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EXPLORING CURRENT STATE AND DIFFUSION OF KNOWLEDGE MANAGEMENT (KM) RESEARCH

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Research-in-progress submission
**EXPLORING CURRENT STATE AND DIFFUSION OF
KNOWLEDGE MANAGEMENT (KM) RESEARCH**

Abstract

The aim of this research-in-progress paper is to provide a comprehensive and systematic review of the literature relating to knowledge management issues in order to establish the current “state of play” in the domain along a number of dimensions including unit of analysis, research paradigm employed, and the research topics/issues investigated. Information on a series of variables was extracted after conducting a review of 1043 articles on knowledge management, published in various peer reviewed journals between 1974 and 2008. Our findings suggest that the positivist paradigm, empirical and conceptual/descriptive research, and the multi-method approach were used predominantly when investigating the topics related to KM. KM systems followed by KM environment issues were the most widely published areas within KM domain. Further, we have identified literature gaps that require further exploration and conceptual refinement in the context of knowledge management research.

Keywords: *IS Research, Profiling, Longitudinal literature survey, Knowledge management*

1 INTRODUCTION

In the 21st century, IT has been transforming various operations of business across the globe. As a result, organizations are often faced with enormous amounts of information and knowledge globally. This has influenced the growing recognition to knowledge as an important resource and knowledge management (KM) in general in organizations. Studies have suggested that knowledge is considered to be one of the strategic resources for organizations to create business value (Davenport & Prusak, 2000; Alavi & Leidner, 2001). Likewise, managing organizational knowledge has become an increasing necessity in the contemporary business environment. As a consequence, knowledge management has gained recognition as an important domain of discourse in academia and practice. Holsapple and Wu (2008) have indicated that KM is an extending field that can provide an integrative base for other disciplines such as accounting, marketing, human resources, strategic management, operations management and information systems. Nonaka and Peltokorpi (2006) have suggested that there is an ongoing debate in terms of establishing KM as a separate discipline of study. In this regard, there are many challenges facing the domain of KM research and one of the key challenges is to have a conceptual plurality for the discipline (Nonaka & Peltokorpi, 2006). Despite these challenges, studies are conducted and many articles have been published related to managing knowledge and associated topics and there is an expanding interest in the exploration of KM related research.

Reviewing and profiling the existing literature on a particular topic is likely to be of use to researchers in assisting them to identify currently under-explored themes, and select theories and methods appropriate to their investigation, all of which are critical issues for conducting fruitful original and rigorous research. This will also help to identify existing strengths and weaknesses of pertinent research streams, promote discussion regarding critical issues in the area, and assist in the identification of alternative theoretical and methodological perspectives (Venkatesh et al. 2007).

As mentioned earlier, there has been a number of reviews and meta-analytic articles published in the area to date. However, perhaps due to the customary inclination of researchers to analyse either research methods and approaches or subtopics, almost all existing studies have focused primarily upon

reviewing the literature relating to research approaches and topic area (for literature published within limited period of time) rather providing a more comprehensive review on the broader area of knowledge management. A number of these studies are discussed further in Section 2.

The general aim of this research-in-progress paper is therefore to provide a comprehensive and systematic review of the literature pertaining to knowledge management research in order to ascertain the current “state of play” of the field along a number dimensions. This overall aim is realised by means of the following objectives; 1. to identify the journals publishing most articles on knowledge management; 2. to present the general trends on knowledge management research according to the year of publication; 3. to identify countries (and hence areas of greatest activity) with the largest number of publications on knowledge management; 4. to identify authors active in the area of knowledge management; 5. to identify the various units of analysis commonly utilised in knowledge management research; 6. to classify knowledge management publications according to the research paradigm; 7. to classify knowledge management publications on the basis of their use of primary research data (empirical and non empirical); 8. to classify knowledge management publications on the basis of nature of primary research data (quantitative and qualitative); 9. to classify knowledge management publications according to the research methods employed; 10. to explore the research topics/issues examined within the knowledge management domain.

In order to realise these objectives, a systematic and comprehensive review of 1043 articles appearing in 385 different peer-reviewed journals (see Table 2) during the period 1974-2008 was conducted. The remainder of this paper is structured as follows. In Section 2, we present a brief discussion of the existing literature reviewing knowledge management research. In Section 3 we provide a discussion of the method we employed in our analysis of the trends of knowledge management research. Our findings are presented and discussed in Section 4 and finally, Section 5 presents our conclusions from this work and the limitations of our approach.

