.28	36	Oil & Gas Journal	0.58
15	Journal of Business Strategy	1.15	37	Sloan Management Review	0.58
16	People Management	1.15	38	American Society for Information Science Bulletin	0.51
17	Training	1.15	39	Asia Pacific Journal of Management	0.51
18	Competitive Intelligence Review	1.09	40	HR Magazine	0.51
19	Information Management Journal	0.90	41	Journal of General Management	0.51
20	International Journal of Technology Management	0..90	42	Management Services	0.51
21	R & D Management	0.83	43	Midrange Systems	0.51
22	Automotive Manufacturing & Production	0.77	44	National Underwriter	0.51

Table 2.4 Academic journals supporting knowledge management, 1995–2001.

Rank	Journal	Counts (%)
1	International Journal of Technology Management	15/02
2	Expert Systems with Applications	9.01
3	Decision Support Systems	8.58
4	NFD Information-Wissenschaft Und Praxis	6.44
5	Journal of Universal Computer Science	5.58
6	International Journal of Human-Computer Studies	5.15
7	Wirtschaftsinformatik	5.15
8	Journal of Management Information Systems	4.72
9	Long Range Planning	4.72
10	ASLIB Proceedings	4.29
11	California Management Review	4.29
12	Knowledge-Based Systems	4.29
13	Research-Technology Management	4.29
14	International Journal of Information Management	3.86
15	Journal of The American Medical Informatics Association	3.86
16	Kybernetes	3.86
17	Training & Development	3.86
18	European Journal of Information Systems	3.43
19	IEEE Intelligent Systems & Their Applications	3.43
20	Information Systems Management	3.43
21	Journal of Scientific & Industrial Research	3.43
22	Journal of Strategic Information Systems	3.43
23	IBM Systems Journal	3.00
24	Journal of Information Science	3.00
25	Journal of Management Studies	3.00

represented 0.5 percent or greater of the total were selected and presented in Table 2.5. The top five authors, representing 14.6 percent of the total count, are Nonaka, Davenport, Senge, Leonard, and Polanyi.

In the 1995–2001 period, 639 academic articles were published. All have added to the intellectual development of KM; however, not all have been influential. To address this, the most cited references in the academic literature were examined.

Table 2.5 Most cited authors, 1995–2001.

Rank	Author	Counts (%)	Rank	Author	Counts (%)
1	Nonaka I	4.818	24	Hamel G	0.747
2	Davenport T	3.927	25	Simon H	0.747
3	Senge P	2.048	26	Porter M	0.723
4	Leonard-Barton D	1.951	27	March J	0.699
5	Polanyi M	1.855	28	Mintzberg H	0.699
6	Drucker P	1.831	29	O'Dell C	0.699
7	Argyris C	1.566	30	Liebowitz J	0.675
8	Brown J	1.518	31	Barney J	0.650
9	Grant R	1.156	32	von Krogh G	0.650
10	Stewart T	1.108	33	Blackler F	0.602
11	Teece D	1.108	34	Edvinsson L	0.602
12	Wiig K	1.108	35	Stein E	0.602
13	Quinn J	1.084	36	Wenger E	0.602
14	Kogut B	1.060	37	Orlikowski W	0.578
15	Spender J	1.060	38	Hedlund G	0.554
16	Nelson R	1.036	39	Lave J	0.554
17	Huber G	0.964	40	Vonhippel E	0.554
18	Hansen M	0.867	41	Tsoukas H	0.530
19	Weick K	0.867	42	Daft R	0.506
20	Prahalad C	0.819	43	Malhotra Y	0.506
21	Ruggles R	0.795	44	Nahapiet J	0.506
22	Cohen W	0.771	45	Winter S	0.506
23	Sveiby K	0.771			

References from the academic KM source articles were ranked, and a threshold of one citation per year, or seven, created a list of 121 works. Appendix B lists the top 50 references. The entire list is available on request. Interestingly, of the total cited reference count (1,868), about half (935) were articles and the rest (933) were monographs. The top five cited works represent 19.2 percent of the total citation count.

