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Conceptualising 'knowledge management' in the context of library and information science using the core/periphery model

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This study took cognisance of the fact that the term 'knowledge management' lacks a universally accepted definition, and consequently sought to describe the term using the most common co-occurring terms in knowledge management (KM) literature as indexed in the Library, Information Science and Technology Abstracts (LISTA) database. Using a variety of approaches and analytic techniques (e.g. core/periphery analysis and co-occurrence of words as subject terms), data were analysed using the core/periphery model and social networks through UCINET for Windows, TI, textSTAT and Bibexcel computer-aided software. The study identified the following as the compound terms with which KM co-occurs most frequently: information resources management, information science, information technology, information services, information retrieval, library science, management information systems and libraries. The core single subject terms with which KM can be defined include resources, technology, libraries, systems, services, retrieval, storage, data and computers. The article concludes by offering the library and information science (LIS) professionals' general perception of KM based on their use of terms, through which KM can be defined within the context of LIS.

Keywords: Knowledge management; library science; information science; content analysis; informetrics

Contents

1 Introduction

Knowledge management (KM) is an elusive term as far as its definition is concerned. To date, there is no single universally accepted definition of the term. Grossman (2007) observes that not only is there lack of consensus regarding the concept's definition but also there is no consensus in regard to its underlying precepts. Sutton (2007) observes that explaining KM is a challenge and attributes it to a number of reasons. He explains thus:

> *KM does not appear to possess the qualities of a discipline. If anything, KM qualifies as an emerging field of study. Those involved in the emerging field of KM are still vexed today by the lack of a single, comprehensive definition, an authoritative body of knowledge, proven theories, and generalized conceptual framework. Academics and practitioners have not been able to stabilize the phenomenon of KM enough to make sense of what it is and what it comprises.* (Sutton 2007)

Despite this lack of understanding of the concept, KM is increasingly becoming popular worldwide (Grossman 2007) and in a variety of disciplines (business administration, computer science, library and information science/studies, etc) and institutions/organisations (universities, business enterprises, governments, etc). A literature review reveals that the term is multidisciplinary in nature (Chaudhry 2005; Hazeri and Martin 2009; Hazeri, Martin and Sarrafzadeh 2009; Jacobs 2004; Onyancha and Ocholla 2006; Ponzi 2002:268; Roknuzzaman and Umemoto 2008; Sutton 2007). These studies, among others, identify the following disciplines as being the greatest contributors to or users of the theories and methods of KM: computer science; business; management; library and information science; engineering; psychology; multidisciplinary science; energy and fuels; social sciences; operation research and management science; and planning and development. Jones (in Grossman 2007) opines that KM 'overlaps with a number of other disciplines (organizational development, innovation, competitive intelligence)'. Perhaps, the most comprehensive list of the disciplines which support KM's interdisciplinarity is that offered by Sutton (2007). In his support of the interdisciplinarity of KM, Sutton (2007) provides a list of over 30 topics, fields and disciplines which reflect the scope of KM. They include artificial intelligence, expert systems, knowledge engineering, business, commerce, management, business intelligence, business process management and engineering, complexity science and chaos theory, communications and journalism, computer science, cybernetics, data warehousing and data mining, ecology, economics, entrepreneurship and innovation, health informatics, organisation studies and organisational behaviour. Others, according to Sutton, include organisational communications, organisational design, organisational memory, organisational theory, information technology and telecommunications, leadership, library and information science, management information systems, marketing, strategic management and systems thinking and theory. Hence, we believe that the different disciplines and sectors that contribute to the development of KM or use its theories and methods have, in our view, greatly contributed to the many definitions and perspectives of KM.

From the business point of view, Wiig (1999) defines KM as the systematic, explicit and deliberate building, renewal and application of knowledge to maximise an enterprise's knowledge-related effectiveness and returns from its knowledge assets. Rowley sees KM as a field 'concerned with the exploitation and development of the knowledge assets of an organization with a view to furthering the organization's objectives' (Rowley 2000:9). In the same vein, Kim (2000:3) explains that knowledge management is a

> *discipline that promotes an integrated approach to identifying, managing and sharing all of an organization's knowledge assets including unarticulated expertise and experience resident in individual workers … it involves the identification and analysis of available and required knowledge, and the subsequent planning and control of actions to develop knowledge assets so as to fulfill organizational objectives.* (Kim 2000:3)