2 LITERATURE REVIEW

Knowledge management research has received increased prominence and attention in the academic community over the last decade. Tied to this a number of literature review based studies covering various topics related to the management of organizational knowledge such as knowledge strategy, knowledge creation, codification, sharing, application, systems, tacit and explicit knowledge have been published (Hahn & Subramani 2000). In this regard, Alavi and Leidner (2001) have reviewed the knowledge management literature in general and investigated the basic concepts such as the definition, meaning of knowledge and its significance to knowledge management. Their study provides reviews and interpretation of knowledge management literature in different areas with a commentary on the important topics that requires more research in this field. Based on this study, they have discussed key important research issues related to knowledge processes and supporting role of IT. Another literature review study by Alavi and Leidner (1999) has provided an analysis of existing practices and outcomes of knowledge management systems and its nature in organizations.

Besides these studies, there are other studies associated with topics related to communities of practice, organizational learning, intellectual capital, social capital, and organizational memory (Prusak, 2001, Davenport and Prusak, 1998; Wenger, ; Huber, ; Brown & Duguid, Wiig, ; Weick,). Similarly, studies on the need, importance and implementation of knowledge strategies and supporting IT infrastructure in organizations have also been published (Earl, 2001; Hansen et al. 1999, Dunford 2000, Schulz & Jobe 1998; Kautz 2002; Venkitachalam, Scheepers, 2004; Scheepers, Venkitachalam & Gibbs, 2004). Recently, Nonaka and Peltokorpi (2006) have identified and reviewed twenty (20) top and widely cited articles in knowledge management that has been published in management journals. Their study classified articles based on the strengths and weaknesses of the publications drawing from research philosophies perspective, positivism and interpretivism. Similarly, Guo & Sheffield (2007) have explored KM research in influential journals for the period 2000-2004. They have analysed 160 articles in ten top ranked information systems and management journals. Their study looked at the

aspect of research paradigms used in KM research. They found that KM research in IS journals is different from management journals due to lack of proper balance of positivist and non-positivist studies.

Until date it can be argued that there is no article that provides a broad review and analysis of the knowledge management literature in general (i.e. profiling a large set of existing KM publications in terms of author, publication year, research approach and paradigm used, data collection method, research design, research theme and constructs). In this regard, a wider perspective of existing research in this domain can be useful to advance the understanding about critical issues and associated topics in the KM literature (Holsapple & Wu, 2008). Further it can be suggested that the presented material in this paper can provide a useful contribution towards better understanding of the current state and diffusion in KM research.

3 RESEARCH METHODOLOGY

The research presented in this paper employed a combination of bibliometric analysis, historical analysis (Chao et al. 2007) and meta-analysis (Avison et al. 2008; Palvia et al., 2007) as a means of categorizing accumulated knowledge on knowledge management research. Chao et al. (2007) employed both bibliometric analysis and historical analysis in examining technology trends and forecasts of RFID, while a meta-analysis approach was adapted by two recently published studies profiling the theoretical and methodological underpinnings of articles published in the *Information Systems Journal* (Avison et al. 2008), *Journal of Electronic Commerce Research* (Dwivedi et al. 2008) and *Information & Management* (Palvia et al. 2007). Given the overall aim of this paper, our approach employs a combination of these techniques.

For the purpose of conducting this research we made use of the academic journals database provided by Thomson Scientific (previously known as the Institute for Scientific Information (ISI)). Thomson Scientific publishes the Science Citation Index (SCI) and the Social Science Citation Index (SSCI) as two of three elements of its Web of Science® product. The reason for selecting this database is that the majority of IS journals are included either within the Science Citation Index (SCI) or within the Social Science Citation Index (SSCI). Therefore, it is possible to search for and locate a significant proportion of the published material (Chao et al. 2007) on knowledge management across various disciplines using the Web of Science® search facility. Moreover, restricting the search activities to a single publication database removed many of the potential problems of duplication inherent in the use of multiple data sources. The Web of Science product provides two main search-techniques i.e. 'General Search' and 'Advanced Search'. The search-technique used within this research exercise was the 'General Search'. The main reason for employing a 'General Search' approach was simply that its easy to use characteristics facilitate the repetition of searches without any confusion, henceforth is straightforward to obtain consistent results in repetitive searches provided the same search criteria are applied. This method of data collection was also adapted by a previous study on RFID (Chao et al. 2007).