Metabolic Rate of the Literature (Ranked by Cited Year)

An important characteristic of papers in a fast-growth field is the predominance of references to recently published works, or the metabolic rate of the literature. One measure of that is Price's Index. Price's Index (1970) corresponds to the percentage of items that refer to materials published within the last five years. The method used in this measure ranks KM source articles by cited year.

Discussion

This section discusses the overall KM life cycle then centers on unpacking the 1995–2001 period in order to illuminate the emergence of and contributors to KM.

Figure 2.1 illustrates the publication activity life cycle of KM and is evidence of the emergence of the discipline. The shape of the KM life cycle suggests it might be a fad. This research, however, shows that KM does not fit the fad profile. According to Rogers (1995), a fad is described as an innovation adopted very quickly then sharply discontinued. The jury is still out on whether KM is a fad, but Ponzi and Koenig (2002) provide a general rule to determine fads.

Ponzi and Koenig (2002) charted the life cycles of three well-known fads (i.e., quality circles, total quality management, and business process re-engineering) and introduced empirical evidence that asserts a typical management movement generally reveals itself as a fad in about five years after having gained some type of momentum. The research by Ponzi and Koenig revealed that when comparing the three life cycles, each fad peaked between four and six years after some momentum began, and then declined just as dramatically. More specifically, in 1979, quality circles appeared to have momentum, only to peak in five years. The same holds true for total quality management (starting in late 1989 and peaking in 1993) and business process re-engineering (starting in 1991 and peaking in 1995). To this end, assuming that KM emerged in 1995 (defined here as the first year with a count greater than 1% of the total), the five-year rule of thumb suggests that KM is at least living longer than typical fads and perhaps is in the process of establishing itself as a new aspect of management.

In sectioning the KM life-cycle curve, three distinct stages can be described. More specifically, the life cycle can be divided into its introduction (pre-1995),

growth period (1995–1999), contraction (2000), and rebound (2001). This research used bibliometric measures to explore further the last three areas.

The growth period of KM started in 1995 and continued through 1999. Nonaka and Takeuchi's 1995 seminal work, *The Knowledge-Creating Company,* marked this period. Establishing the birth year of KM, this work was the first expanded KM model. Nonaka and Takeuchi described a "spiral model of knowledge creation" and argued that knowledge is created out of a dialogue between people's tacit and explicit knowledge. This work not only conceptually framed KM but also became the most influential work of the period (Table 2.6).

In 1996, the contributing disciplines, or disciplinary activity, were concentrated into three core areas of study: computer science, business, and management. The number of contributing disciplines, or disciplinary breadth, expanded from the three in 1996 to 10 disciplines in 1999 (see Table 2.2). According to Koenig (2000), this expansion was in response to new developments in technology and to organizations seeking an advantage in an increasingly competitive market.

Table 2.6 Top five most cited references, 1995–2001.

Rank	Work	Counts (%)
1	Nonaka, I., and Takeuchi, H. (1995). *The Knowledge-Creating Company; How Japanese Companies Create the Dynamics of Innovation.* New York: Oxford University Press.	7.12
2	Davenport, T., and Prusak, L. (1998). *Working Knowledge; How Organizations Manage What They Know.* Boston, MA: Harvard Business School Press.	3.85
3	Senge, P. (1990). *The Fifth Discipline: The Art and Practice of the Learning Organization.* New York: Doubleday.	3.16
4	Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization.* 51:24–38.	2.94
5	Argyris, C., and Schon, D. (1978). *Organizational Learning: A Theory of Action Approach.* Reading, MA: Addison Wesley.	2.09

In 2000, KM experienced a contraction in disciplinary activity and breadth. To improve our understanding of the event(s) that caused the 2000 pullback, it is important to narrow the KM discourse activity. Comparison of Tables 2.3 and 2.4 reveals that the percentage of publishing activity is much more concentrated among academic journals than industry journals. That is, the top five academic journals represent 45 percent of the KM counts as compared with 21 percent of the industry journals. In Tables 2.3 and 2.4, the top five journals are oriented more toward computer science and business.