We have also noted that there is no clear classification of knowledge management within the field of library and information studies (LIS). For example, in the LIS Research Areas Classification Scheme (http://www.alise.org/mc/page.do?sitePageId=55727) produced by the influential Association for Library and Information Science Education (ALISE), which captures 90 research sub-themes within eight broad research categories, KM is classified under 'Information Organization' instead of 'Management/Administration'. The concept 'knowledge' is also missing from the 'information organization' category in ALISE's classification. To many library and information scientists, KM includes, but is not limited to, information management. According to Read-Smith, Ginn, Kallaus, Fosegan, Logan and Schneiter (2002:317), KM is 'an interdisciplinary field that is concerned with systematic, effective management and utilization of an organization's knowledge resources ... it encompasses creation, storage, retrieval, and distribution of an organization's knowledge – similar to records and information management'. Read-Smith *et al.* (2002) therefore consider the processes of KM as being similar to the processes that constitute records management or information management. In fact, Al-Hawamdeh (2003:21) states that information management is a part of KM, and proceeds to define KM as the 'process of identifying, organizing and managing knowledge resources', in which case the resources include explicit knowledge (information), 'know-how' (learning capacity), 'know-who' (customer capacity) and tacit knowledge in the form of skills and competencies. Kim (2000) observes that managing books, journals and other similar resources and conducting searches in such

resources for clients or arranging for the circulation of materials is but a small part of KM. This explains, to some extent, why ALISE would classify KM under information organisation, as alluded to earlier.

A subject content analysis of the periodicals in which KM research is published, as provided by Onyancha and Ocholla (2006), reveals that they cover subjects such as library and information science, business, management science, computer science, financial management, human resource management, management information systems and information technology. Visibly, this wide range of coverage of KM complicates efforts of arriving at a uniform definition of the concept. Any attempt to come up with a uniform definition of KM is further complicated by the different titles given to KM courses or programmes at institutions of higher learning, a situation that reflects divergent views held by different people. For example, in a study conducted by Chaudhry and Higgins (2001) to investigate the state of KM education in selected universities in Australia, Canada, Singapore, UK and the USA, it was found that KM courses are known by different names, such as 'Knowledge Management and Decision Systems', 'Information Architecture and Knowledge Management', 'Intelligence Systems and Knowledge Management', 'Management of Information Systems and Services', 'Information and Knowledge Management' and 'Knowledge Management in Health Services'. A long list of nomenclature purportedly referring to KM is likely to occur when an inclusive survey is conducted with a larger international sample. What is inherent in the titles sampled is the frequent occurrence of the term 'management' in the titles.

In an article entitled 'KM education in LIS programs', Rehman and Chaudhry (2005) investigated the perceptions of the heads of 12 schools on KM in terms of: (a) the nature of their KM coursework; (b) KM positions the graduates might target; (c) interdisciplinary partnerships; (d) strategic partnerships with industry; and (e) practical difficulties in the introduction of KM courses. The authors found, among other things, that there was limited knowledge about the job market for LIS graduates taking KM courses although there existed 'an appreciation and realization of the potential of KM among academic leaders in LIS education' (Rehman and Chaudhry 2005:256). Rehman and Chaudhry's (2005) article does not state, however, how LIS scholars view KM as a concept. As mentioned above, LIS professionals and scholars view KM as an extension of what they have always done – managing information (including records management). However they hold different views on the scope and exact meaning of KM (DiMattia and Order 1997). We concur with other writers who have observed that 'clarity about KM functions and the required competencies among professionals will help in deploying appropriate strategies for incorporating a KM component into the existing LIS curriculum' (Rehman and Chaudhry 2005:255). This study was therefore an attempt to provide a meaningful insight into how KM is understood in the context of LIS. It endeavoured to answer some of the following inter-related questions: What are the processes mostly associated with KM within the context of LIS? What are the core terms (in LIS) with which KM can be defined? Which terms can be used to describe KM processes and activities within the context of LIS? Which departments or sectors or professions associated with LIS ascribe to or practise KM? Which LIS activities fall within the scope of KM? In short, what are the LIS professionals' perceptions of KM?

