Knowledge Management in Twenty-first Century: Literature Review and Future Research Directions

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Abstract

Title: Knowledge management in twenty-first century: literature review and future research directions

Keywords: Knowledge Management, Literature Review, Research Issues and Future Research Directions

Category of paper: Conceptual paper

Purpose of the research: This paper aims to review and investigate the gaps in the current literature on knowledge management.

Findings: By reviewing 80 knowledge management papers from seven selected journals in the disciplines of information systems, business, management and operations research, we identified the current status, activities and directions of knowledge management research.

Value of the paper: This paper will make contribution in the field of knowledge management by proposing a number of research agenda along the dimensions of research methods, research levels and research topics of knowledge management.

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Section headings: Introduction, The Method, Results of the Literature Review, Identified Research Agenda and Research Issues.

Knowledge Management in Twenty-first Century: Literature Review and Future Research Directions

Introduction

Knowledge management is not new. Human beings have been practicing knowledge management from the time when the earliest civilization evolved. Even though interest in knowledge management did not gain strength until recently, in the past several years a large body of literature on knowledge management has emerged. In recent years, knowledge management has been of great interest to researchers and scholars. There is an abundance of literature on knowledge management, and the literature covers various topics. While there are some studies that analyze knowledge management literature, providing frameworks for organizing this literature and discussing future research directions and research agenda of knowledge management (see Table-1), there has been no comprehensive review of knowledge management studies except one: Schultze & Leidner (2002) which involved a comprehensive review of knowledge management studies in information systems journals. Most of the current knowledge management review studies have only looked at certain aspects of knowledge management and have not taken a systematic approach. This study addresses this gap by looking at the knowledge management literature from multiple perspectives and from different disciplines, including place of publication, frequency of publication, research approach and method of study, focused level of knowledge management, and research areas and topics. This paper is organized as follows. The following section presents the method of this study, which is followed by a detailed review and analysis of selected articles. Some suggestions for future research directions are then presented.

Table-1: Examples of Previous Studies on the Knowledge Management Literature and Research Agenda

Category	Focus
Analyzing knowledge management literature	Review of knowledge management implementation framework
	Review of knowledge management for training
	Review of case studies of knowledge management
	Meta-review of knowledge management literature by examining citation and impact factors
	Review of literature of knowledge management performance evaluation
	Review of knowledge management studies by information systems researchers via examining discourses
	Review of empirical research of knowledge management processes
	Review of survey research in knowledge management
Frameworks for organizing knowledge management review	Evaluating knowledge management via knowledge value chain approach
	Integrated framework for organizing knowledge management literature
Future research directions and research agenda of knowledge management	Conceptual foundations and research issues
	Future research directions

Source: Developed for this study.

The Method

We selected seven journals (bold and italic in Table-2) from a list of information systems, business, management and operation research journals arranged by impact factors [2]. The criteria for choosing a journal were: (1) impact factor higher than 1; (2) the full text of the journal must be available in Southern Cross University library's electronic databases; (3) the journal should not be purely concerned with computing science and mathematics.

Table-2: Rankings of Journals by Impact

Rank	Information Systems Journal	Impact Factor	Business, Management, and Operation Research	Impact Factor
1	*Communications of the ACM*	2.238	Academy of Management Review	3.912
2	*MIS Quarterly*	2.064	Administrative Science Quarterly	3.333
3	Human-Computer Interaction	1.95	Harvard Business Review	2.561
4	*Information & Management*	1.176	**Academy of Management Journal**	2.375
5	*IS Research*	1.093	**Sloan Management Review**	1.794
6	Journal of the ACM	1.078	Organizational Behavior & Human Decision	1.2
7	IEEE Computer	1.062	Organization Science	1.052
8			**Management Science**	1.011

Source: Adapted from (Barneys 2005, p. 111).

Results of the Literature Review

Reviewed Journals and Period of Journals

In this study, we have taken a broad approach by selecting articles which are related to various areas of knowledge, knowledge management, knowledge management systems, organizational learning, learning organization and organizational memory. The period of our literature review was from 2000 to 2006 since our focus was KM articles published in the 21st century. By checking the title, key words and abstract, we identified 80 articles from the seven chosen journals (see Table-3).

Table-3: Reviewed Journals and Period of Journals

	2000	2001	2002	2003	2004	2005	2006	Total
CACM	1	1	1	6	2	4	3	(18)
MISQ	2	1	4	1	1			(9)
I&M			1	2	3	4	6	(16)
ISR			1	1	2	1		(5)
AMJ						1	2	(3)
SMR	3	3	2		4	3	1	(16)
MS	1	2		5	5			(13)
Total	(7)	(7)	(9)	(15)	(17)	(13)	(12)	**80**

Source: Developed for this study.