Table 2.2 reveals that the 2000 computer science and business literature decreased, whereas the remaining six disciplines increased. According to Abrahamson (1991; 1996), downswings in popularity might be the direct result of shortfalls in realized benefits experienced by organizations. One such study indicating that KM was coming up short was conducted by Bain & Company. Their well-known survey on management tools and techniques reported that KM "not only had relatively low utilization but also very low satisfaction scores relative to the average" (Rigby, 2001).

The rebound in 2001 included eight disciplines contributing to the development of KM. Four disciplines (computer science, business, management, and information and library science) are each contributing more than 10 percent of the total count and together represent 88 percent of the publishing activity in the industry and academic literature. The rebound of KM observed in Figure 2.1 appears to lie within the computer science discipline and, more specifically, the industry literature.

Reflected in the 2001 computer-trade literature, the approach to KM became accepted by the industry, not strictly as a technology solution but as technology used as a supporting element in an organizational learning construct. The organizational learning proposition originally was posed in the academic literature. Table 2.6 demonstrates that four of the top five citations during the 1995–2001 period (Nonaka, 1994; 1995; Senge, 1990; Argyris and Schon, 1978) originate from the organizational science literature, supporting the idea that KM has emerged from the organizational sciences and predominately is a social science construct.

The growth of the academic literature surrounding the KM concept appears to be strong throughout the 1995–2001 period (Figure 2.3). According to Price (1970), whereas references from fast-growing hard sciences (e.g., physics and biochemistry) would consist of approximately 60 percent or more of research published within the last five years, social sciences would weigh in at 42 percent. Application of Price's social science figure to the KM 2001 academic literature

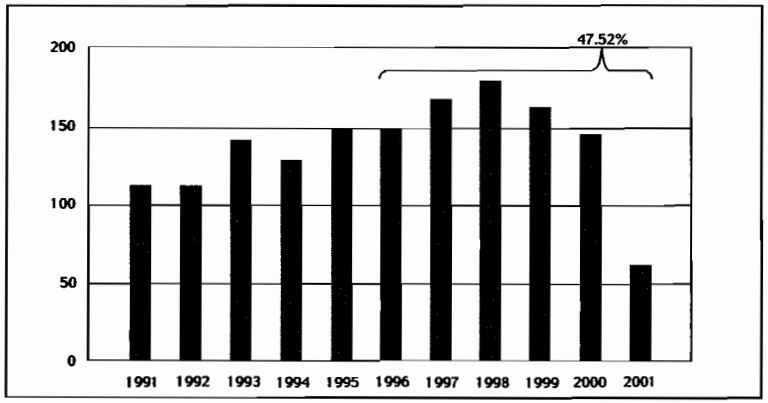

Figure 2.3 Knowledge management source articles by cited year, 1991–2001.

suggests that the academic community is metabolizing recently published works at the fairly rapid rate of 47.5 percent.

Conclusion and Future Research

The structural view of a discipline can reveal its birth and is a starting point for further research. This view allows researchers and practitioners to observe empirically the linkage and cross-fertilization of the literature. This research has revealed several interesting conclusions that lend a hand in describing the emergence of KM and that researchers may find useful in their own research.

Most notable is that KM is a multidiscipline management theory that has roots in the discipline of organizational science. Throughout the expansion years, KM drew from a number of literature domains, each contributing theories and practices to its development. The most influential author identified in this research is Nonaka. As stated previously, Nonaka and Takeuchi's 1995 seminal work, *The Knowledge-Creating Company*, not only was the most influential work but also marked the birth year of KM.