2 Methodology

Broadly, this study employed informetric approaches to examine the terms that can be used to describe KM in the context of LIS. Specifically, a content analysis of KM literature as indexed in the Library and Information Science and Technology Abstracts (LISTA) was conducted to identify the most commonly used indexing terms to describe KM and the core terms with which KM can be described; all in an attempt to contextualise KM within the broader field/discipline of library and information science/studies. The LISTA database was deemed appropriate for this study owing to its controlled vocabulary and well-constructed thesaurus which allows for high precision and recall when searching for multidisciplinary subjects or topics such as 'knowledge management'. The database indexes more than 500 core journals, more than 50 priority journals and 125 selective journals in the field of library and information science. As the current study sought to investigate LIS scholars' perceptions of KM, it became necessary to use a subject-specific database. The database also allows searches to be conducted within or using 44 different searchable fields or tags, respectively. To extract relevant data from the database, a search of DE 'Knowledge Management' was conducted within the subject field, where DE denotes subject descriptor. The searchable tag DE performs an exact search of the subject headings,

companies, people and author-supplied key words for terms describing a document's contents. Data were downloaded in the months of June and July 2008 and the search was limited to the years 1961 to 2007, split into four ten-year and one seven-year periods. The start publication year was dictated by the fact that the earliest published document as indexed in LISTA was published in 1968 while the grouping of years as aforementioned was for purposes of comparing the developments in one decade with another. Only two types of articles, namely magazine and journal articles, were considered. The inclusion of magazine articles was deemed important because we felt that some of them (e.g. *UNESCO Bulletin*) publish high quality articles on KM. After all, our major focus was on the subject terms that are associated with KM and not necessarily on research articles. Having downloaded the relevant data, different computer-aided softwares were used to analyse the data. The use of different softwares for data analysis was on the basis that no one particular software could perform all data analysis functions, that is, cleaning of data and the generation of frequency counts of subject terms, frequency counts of the usage of words within the text, co-word analysis and the generation of social networks. Notepad was used to clean the data of irrelevant information and duplicates and to prepare the data for analysis. To prepare the data for Bibexcel, each subject in each record was entered in its own line, e.g.

- INFORMATION resources management
- INFORMATION science
- INFORMATION technology
- RESEARCH institutes
- KNOWLEDGE management.

Using this data, Bibexcel counted the number of times each subject appeared in each record for all records and returned the sum total of each subject's frequency. The subjects that recorded the highest number of appearances were deemed to be the most commonly used terms to describe KM literature. Partly, these subject terms provided a picture of how LIS professionals viewed KM. In other words, they answered what LIS professionals associate KM with in their line of activities.

As the above mentioned analysis provided only the frequencies of co-occurrence of KM with other compound subject terms, there was a need to measure the strength of their relationships as well as identify the single subject terms with which KM is defined by LIS professionals. It was assumed that the 'associatedness' of single terms derived from the compound subject terms could further assist in identifying the core terms with which to describe KM. To achieve this, a simple core/periphery model analysis was applied on 90 selected terms (excluding *knowledge* and *information)* that recorded the highest frequency counts of occurrence in the compound subject terms. According to Borgatti and Everett (1999) and Borgatti, Everett and Freeman (2002), the core/periphery function simultaneously fits a core/periphery model to the data network and identifies which actors (in this case, the terms) belong in the core and which belong in the periphery. As this analysis requires a co-occurrence matrix with which to work, we first identified one-word terms with high frequencies by subjecting the data mentioned above to further analysis using the textSTAT software. (The textSTAT software 'makes text statistics, counts characters, words, sentences, to find words repetitions and how many times they appear in a given text' – http://textstat.software.informer.com/.) Two files (i.e. *text.txt* and *words.txt*) were created and subjected to analysis using TI software, which was also used to prepare both the raw and normalised co-occurrence matrices named COOCC.DBF and COSINE.DBF respectively.