In order to identify publications specific to the "Knowledge Management" area, single search-term or keyword was employed in this study. The search criteria included the keyword: "Knowledge Management". The search was restricted to occurrences of the "Knowledge Management" keyword appearing in the article title in order to avoid locating publications where keywords might have appeared generally within the main text. However, if the keyword appeared in the article title, it suggested that the focus of the article was on some aspects of knowledge management. Search utilizing the single search term resulted in the extraction of 1043 records providing details on publications relating to "Knowledge Management". All 1043 items were then examined manually in order to crosscheck and confirm the relevance of the search results.

A number of analyses were then conducted on the search output employing the various analysis tools available in the Web of Science®. Count and percentage data was generated for the assorted variables

utilised to categorise the search output. Variables analysed included subject category, journal in which an article appeared, year of publication, author, author's institution, and the country in which the research was conducted.

A further detailed manual analysis was then conducted in order to extract various items of information which could not be obtained directly from the Web of Science® database. In order to do so we examined each of the abstracts of the articles contained in the search results. These abstracts were then individually scrutinized in order to obtain and record information such as the unit or level of analysis, the research paradigm, issues pertaining to primary data, and so on. It is important to note that due to time constraints and the amount of effort required to conduct the analysis, some of the results presented in this paper arise from the analysis of a subset of 300 of the total 1043 articles available for consideration. We are continuing to analyze the remaining publications, the results of the entire analysis will be reported in final version of the paper (if we will get chance to revise and re-submit).

Data obtained from this analysis relating to the variables under examination were first recoded in SPSS v.14, and then count and percentage values generated, the results of which are illustrated Tables 9-14. For the methodological variables we adopted categories from the previous studies of Avison et al. (2008) and Dwivedi et al. (2008). For capturing the data on research topics authors adapted Barki et al.'s [1993] classification scheme that consists of nine major research themes. However, by observing the nature of published Knowledge Management (KM) research, we can compress the nine categories into six categories namely 'KM Environment', 'KM Processes', 'KM Systems', 'KM: Planning, Policy, Evaluation, Strategy', 'KM Research and Education', and 'KM Others'. The reason for choosing this scheme over others published scheme was due to better clarity in the classification scheme and for providing researchers with comparative data. Avison et al. [2008] recently employed this classification scheme for profiling 17 years of ISJ publications and Dwivedi et al. (2008) classified eight years of research published in *Journal of Electronic Commerce Research*. All papers were classified into aforementioned six major mutually exclusive categories. This is because although a particular paper maybe addressing more than one subtopic, the main focus of the paper cannot be more than one problem area

4 FINDINGS

4.1 Knowledge Management Studies According to Subject Category

A total of 89 Web of Science® Subject Categories have published research on knowledge management. Table 1 illustrates the top 26 Web of Science® Subject Categories each with 10 or more articles, the largest number of articles (222) appearing within the 'Computer Science, Information Systems' category on knowledge management. This is followed by the 'Computer Science, Artificial Intelligence' category (221), the 'Management' category (200), and then 'Information Science & Library Science' (172). The lowest count (10) presented in this Table is for two subject categories 'Economics' and 'Telecommunications'. For remaining 63 categories article count varies between 9 to 1 articles. The lowest number of articles in our study (1) appeared in the 26 different categories while two articles each appeared in 11 different categories preceded by six categories with only three articles each, seven categories with four articles each, four categories with five articles each, only one category with six articles, four categories with seven articles each, three categories with eight articles each and just one category published nine articles. It is important to note at this point that these results are indicative only, and are intended to provide a representation of the main areas of study in which research articles on knowledge management are likely to appear. Clearly, extending the number of keywords and altering the categories included would alter the results, although it is argued, not to the extent that it would substantially alter the overall profile. Due to space limitations all the subject categories are not listed here, but interested readers may find them and other information relating to the development of this paper at: <http://aadref.googlepages.com/km>