While continuing to grow and define itself, the intellectual development of KM remains unclear. This research suggests the underlying KM value proposition argues that the theories and processes from a variety of disciplines as a whole are extensively greater than the sum of their parts. This author recommends additional research to further explore how each discipline and each author—beyond the most cited—has contributed to the development of KM.

Appendix A: Dialog Search Commands

B 7,15,34
? S (Knowledge()Management)/de,ti,ab and py=Year
S1
? rd
S2 2240

Appendix B: The 50 Most-Cited KM Articles from Academic Literature, 1995–2001

Rank	Citation	Counts (%)
1	Nonaka, I., and Takeuchi, H. (1995). *The Knowledge-Creating Company; How Japanese Companies Create the Dynamics of Innovation*. New York: Oxford University Press.	7.12
2	Davenport, T., and Prusak, L. (1998). *Working Knowledge; How Organizations Manage What They Know*. Boston, MA: Harvard Business School Press.	3.85
3	Senge, P. (1990). *The Fifth Discipline: The Art and Practice of the Learning Organization*. New York: Doubleday.	3.16
4	Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization Science*. 51:24–38.	2.94
5	Argyris, C., and Schon, D. (1978). *Organizational Learning: A Theory of Action Approach*. Reading, MA: Addison Wesley.	2.09
6	Polanyi, M. (1966). *The Tacit Dimension*. New York: Doubleday.	1.98
7	Polanyi, M. (1962). *Personal Knowledge Toward a Post-Critical Philosophy*. Chicago, IL: University of Chicago Press.	1.87
8	Nelson, R., and Winter, S. (1982). *Evolutionary Theory of Economic Change*. Cambridge, MA: Harvard University Press.	1.77
9	Nonaka, I. (1991). The knowledge-creating company. *Harvard Business Review*. 96–104. Nov.-Dec.	1.71
10	Huber, G. (1991). Organization learning: The contributing processes and the literatures. *Organization Science*. 2(1):88–115.	1.66
11	Leonard-Barton, D. (1995). *Wellsprings of Knowledge*. Boston, MA: Harvard Business School Press.	1.66
12	Grant, R. (1991). The resource-based theory of competitive advantage: Implication for strategy formulation. *California Management Review*. Spring:114–135.	1.61
13	Stewart, T. (1997). *Intellectual Capital; How the Knowledge Economy Is Creating New Challenges for Corporations and New Opportunities for the People Who Work for Them*. New York: Doubleday.	1.55
14	Cohen, W. (1990). Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly*. 35:128–152.	1.45
15	Drucker, P. (1993). *The Post-Capitalist Society*. New York: Harper Business/HarperCollins.	1.39
16	Hansen, M., Nohria, N., and Tierney, T. (1999). What's Your Strategy for Managing Knowledge? *Harvard Business Review*. 77(2) (March–April):106–116.	1.39
17	Kogut, B., and Zander, U. (1992). Knowledge of the firm, combinative capabilities, and the replication of technology. *Organization Science*. 3(3):383–397.	1.39
18	Quinn, J. (1992). *Intelligent Enterprise: A Knowledge and Service Based Paradigm for Industry*. New York: The Free Press.	1.39
19	Rubin, M., and Huber, M. (1986). *The Knowledge Industry in the United States, 1960–1980*. Princeton, NJ: Princeton University Press.	1.34
20	Barney, J. (1991). Firm Resources and Sustained Competitive Advantage. *Journal of Management*. 17(1):99–121.	1.28
21	Nonaka, I. (1998). The concept of "ba": Building a foundation for knowledge creation. *California Management Review*. 40(3):40–55.	1.23%