Finally, the data contained in the COSINE.DBF file were imported into UCINET for Windows version 6 for further analysis so that the core terms that describe KM could be determined. The process produced the terms that are the core in describing KM within the context of LIS as well as those in the periphery. It was assumed that the further the terms are from the core terms, the less of a relationship they have with KM. This relationship is further demonstrated in Figures 2, 4, 6 and 8, which were prepared using Pajek software. Developed by Vladimir Batagelj (Department of Mathematics, University of Ljubljana, Slovenia) and Andrej Mrvar (Faculty of Social Sciences, University of Ljubljana, Slovenia), the program is Windows-based and is capable of analysing and illustrating large networks containing thousands or even millions of vertices. It is freeware software (used for academic purposes), and can be

downloaded from http://vlado.fmf.uni-lj.si/pub/networks/pajek/. The file format accepted by Pajek provides information on *vertices*, *arcs* (directed edges), and undirected *edges.* Only four year periods were illustrated in the sociograms as the 1961–1970 year period produced only 9 records and therefore very few terms to be graphically presented.

Visualisation of the relationships between and among the selected single terms was done to supplement the information provided in the core/periphery models as the models did not reveal the relationships of all the terms. The graphics of the core/periphery models could not fit into the MS Word template, thereby dictating the provision of only core single terms used to describe KM. Furthermore, clustering of the terms using sociograms assisted in identifying those terms that belong in various clusters of core or periphery terms. Whereas the core/periphery model provides two clusters (i.e. core and periphery), the sociograms reveal more clusters, even within the two categories of terms.

Limitations of the study

As mentioned above, this article describes KM from the point of view of the LIS profession. In other words, we examined the perceptions of KM by LIS professionals using subject terms of the published KM literature as indexed in LISTA. The core terms with which KM is described as provided in the results section are those emanating from LIS research only. The article therefore does not provide a generalised view of KM as the term is multidisciplinary.

3 Results and discussion

3.1 Subject terms used to describe KM literature

An analysis of the terms that appear the most in KM literature may give an indication of the LIS scholars' perceptions of KM. The underlying theoretical basis is that two or more terms have a relationship when they co-occur in a given text. The more frequently two or more terms co-occur in a text(s) or document(s), the stronger their relationship (Krsul 2002). Table 1 provides the top 100 compound subject terms which co-occurred 13 or more times with KM. The leading term is *information resources management*, which recorded a frequency count of 555, followed by *information science* (417), *information technology* (385), *information services* (200), *information retrieval* (170), *library science* (131), *management information systems* (124), *libraries* (113), *management* (111) and *information resources* (100), just to name the top 10.

If we classify the 100 terms into various categories describing different aspects of KM, the terms that describe the **management function** would comprise: *information resources management*; *management*; *industrial management*; *records management*; *information services management*; *database management*; *personnel management*; *document management*; *resource management*; and *library administration*. The list of terms also comprises **activities** or **processes** associated with KM as perceived by LIS professionals, e.g. *information retrieval*, *organisational learning*, *data mining*, *electronic data processing*, *database searching*, *knowledge acquisition (expert systems)*, *information organisation*, *documentation*, *knowledge representation (information theory)*, *libraries – automation*, *information sharing*, *library cooperation*, *classification*, and *Website development*.

Table 1
Top 100 subject terms used to describe KM literature

No.	List of subject terms	Articles	No.	List of subject terms	Articles
1	Information resources management	555	51	Online information services	28
2	Information science	417	52	Expert systems (computer science)	28
3	Information technology	385	53	Computer systems	28
4	Information services	200	54	Database searching	28
5	Information retrieval	170	55	Knowledge acquisition (expert systems)	27
6	Library science	131	56	Intellectual property	26
7	Management information systems	124	57	Information organisation	25
8	Libraries	113	58	Metadata	24
9	Management	111	59	Academic libraries	23
10	Information resources	100	60	Knowledge representation (information theory)	22
11	Information storage and retrieval systems	78	61	Communication	21
12	Organisational learning	77	62	Education	21
13	Data mining	76	63	Classification	20
14	Electronic data processing	76	64	Surveys	20
15	Intellectual capital	74	65	Employees	19
16	Knowledge workers	69	66	Executives	19