	Subject Area [N=89]	Record Count	% of 1043
1	COMPUTER SCIENCE, INFORMATION SYSTEMS	222	21.28%
2	COMPUTER SCIENCE, ARTIFICIAL INTELLIGENCE	221	21.19%
3	MANAGEMENT	200	19.18%
4	INFORMATION SCIENCE & LIBRARY SCIENCE	172	16.49%
5	COMPUTER SCIENCE, THEORY & METHODS	129	12.37%
6	OPERATIONS RESEARCH & MANAGEMENT SCIENCE	124	11.89%
7	COMPUTER SCIENCE, SOFTWARE ENGINEERING	70	6.71%
8	COMPUTER SCIENCE, INTERDISCIPLINARY APPLICATIONS	69	6.62%
9	BUSINESS	63	6.04%
10	ENGINEERING, INDUSTRIAL	59	5.66%
11	ENGINEERING, ELECTRICAL & ELECTRONIC	52	4.99%
12	ENGINEERING, MULTIDISCIPLINARY	38	3.64%
13	ENGINEERING, MANUFACTURING	32	3.07%
14	COMPUTER SCIENCE, CYBERNETICS	27	2.59%
15	MEDICAL INFORMATICS	22	2.11%
16	SOCIAL SCIENCES, INTERDISCIPLINARY	16	1.53%
17	COMPUTER SCIENCE, HARDWARE & ARCHITECTURE	15	1.44%
18	EDUCATION & EDUCATIONAL RESEARCH	14	1.34%
19	ENGINEERING, CHEMICAL	14	1.34%
20	ENGINEERING, CIVIL	14	1.34%
21	PLANNING & DEVELOPMENT	14	1.34%
22	ERGONOMICS	12	1.15%
23	MULTIDISCIPLINARY SCIENCES	12	1.15%
24	PUBLIC ADMINISTRATION	11	1.05%
25	ECONOMICS	10	0.96%
26	TELECOMMUNICATIONS	10	0.96%

Table 1. Knowledge Management Studies According to Subject Category

4.2 Knowledge Management Studies According to Journals

Table 2 presents the breakdown of our search output according to the journals in which the articles on knowledge management appeared. A total of 385 publishing outlets have published 1043 articles on knowledge management. Table 2 illustrates the top 20 source titles which suggest that the largest number of articles (31) on knowledge management appeared in the journal International Journal of Technology Management and the least number (1) of articles resulting from our search activities appeared in 230 source titles. Other journals that have published a significant number of articles on knowledge management include the Journal of Universal Computer Science (28), Expert Systems with Applications (27), Journal of Computer Information Systems (26), Decision Support Systems (24), Professional Knowledge Management (21), and two journal namely, Journal of Information Science, & the Journal of the American Society for Information Science and Technology both with 19 articles each. The list suggest that although majority of journals are from Information Systems discipline, there are number of journals from other disciplines that have published knowledge management research. This clearly shows cross-disciplinary nature of knowledge management research. Due to space limitations all the source titles are not listed in Table 2, but interested readers may find them and other information relating to the development of this paper at: <http://aadref.googlepages.com/km>

	Field: Source Title (Source: Web of Science® Database) [N=385]	Record Count	% of 1043
1	INTERNATIONAL JOURNAL OF TECHNOLOGY MANAGEMENT	31	2.97%
2	JOURNAL OF UNIVERSAL COMPUTER SCIENCE	28	2.68%
3	EXPERT SYSTEMS WITH APPLICATIONS	27	2.59%

4	JOURNAL OF COMPUTER INFORMATION SYSTEMS	26	2.49%
5	DECISION SUPPORT SYSTEMS	24	2.30%
6	PROFESSIONAL KNOWLEDGE MANAGEMENT	21	2.01%
7	JOURNAL OF INFORMATION SCIENCE	19	1.82%
8	JOURNAL OF THE AMERICAN SOCIETY FOR INFORMATION SCIENCE AND TECHNOLOGY	19	1.82%
9	INDUSTRIAL MANAGEMENT & DATA SYSTEMS	18	1.73%
10	PRACTICAL ASPECTS OF KNOWLEDGE MANAGEMENT	17	1.63%
11	PRACTICAL ASPECTS OF KNOWLEDGE MANAGEMENT, PROCEEDINGS	15	1.44%
12	KNOWLEDGE MANAGEMENT IN ELECTRONIC GOVERNMENT	14	1.34%
13	NFD INFORMATION-WISSENSCHAFT UND PRAXIS	14	1.34%
14	INFORMATION & MANAGEMENT	11	1.05%
15	INFORMATION SYSTEMS MANAGEMENT	11	1.05%
16	INTERNATIONAL JOURNAL OF INFORMATION MANAGEMENT	10	0.96%
17	JOURNAL OF MANAGEMENT INFORMATION SYSTEMS	10	0.96%
18	KYBERNETES	10	0.96%
19	LONG RANGE PLANNING	10	0.96%
20	SYSTEMS RESEARCH AND BEHAVIORAL SCIENCE	10	0.96%