Rank	Citation	Counts (%)
22	Brown, J. (1991). Organizational learning and communities of practice: Toward a unified view of working, learning, and innovation. *Organization Science*. 2(1):40–57.	1.12
23	Brown, J. (1998). Organizing knowledge. *California Management Review*. 40(3):90–112.	1.12
24	Leonard, D. (1998). The role of tacit knowledge in group innovation. *California Management Review*. 40(3):112–143.	1.12
25	Wenger, E. (1998). *Communities of Practice: Learning, Meaning, and Identity.* Boston, MA: Cambridge University Press.	1.12
26	Blacker, F. (1995). Knowledge, knowledge work and organization: An overview and interpretation. *Organization Studies*. 16(6):1021–1048.	1.07
27	Spender, J. (1996). Competitive advantage from tacit knowledge? Unpacking the concept and its strategic implications. In: *Organizational Learning and Competitive Advantage*. Mosingeon, B. and Edmondson, A., eds. London: Sage; pp. 56–73.	1.07
28	Sveiby, K. (1997). *The New Organizational Wealth: Managing and Measuring Knowledge-Based Assets*. San Francisco, CA: Berrett Koehler.	1.07
29	Lave, J., and Wenger, E. (1991). *Situated Learning: Legitimate Peripheral Participation*. Boston, MA: Cambridge University Press.	1.02
30	Davenport, T., De Long, D., and Beers, M. (1998). Successful knowledge management projects. *Sloan Management Review*. Winter:43–57.	0.96
31	Edvinsson, L., and Malone, M. (1997). *Intellectual Capital: Realizing Your Company's True Value by Finding Its Hidden Brainpower*. New York: Harper Business/HarperCollins.	0.96
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33	Tsoukas, H. (1996). The firm as a distributed knowledge system: A constructionist approach. *Strategic Management Journal*. 17:11–25.	0.96
34	O'Dell, C. (1998). If only we knew what we know: Identification and transfer of internal best practices. *California Management Review*. 40(3):154–175.	0.91
35	Walsh, J. (1991). Organizational memory. *Academy of Management Review*. 16(1):57–91.	0.91
36	Grant, R. (1996). Towards a knowledge-based theory of the firm. *Strategic Management Journal*. 17(Winter special issue):109–122.	0.86
37	Hedlund, G. (1994). A model of knowledge management and N-form corporation. *Strategic Management Journal*. 15:73–90.	0.86
38	Stein, E., and Zwass, V. (1995). Actualizing organizational memory with information systems. *Information System Research*. 6(2):85–118.	0.80
39	Teece, D. (1998). Capturing value from knowledge assets: The new economy, markets for know-how, and intangible assets. *California Management Review*. 40(3):55–75.	0.80
40	Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal*. 5(2):171–181.	0.80
41	Polanyi, M. (1967). *The Tacit Dimension*. New York: Doubleday.	0.75
42	Szulanski, G. (1996). Exploring internal stickiness: Impediments to the transfer of best practice within the firm. *Strategic Management Journal*. 17:27.	0.75
43	Hamel, G., and Prahalad, C. (1994). *Competing for the Future*. Boston, MA: Harvard Business Schools Press.	0.70
44	Starbuck, W. (1992). Learning by knowledge-intensive firms. *Journal of Management Studies*. 29:713–740.	0.70

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45	Stein, E. (1995). Organizational memory: Review of concepts and recommendations for management. *International Journal of Information Management*. 15(1):17–33.	0.64
46	Von Hippel, E. (1994). Sticky information and the locus of problem solving: Implications for innovations. *Management Science*. 40(4):429–439.	0.64
47	Winter, S. (1987). Knowledge and competence as strategic assets. In: *The Competitive Challenge*. Teece, D., ed. Boston, MA: Harvard Business School Press, pp. 159–184.	0.64
48	Davenport, T. (1996). Improving knowledge work processes. *Sloan Management Review*. 37(4):53–65.	0.59
49	Davenport, T. (1997). *Information Ecology: Master the Information and Knowledge Environment*. New York: Oxford University Press.	0.59
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Part I

Strategy and Implementation