17	Associations, institutions, etc	67	67	Information services – management	19
18	Information professionals	66	68	Libraries – automation	19
19	Corporate culture	66	69	Database management	19
20	Business enterprises	65	70	Information scientists	19
21	Industrial management	59	71	Personnel management	19
22	Librarians	58	72	Computer science	19
23	Information theory	56	73	Organisational behaviour	19
24	Digital libraries	55	74	Human capital	18
25	Congresses and conventions	55	75	Document management	18
26	Web sites	54	76	Electronic commerce	18
27	Research	52	77	Computer networks	18
28	Electronic information resources	48	78	World Wide Web	17
29	Decision making	45	79	Information sharing	17
30	Information architecture	44	80	Library cooperation	17
31	Concepts	42	81	Web portals	17
32	Computer software	39	82	Library employees	17
33	Information literacy	39	83	Resource management	16
34	Organisation	38	84	Library administration	16
35	Technological innovations	37	85	Organisational structure	15
36	Business intelligence	35	86	Information society	15
37	Internet	35	87	Web site development	15
38	Universities and colleges	34	88	Electronic systems	15
39	Computer network resources	33	89	Medical care	14
40	Documentation	33	90	Business planning	14
41	Technology	33	91	Business information services	14
42	Artificial intelligence	32	92	Methodology	14
43	Learning	32	93	Competitive advantage	14
44	Strategic planning	32	94	Work environment	14
45	Databases	31	95	Bibliometrics	13
46	Intranets (computer networks)	30	96	Taxonomy	13
47	Business	30	97	Administrative agencies	13
48	Management science	29	98	Archives	13
49	Records – management	29	99	Search engines	13
50	Knowledge, theory of	22	100	Information dissemination	13

The **resources** or **systems** or **services** that are managed include the following: *information technology*; *information services*; *management information systems*; *libraries*; *information resources*; *intellectual capital*; i*nformation storage and retrieval systems*; *business enterprises*; *digital libraries*; *Websites*; *electronic information resources*; *computer software*; *Internet*; *computer network resources*; *intranets* (*computer networks*); *databases*; *online information services*; *expert systems*; *computer systems*; *academic libraries*; *human capital*; *computer networks*; *technology*; *Web portals*; *World Wide Web*; *electronic systems*; *business information services*; and *archives*.

Knowledge managers are variously referred to in Table 1 as the following: knowledge workers; information professionals; librarians; executives; employees; information scientists; and library employees. Table 1 also provides the **disciplines** or **fields** that are contributors to or users of theories and methods of KM. These include: *information science*; *information technology*; *library science*; *business*; *management science*; *education*; and *computer science*.

3.2 Core terms with which KM is described by LIS scholars

Two techniques were used to identify the core terms with which KM can be described or defined, namely the core/periphery model and social networks as illustrated in Figures 1 to 8. In this section the findings are discussed under four sub-headings so as to illustrate the emerging terms that are increasingly becoming associated with KM.

Figures 1 and 2 illustrate the single terms that were core in describing the KM literature between 1971 and 1980, inclusive. Out of the total of 32 single subject terms that appeared in the subject fields of KM literature in 1971–1980, over 50% (i.e. 17) co-appeared with KM, with the co-occurrence of the terms *electronic* and *data* producing the highest strength of association which equaled to 0,945. The co-occurrence of the terms *electronic* and *processing* produced a similar strength of association value while *storage* and *systems* yielded scored a value of 0,906. Other associations that produced high scores include: *storage* and *retrieval* (0,681)*;* and *computer(s)* and *system(s)* (0,620). With the emergence of computers in the 1970s, the 1971–1980 period heralded the era of library automation hence the co-occurrence of the aforementioned terms in the KM literature. For instance, information available at http://www.librarytechnology.org/automationhistory.pl indicate that two projects on library automation were implemented in the United States of America, namely the South West Academic Libraries Cooperative Mechanization Project and Birmingham Libraries Cooperative Mechanization Project. According to Cho (2009), the automated systems largely involved the automation of library card catalogs. It is observable in Figures 1 and 2 that the terms *documentation* – which means the collection and classification of information or information resources – and *retrieval* co-appeared with all the terms forming the core cluster.