Table 2. Knowledge Management Studies According to Journal

4.3 Knowledge Management Studies According to Year of Publication

Our findings (illustrated in Table 3) reveal that the number of articles published on knowledge management has substantially increased after year 2000. Based on the citation index of Thomson Scientific, To date, the largest number of articles (141) appeared in 2002, closely followed by 2005 with a total count of 136 articles and 2004 with a total count of 122 articles. Prior to 1995, a low number of articles appeared in each year, with no articles at all appearing in our selected journals during some years. While it may be argued that the increasing number of articles appearing post 1995 illustrates increasing levels of interest and research activity in the subject area, the lack of articles prior to this time may be attributed to a number of reasons, including the fact that not all journals in our search list were being published in each year. This point is particularly applicable to the earlier years considered.

Year	Article Count (n=1043)	% of 1043	Year	Article Count (n=1043)	% of 1043	Year	Article Count (n=1043)	% of 1043
2002	141	13.52%	1998	28	2.68%	1986	2	0.19%
2005	136	13.04%	2008	23	2.21%	1991	2	0.19%
2004	122	11.70%	1997	18	1.73%	1992	2	0.19%
2003	116	11.12%	1996	6	0.58%	1974	1	0.10%
2001	106	10.16%	1975	4	0.38%	1976	1	0.10%
2006	105	10.07%	1989	4	0.38%	1977	1	0.10%
2007	95	9.11%	1993	3	0.29%	1987	1	0.10%
2000	78	7.48%	1994	3	0.29%	1988	1	0.10%
1999	40	3.84%	1995	3	0.29%	1990	1	0.10%

Table 3. Knowledge Management Studies Published between 1974-2008

4.4 Knowledge Management Studies According to Country

Our findings (illustrated in Table 4) disclose that the research presented in the 1043 publications we identified on knowledge management was conducted in 55 countries. By far the largest amount of published activity has taken place in the USA, with a number of others countries (including the UK, Germany, Taiwan, Canada, China,

Australia, Italy, Netherlands, Austria, Spain, France, South Korea, Japan and Singapore) also being the location of a substantial amount of research activity which has resulted in publications that appeared in our search results.

<i>Country</i>	<i>AC (n=1043)</i>	<i>Country</i>	<i>AC (n=1043)</i>	<i>Country</i>	<i>AC (n=1043)</i>
USA	321	BRAZIL	12	BELGIUM	1
UK	162	SWEDEN	12	BOTSWANA	1
GERMANY	104	SWITZERLAND	12	COLOMBIA	1
TAIWAN	64	DENMARK	10	CYPRUS	1
CANADA	51	NEW ZEALAND	9	EGYPT	1
PEOPLES R CHINA	44	POLAND	9	ISRAEL	1
AUSTRALIA	39	IRELAND	8	JORDAN	1
ITALY	30	MALAYSIA	4	LEBANON	1
NETHERLANDS	30	PORTUGAL	4	NAMIBIA	1
AUSTRIA	29	CHILE	3	ROMANIA	1
SPAIN	27	CZECH REPUBLIC	3	RUSSIA	1
FRANCE	23	FINLAND	3	SAUDI ARABIA	1
SOUTH KOREA	21	HUNGARY	3	SERBIA MONTENEG	1
JAPAN	19	LATVIA	3	SRI LANKA	1
SINGAPORE	16	MEXICO	3	THAILAND	1
GREECE	15	SLOVAKIA	3	U ARAB EMIRATES	1
SOUTH AFRICA	15	SLOVENIA	3	VIETNAM	1
INDIA	14	IRAN	2		
NORWAY	14	TURKEY	2		

Table 4. Knowledge Management Studies According to Country

A number of countries (including Finland, Ireland, Portugal, Hungary and Malaysia) have been the location of research which has resulted in a low number of publications, and given the overall level of research activity in such countries, and indeed the supposed high-profile of ICT, this is perhaps a surprising result and indicates that there is opportunity for additional research based in such countries to take place in order to further expand the existing knowledge base.