It can be seen from Table-3 that for the period of 2000 to 2006 in these journals, 2003 and 2004 had the most KM publications while 2005 and 2006 had more KM publications than 2000-2002. Moreover, CACM, I&M and SMR are the journals that published the most KM studies while ISR and AMJ published the least. However, the data in Table-3 should be interpreted with caution since the number of articles and issues published were varied among the journals.

Research Methods/Approaches

Table-4 presents the number of papers in different categories classified according to research approach. The numbers in brackets are the number of articles published in one particular category of research method under the umbrellas of empirical and non-empirical studies respectively.

Table-4: Classification of KM Articles as per Research Method/Approach

Empirical	Frequency	Non-empirical	Frequency
Events/Processes	(51)		(14)
		Conceptual orientation	
Laboratory experiment	5	Frameworks	3
Field experiment	3	Conceptual models	6
Field study	10	Conceptual overviews of ideas, theories, concepts (including literature review and discussion of research issues and future research directions)	4
Case study	17	Theory	1
Ethnography	1		(10)
		Illustrative	
Survey	9	Opinion (pure or supported by example)	6
Ex-post description of project or event	1	Opinion (supported by experience)	1
Secondary data	5	Tools, techniques, methods, applications	3
	(1)		(4)
Objects		*Applied Concept*	
Descriptions of types/classes of products/ technologies/systems	1	Concepts and their applications	4
Empirical Total	**(52)**	**Non-Empirical Total**	**(28)**

Source: Developed from (Boudreau et al. 2001, Pervan 1998, Myers 2006).

As shown in Table-4, empirical studies, which mainly collect data from observation, have been the majority and accounted for 65% (52 out of 80) of the papers reviewed, while the remaining 28 papers report non-empirical knowledge management studies focusing on conceptual ideas, frameworks and concepts. All the empirical studies except one, which provided descriptions of some knowledge management technologies, investigated the events, processes and/or outcomes of knowledge management. The top three most popular empirical research methods are, in order, case study, field study, and survey. Case studies typically closely examine a small number of entities and have the intention of generating knowledge, while field studies can cover multiple sites with a focus on statistical generation (Boudreau et al. 2001). Both case studies and field studies utilize survey, interviews and other techniques. Ethnography, which requires researchers to spend a significant amount of time in the field to immerse themselves in the lives of the individuals and organizations they are researching and understand their social and cultural context (Myers 2006), has been the least used method for collecting primary data. Of 28 empirical papers, 14 deal with frameworks, conceptual models, conceptual overviews and theories of knowledge management, while 10 illustrate the authors' opinions on knowledge management and explain tools, techniques, methods and applications for knowledge management. The remaining four, non-empirical studies discuss some concepts and their applications for managing knowledge.

Levels of KM Activities
Table-5 reports on the focused levels of knowledge management in these eighty articles.

Table-5: Focused Levels of KM Activities

KM Level	Frequency
Individual	24
Work Unit/Team Group/Department/Function	7
Organization	46
Inter-Organizations	2
Country/National	1
Total	**(80)**

Source: Developed for this study.

As seen in the Table-5, the majority of studies (46 out of 80) have focused on knowledge management activities at the organizational level, while the individual's involvement in knowledge management and knowledge management for group work are the second (24

studies) and third (7 studies) most popular research focus respectively. Only two papers deal with knowledge management for inter-organizational practices. Knowledge management at the country/national level received the least attention (with only one paper).

Taxonomy of KM Research Topics

Table-6 reports on the results of analyzing the literature by examining the taxonomy of knowledge management research topics. The number in brackets in the first column is the number of articles published in a particular research category.

Table-6: Research Topics of KM Studies Reviewed

Research Category	Research Topics
General KM Studies (11)	Literature review of KM
	Conceptual foundations, framework and research agenda of KM
	Understanding of knowledge, knowledge management, knowledge work, knowledge workers and knowledge-based organizations
	Effective management of knowledge
	Building corporate memory
Linking KM with Business (23)	Knowledge management and inter-firm relationships
	Knowledge management and groups/teams
	KM with competitive advantage and business performance
	KM and individual performance
KM Processes (9)	Knowledge creation and acquisition
	Knowledge sharing, dissemination, exchange, knowledge flow and knowledge marketing
	Knowledge application
	Knowledge retention
Factors Influencing success of KM (10)	Factors influencing users' acceptance of KM technologies/KMSs
	Success factors of KM technologies/KMSs
	Success factors of KM and important issues of KM
Technologies, Tools, Methods, and Techniques for KM (21)	Systems & methods for supporting KM processes (including sharing, collaboration, storage, creation and application)
	Technologies for security of knowledge
	KM tools for managing individuals skills and learning
	Technology for improving productivity
	Ontology for managing knowledge
	Role of IT in KM
Evaluation of KM Performance (4)	Evaluating KM performance
	Evaluating KMS performance
	Managing and evaluating knowledge based resources and capabilities
KM in different countries and economies (2)	KM in China
	National culture and KM

Source: Developed for this study.