Figure 1
Core/periphery model of terms describing KM literature, 1971–1980

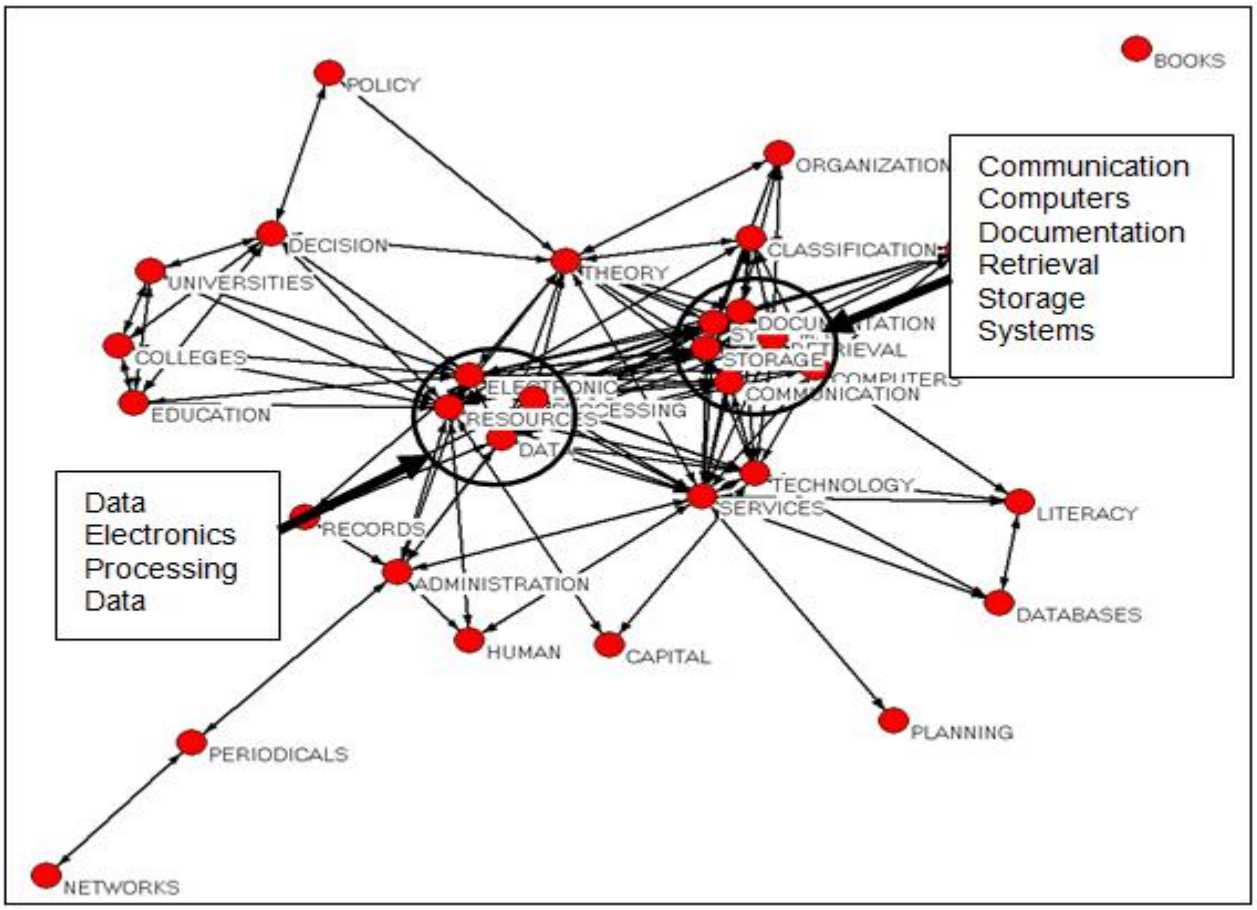
Core/Periphery Class Memberships:

1: RESOURCES TECHNOLOGY SYSTEMS SERVICES COMPUTERS RETRIEVAL ELECTRONIC DATA RESEARCH ORGANIZATIONAL THEORY COMMUNICATI
2: EDUCATION NETWORKS CAPITAL PLANNING DECISION COLLEGES LITERACY UNIVERSITIES DATABASES ADMINISTRATION RECORDS HUMAN P