4.5 Authors Actively Involved in Publishing Knowledge Management Research

A total of 2079 authors contributed to the 1043 articles on knowledge management. Table 5 lists the top nine authors (with five or more articles each) most actively involved in conducting and publishing knowledge management related research. It appears that the most productive author in knowledge management research (in terms of journal publications across the journals in our search) is Davenport, E. with 8 articles, followed by three authors (Chen, YM, Gottschalk, P, and Liebowitz, J) each with 7 articles. Thereafter three authors (Chen, YJ, Edwards, JS and Wang, CB) contributed six articles each, two authors (Chen, MY and Mcadam, R) contributed five articles each (See Table 5). From the 2079, 26 authors contributed four articles each, 39 authors contributed three articles each, and 283 authors contributed two articles each, while a vast majority of authors (1796 authors) contributed to just one article in the set of journals comprising our search data. Due to space limitations these authors are not listed here, but interested readers may find them and other information relating to the development of this paper at: <http://aadref.googlepages.com/km>

<i>Author</i>	<i>Number of Articles Published</i>	<i>%</i>
DAVENPORT, E	8	0.77%
CHEN, YM	7	0.67%
GOTTSCHALK, P	7	0.67%
LIEBOWITZ, J	7	0.67%
CHEN, YJ	6	0.58%
EDWARDS, JS	6	0.58%

WANG, CB	6	0.58%
CHEN, MY	5	0.48%
MCADAM, R	5	0.48%

Table 5. Authors Actively Involved in Publishing Knowledge Management Research

4.6 Knowledge Management Studies According to Institution

A total of 938 institutions' author contributed to the 1043 articles on knowledge management. Table 6 identifies the institutions apparently most active in the area of knowledge management research. The overall number of contributions from each university varies from 1 to 16. Clearly National Cheng Kung University, Taiwan (with 16 publications) has contributed the largest number and can therefore be seen a leading centre of knowledge management related research. This is closely followed by two universities namely, Napier University, UK and University of Karlsruhe, Germany (with 12 outputs each). A number of other institutions have also been the source of a noteworthy number of publications over the years, including the Rutgers State University & the University of Texas both with 10 publications each, two UK based universities namely, the University of Sheffield and the University of Warwick contributed to nine publications each. Table 6 also illustrates that two universities (National Chiao Tung University and National Taiwan University) contributed 8 articles each. A further 120 universities (not listed) contributed two articles each, while 675 universities were the source of just one article. Again, due to space limitations institutions producing less than eight articles over the period under study are not listed in Table 6, but interested readers may find them and other information relating to the development of this paper at: <http://aadref.googlepages.com/km>

Field: Institution Name	Record Count	% of 1043
NATL CHENG KUNG UNIV	16	1.53%
NAPIER UNIV	12	1.15%
UNIV KARLSRUHE	12	1.15%
RUTGERS STATE UNIV	10	0.96%
UNIV TEXAS	10	0.96%
UNIV SHEFFIELD	9	0.86%
UNIV WARWICK	9	0.86%
NATL CHIAO TUNG UNIV	8	0.77%
NATL TAIWAN UNIV	8	0.77%
UNIV MANCHESTER	8	0.77%

Table 6. Universities Facilitating Knowledge Management research Resulting in Journal Publications

4.7 Language of Publications and Document Type

Our findings disclose that the research presented in the 1043 publications we identified on knowledge management was communicated in eight languages. By far the largest amount of articles were communicated in English language (1002), with a very few numbers of articles published in German (32), Japanese (3), Spanish (2), Danish (1), Rumanian (1), Slovak (1) and Swedish (1).

Findings also suggest that the research presented in the 1043 publications we identified on knowledge management were largely research articles (993), which are followed by 49 review articles and one bibliography. A number of articles were also classified as editorial, book review, meeting abstract, news item, letter and note but excluded from the analysis.

4.8 Knowledge Management Studies According to Unit/Level of Analysis

The results of our exploration into the most common forms of unit of analysis employed are presented in Table 7. It can be seen that the majority of articles (88) appearing in our search results examined knowledge management related issues at the organizational level, closely followed by studies focusing upon System level (63). Far fewer articles were found to examine knowledge management in the context of SMEs (5), Groups/Teams (4) and the Society (4).