The data in Table-6 suggest the reviewed literature has looked at the following knowledge management areas: general knowledge management studies; linking knowledge management with business; processes of knowledge management; factors influencing the success of knowledge management; technologies, tools, methods and techniques for knowledge management; evaluation of knowledge management performance; and knowledge management in different national and cultural contexts.

More than half the studies (44) were devoted to linking KM with business (23) (i.e. knowledge management and inter-firm relationships; knowledge management and groups/teams; knowledge management and competitive advantage and business performance; knowledge management and individual performance) and technologies, tools, methods, and techniques for knowledge management (21) (such as systems and methods for supporting KM processes involving sharing, collaboration, storage, creation and application; technologies for security of knowledge; knowledge management tools for managing individuals' skills and

learning; technologies for improving productivity; ontology for managing knowledge; role in knowledge management).

Eleven of the studies addressed general knowledge issues (including literature reviews of knowledge management, conceptual foundations, framework and research agenda of knowledge management, understanding knowledge, knowledge management, knowledge work, knowledge workers, and knowledge-based organizations, effective management of knowledge, and building corporate memory), while identification of factors influencing the success of knowledge management (such as factors influencing users' acceptance of knowledge management technologies/knowledge management systems; success factors of knowledge management technologies/knowledge management systems; success factors of knowledge management and important issues of knowledge management) are the research objectives of 10 studies. Nine papers are concerned with knowledge management processes (i.e. knowledge creation and acquisition; knowledge sharing, dissemination, exchange, knowledge flow and knowledge marketing; knowledge application; knowledge retention). Finally, evaluation of knowledge management performance (i.e. evaluating knowledge management performance; evaluating knowledge management systems performance; managing and evaluating knowledge based resources and capabilities) and knowledge management in different countries and economies (i.e. knowledge management in China; national culture and knowledge management) are explored in four and two studies respectively.

Identified Research Agenda and Research Issues
Suggestions for KM Research Methods

As seen in Table-4, while there are more empirical than non-empirical works in the literature, and the empirical studies have adopted a range of data collection methods, there is a lack of some important qualitative research methods in empirically researching knowledge management activities. Research methods such as action research and grounded theory have not been applied to knowledge management studies. Action research and grounded theory are two very powerful methods for connecting theory with practice. Action research is particularly useful when traditional research methods may not suit many 'field' settings because of the study's tentative nature and complexity. For example, the usual precisely-worded research question may mislead the researcher, and imprecise questions can lead to imprecise answers. There are also times when the researcher has to use 'fuzzy methods' to answer 'fuzzy questions', and action research has the flexibility to allow 'fuzzy starts' to converge towards 'appropriate endings'. For action research can be a meta-methodology, that is, a framework to integrate several other methodologies: interviewing, large group intervention (for example, 'search' workshops for strategic planning), focus groups, surveys, project evaluation exercises, soft systems methodology, and journal writing (Dick 2000). With action research, the researcher is actively involved (in many cases having influence on the decision makers) in the organization; and both researcher and organization can achieve expected benefits. Furthermore, the knowledge obtained can be immediately applied for change, and the research is a cyclical process linking theory and practice. Action research is a suitable tool for researching and practicing knowledge management (Sankaran et al. 2005). However, as seen in this study, more efforts have to be made to introduce this method to researchers and practitioners even though there may be some action research studies of knowledge management published in other outlets. Possible reasons for this slow uptake could be lack of training and lack of imparity among researchers (Baskerville & Wood-Harper 1996).