Unit of Analysis	Count (n=300)	%	Unit of Analysis	Count (n=250)	%
Organization/Firm	88	35.2	SMEs	5	2.0
Systems	63	25.2	Group/Team	4	1.6
Industry	34	13.6	Society	4	1.6
Subject/Theory/Tool	25	10.0	Stakeholders	1	.4
Users	15	6.0	Others	3	1.2
Country	8	3.2			

Table 7. Unit of Analysis & Knowledge Management Research (categories adapted from Dwivedi et al. 2008)

4.9 Knowledge Management Studies According to Research Paradigm

The data clearly indicates that positivism used in 102 (40.8%) articles is the dominant or most popular research paradigm amongst knowledge management researchers, followed by the 'Descriptive/Conceptual/Theoretical' being employed in 76 (30.4%) articles, which includes papers that do not neatly fit into either positivist or interpretive categories, primarily comprising articles based on literature reviews, personal view points, or studies that are highly conceptual in nature (Avison et al. 2008). The third largest category was 'interpretive' with a total of 10 (4%) articles followed by critical approach being employed in 2 (0.8) articles. For 60 (16.8) articles, the paradigm was unclear and hence was not apparent if they should be placed in either positivist or interpretive category.

4.10 Research Methodology: Empirical vs. Non Empirical

A very large proportion of articles within our search results (C=115, 46%) were empirical in nature in comparison to articles that fell within the non-empirical category (C=92, 36.8%). However, for 43 (17.2%) articles it was not possible to determine if they were empirical or non empirical in nature, due to the lack of relevant information provided.

4.11 Research Methodology: Quantitative vs. Qualitative

Findings indicate that the conceptual/theoretical/meta-analysis has dominated knowledge management research within various disciplines. A total of 35 (14%) articles employed a quantitative approach (which also includes descriptive quantitative articles) in comparison to the qualitative approach which was employed by 31 (12.4%) articles. A substantial number of articles (C=47, 18.8%) employed a mix of data types, while the largest number of was conceptual/theoretical/meta-analytic in nature (C=88, 35.2%). For 49 (19.6%) articles it was not possible to determine the primary approach employed.

4.12 Research Methods

Table 8 illustrates that although a total of 16 different research methods were recorded from our data analysis activities, the majority of studies (67) within our results employed multi-methods. The other

major category employed was the Library research/Literature analysis/Frameworks/Conceptual Method, which was used in 59 articles. Other approaches identified include Case study (37), Survey (22), Field experiment (15), Speculation/Commentary (8), Mathematical model (5), Content Analysis (5) and Interview (7). All remaining categories were employed by very few studies, with only one article employing interview and ethnography (See Table 8).

Research Method	Count (n=250)	%	Research Method	Count (n=250)	%
Multi-method	67	26.8	Secondary Data Analysis	4	1.6
Library research/Literature analysis/Frameworks/Conceptual Method	59	23.6	Field Study	4	1.6
Case Study	37	14.8	Laboratory experiment	3	1.2
Survey	22	8.8	Action research	2	.8
Field experiment	15	6.0	Grounded Theory	2	.8
Speculation/Commentary	8	3.2	Ethnography	1	.4
Mathematical model	5	2.0	Interview	1	.4
Content Analysis	5	2.0	Not Known	15	6.0

Table 8. Research Methods (Source: Categories adapted from Avison et al. 2008)

4.13 Major Research Topics

The findings suggest that the largest number of articles investigated research issues related with the Knowledge Management Systems category (39.2% C=98), which is followed by the Knowledge Management Environment Issue category (22.8% C=57). The third most researched topic was Knowledge Management Processes, as 43 articles (17.2%) fell within this category, followed by the KM: Planning, Policy, Evaluation, Strategy (24% C=9.6) category. Finally, the Knowledge Management Research and Education category was represented by nine articles (3.6%).

4.14 A Qualitative Analysis of Limitations of Existing Research and Drawing Directions for Future Research

Performing a qualitative analysis of the abstract text of each article in this study provided some useful conclusions. One of the highly cited problems is that the scholars and practitioners engaged in KM discourse have a fragmented view towards basic conceptual foundations in the field. Despite many studies conducted in the area of knowledge management, there is a lack of mutual understanding in terms of the methodological and theoretical dimensions of the discipline. In this regard, there is a common view that researchers in the field make strong claims in terms of the validity of their findings, besides not addressing the existing distorted view towards conceptual unification of the discipline. In general, there is a presence of non-collective coherence in KM research. Even though the domain of knowledge management has been evolving over the last decade, only limited understanding with respect to paradigms, methods and theories pertained to this area has been documented. However, around 180 KM articles have been published in highly regarded information systems and management journals such as MISQ, Management Science, California Management Review, Strategic Management and Organization Science over the last seven years. Despite the findings published in these journals, the research approaches (positivist and non-positivist) used in these studies do not provide any strong indication in terms of research approach usage and balance.

Another insight is the evidences presented in scholarly and practitioner literature present quantitative variances in terms of what type of questions KM authors examine, perspectives and methodologies adopted and followed. Further, how KM authors convince the reader in terms of their propositions, theories and thereby its validity does pose some concerns in the discipline. Therefore, it is critically important to establish the feasibility of KM research and researchers involve in this area to take

necessary steps to address and evaluate the presented evidence in their studies more rigorously to practice sanctity and credibility of this line of discourse.

Future research in the field of knowledge management require studies related to unifying different knowledge management models in the existing literature, understanding the determinants of the evolution of knowledge management in organizations. This involves how organizations evolve their knowledge processes in the knowledge management life cycle (knowledge creation and capture, sharing, application and reuse) over time and how the evolutionary of these processes in organizations influences the practice of knowledge management. Also, studies pertained to knowledge management effectiveness (at the individual, team and organizational levels) and associated organizational support and information technology diffusion will contribute important insights to theoretical development and the body of KM literature. Another theme of KM research is the need to understand the relationships between knowledge processes, social and technical aspects of an organization and its impact on firm performance. Researchers and practitioners of knowledge management should also aim to develop deeper understanding of how KM practice in a certain cultural context can be effectively replicated or applied in another cultural context/s (i.e. between eastern and western types of organizational culture).

5 CONCLUSIONS

Our intention in this paper has been to provide an overview of the current state of diffusion of KM research by presenting the results of a systematic and comprehensive review of 1043 articles appearing across 385 different peer-reviewed journals during the period 1974-2008. We have presented the results of our investigation along a series of dimensions including the journals most often publishing articles on KM research, authors most active in the subject area (in terms of articles published), the most commonly used unit of analysis, methodological practice and use of primary data, the theories and theoretical constructs utilised, and contexts and technologies examined. The motivation behind our investigation is to provide a comprehensive and useful insight into the current research gaps and future research implications in the broad domain of KM discourse. In keeping with previous “state of play” studies of this nature, we posit that our findings highlight promising lines of inquiry (Avison et al. 2008; Palvia and Pinjani, 2007; Dwivedi et al. 2008). Furthermore we argue that the findings of this study may help in directing limited and valuable research resources to fruitful lines of inquiry (Palvia and Pinjani 2007) as well as strengthening the area of KM research by facilitating consideration of less used but useful alternative methodological perspectives. KM Systems related topics followed by KM Environment Issues were the most widely published areas. Positivist and empirical approaches were the most widely employed approaches. The multi-method was the most dominant research method utilised by KM authors within the period we studied.

5.1 Limitations & Future Research Directions

We fully acknowledge that our study has a number of limitations, and readers should be aware of these and indeed interpret the material presented in this paper within the context of these limitations. Firstly, our search activities were restricted to occurrences of the KM keyword in the article titles only, and we fully acknowledge that there may be numerous studies, which lack the keyword in the title, but still focus upon KM in the main text. A further limitation is the extraction of theoretical and methodological data from limited search outputs. We limited our search to the journals indexed only in Web of Science®, but there are many well known journals particularly devoted to the KM research that are not indexed in this product, and this clearly will have limited our ability to identify all relevant articles, although further research is required to determine the extent of the influence of such factors. Although we believe that this paper has analysed the largest number of articles in comparison to other existing review articles on this theme, we believe that yet comprehensive research is required in order to reduce the impact of the limitations we have identified in order to provide a greater understanding of the domain of KM research.

We anticipate this paper will prove to be a useful source of information for those readers who wish to learn more about the various facets pertaining to the existing body of published KM research in multi-disciplinary perspective. Moreover, readers also may benefit by becoming aware how the various research approaches/methods fit with the different theories/models and units of analysis.

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NOTE: Due to space limitations, references analysed for the review are not listed here, but interested readers find them and other information relating to the development of this paper at: <http://aadref.googlepages.com/km>

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