Grounded theory method is 'an inductive, theory discovery methodology that allows the researcher to develop a theoretical account of the general features of a topic while simultaneously grounding the account in empirical observations or data' (Myers 2006). And it focuses on a continuous play between data collection and analysis and aims to 'develop theory that is grounded in data systematically gathered and analyzed' (Myers 2006). However, our data suggest that this method has been overlooked so far. Greater adoption of this method in knowledge management research should be encouraged. Grounded theory can be extremely useful in developing context-based, processed-oriented descriptions and explanation of knowledge management. More ethnography studies to understand knowledge management phenomena should also be encouraged to leverage the advantages of field notes and researcher's lived experience (Myers 2006). Research methods such as action research, grounded theory and ethnography have the capacity to address the gap 'between the [wrong] theory applied and the right theory applied' as suggested by Watson (Lytras 2005). Watson also argues that 'business is theory in practice … The problem is many times the theories we use lead to poor predications' (Lytras 2005). These methods are effective tools in understanding dynamics of knowledge management.

Suggestions for KM Levels

Given that there is only one study of knowledge management at country/national level (see Table-5), more attention should be given to this area. In our review, there is only one study which looks at current knowledge management practices and factors influencing knowledge management in China. In the future, more research looking at the impact of political, economic, social and technological factors on knowledge management in more countries should be explored. Comparison between different countries and regions could also be interesting research topics. Knowledge management for inter-firm relationship should also be further explored, since organizations are now competing in an environment where 'co-opetition' (competing and co-operating at the same time with members within an industry or an industry set (more than one industry)) is a common phenomenon.

Suggestions for KM Research Topics

It can be seen from Table-6 that there is a need for more research on the evaluation of knowledge management performance. The tacit dimension of knowledge has made measuring performance of knowledge-based assets and investments harder as a result of the difficulties in quantifying these and the lack of a common standard for measuring the intangible benefits arising from managing tacit knowledge. However, it is important to undertake research in this area, since an organization's knowledge management adoption decisions very much rely on the expected performance of knowledge management. Such research can help obtain management buy-in for knowledge management programs, and support for managing organizational knowledge assets in a more systematic and effective way. Knowledge management for our communities and society is definitely a critical research area that researchers and practitioners should pay close attention to. Such research includes knowledge management for addressing concerns such as climate change, HIV and other epidemics, environmental deterioration issues, decreasing biodiversity, digital divide, world poverty, intolerance and other issues facing us in the 21st century (Lytras 2005, Dewan & Riggins 2005). Furthermore, by engaging in such research we can also move beyond rigor and relevance and towards responsibility and reverberation (Desouza et al. 2006).

References

Barnes, S.J. 2005, 'Assessing the value of IS journals', *Communications of the ACM*, vol. 48, no. 1, pp. 110-112.

Baskerville, R.D. & Wood-Harper, A.T. 1996, 'A critical perspective on action research as a method for information systems research', *Journal of Information Technology*, vol. 11, pp. 235-246.

Boudreau, M-C., Gefen, D. & Straub, D. 2001, 'Validation in IS Research: A State-of-the-Art Assessment', *MIS Quarterly*, vol. 25, no. 1, pp. 1-16.

Desouza, K.C., El Sawy, O.A., Galliers, R.D., Loebbecke, C. & Watson, R.T. 2006, 'Beyond rigor and relevance towards responsibility and reverberation', *Communications of the Association for Information Systems*, vol. 17, pp. 341-353.

Dewan, S. & Riggins, F.J. 2005, 'The digital divide: current and future research directions', *Journal of the Association for Information Systems*, vol. 6, no. 12, pp. 298-337.

Dick, B. 2000, *Postgraduate programs using action research*, viewed on Oct 20 2006, http://www.scu.edu.au/schools/gcm/ar/arp/ppar.html.

Lytras, M.D. 2005, 'An interview with Richard Watson', *AIS SIGSEMIS*, vol. 2, no. 1, www.sigsemis.org/.

Myers, M.D. 2006, *Qualitative research in information systems*, viewed on 20 October 2006; http://www.misq.org/discovery/MISQD_isworld.

Pervan, G.P. 1998, 'A review of research in group support systems: leaders, approaches and directions', *Decision Support Systems*, vol. 23, pp. 149-159.

Sankaran, S., James, P., Orr, M. & Walker, S. 2005, 'Real experiences in knowledge management implementation: using action research', *International Journal of Knowledge, Culture and Change Management*, vol. 5, http://ijm5.cgpublisher.com/.

Schultze, U. & Leidner, D.E. 2002, 'Studying knowlege management in information systems research: discourses and theoretical assumptions', *MIS Quarterly*, vol. 26, no. 3, pp. 213-242.

The Australian 2006, '2026: a vision for the world', *The Australian*, 25 October 2006.

Note: Due to space constraints, the complete list of previous reviews of the KM literature and the studies reviewed for this paper has not been included. The list can be obtained by contacting the corresponding author of this paper.