Blocked Adjacency Matrix

		1 RESOU	2 TECHN	3 SYSTE	4 SERVI	5 COMPU	6 RETRI	7 ELECT	8 DATA	9 RESEA	10 ORGAN	11 THEOR	28 DOCUM	17 STORA	30 TEACH	15 COMMU	16 PROCE	27 CLASS
1	RESOURCES		0.245	0.088	0.316		0.132	0.075				0.316	0.105	0.129				0.183
2	TECHNOLOGY	0.245		0.072	0.568	0.115	0.538	0.365	0.414				0.086	0.105		0.115	0.414	
3	SYSTEMS	0.088	0.072		0.111	0.620	0.578	0.261	0.296	0.277	0.277	0.185	0.462	0.906	0.555		0.296	0.320
4	SERVICES	0.316	0.568	0.111		0.089	0.459	0.424	0.481			0.200	0.267	0.082		0.179	0.481	
5	COMPUTERS		0.115	0.620	0.089		0.187	0.422	0.359				0.447	0.365	0.447		0.359	0.258
6	RETRIEVAL	0.132	0.538	0.578	0.459	0.187		0.491	0.557	0.209	0.209	0.278	0.209	0.681	0.209	0.187	0.557	0.120
7	ELECTRONIC	0.075	0.365	0.261	0.424	0.422	0.491		0.945			0.079	0.314	0.192		0.211	0.945	
8	DATA		0.414	0.296	0.481	0.359	0.557	0.945				0.089	0.267	0.218		0.239	1.000	
9	RESEARCH			0.277			0.209				1.000	0.333	0.333	0.408				
10	ORGANIZATIONAL			0.277			0.209			1.000		0.333	0.333	0.408				
11	THEORY	0.316		0.185	0.200		0.278	0.079	0.089	0.333	0.333		0.222	0.272		0.149	0.089	0.192
28	DOCUMENTATION	0.105	0.086	0.462	0.267	0.447	0.209	0.314	0.267	0.333	0.333	0.222		0.408	0.333	0.149	0.267	0.577
17	STORAGE	0.129	0.105	0.906	0.082	0.365	0.681	0.192	0.218	0.408	0.408	0.272	0.408		0.408		0.218	0.236
30	TEACHING			0.555		0.447	0.209						0.333	0.408				0.577
15	COMMUNICATION		0.115		0.179		0.187	0.211	0.239			0.149	0.149				0.239	0.258
16	PROCESSING		0.414	0.296	0.481	0.359	0.557	0.945	1.000			0.089	0.267	0.218		0.239		
27	CLASSIFICATION	0.183		0.320		0.258	0.120					0.192	0.577	0.236	0.577	0.258		
18	PLANNING				0.200													
13	NETWORKS																	
20	COLLEGES	0.316						0.236										
21	LITERACY		0.365		0.283		0.147											
22	UNIVERSITIES	0.316						0.236										
23	DATABASES		0.258		0.200													
24	ADMINISTRATION	0.129			0.163			0.096	0.109								0.109	
25	RECORDS							0.236	0.267								0.267	
26	HUMAN	0.316			0.400													
19	DECISION	0.129						0.096				0.408						
12	EDUCATION	0.316						0.236										
29	POLICY											0.333						
14	CAPITAL	0.316	0.258															
31	BOOKS																	
32	PERIODICALS																	

Figure 2
Visual map of core/periphery terms describing KM literature, 1971–1980



Core terms in 1981–1990

During this period, there were 12 key words that formed the core terms that were used to describe KM literature. These were: *resources*, *technology*, *systems*, *performance*, *services*, *computers*, *retrieval*, *processing*, *electronic*, *data*, *policy* and *storage*. A combination of one or two of these words defined what KM was perceived to be in the said period. The highest strength of association was between the terms *retrieval* and *technology*, which recorded a normalised count of 0,882. Evidently, unlike the previous period of study where the emphasis was laid on the development of computerised systems or simply the computerisation of library and information services, the areas of research focus between 1981 and 1990 were the use of technology in information retrieval and resources (including data and information) management. Essentially, therefore, KM was largely associated with the use of information technology in the retrieval of information and organisation of data. Of the 90 unique terms that were selected to conduct the core/periphery analysis, 60 did not have any links to any other words in the period 1981–1990, implying that they were either rarely used or not used at all in describing KM literature. Only 30 terms were interlinked with one or more other terms during this period. The 'disassociatedness' of the majority of the selected terms with KM (either directly or by proxy) is probably because they were introduced into KM literature later than 1990, or they were simply not related to the term KM before then. It was noted that one cluster of seven terms that had close association among themselves and therefore important in describing KM emerged in 1981–1990. Most of these terms comprised the core key words illustrated in Figure 4. They are: *technology*, *retrieval*, *processing*, *data*, *electronic*, *policy* and *systems*.

Figure 3
Core/periphery model of terms describing KM literature, 1981–1990

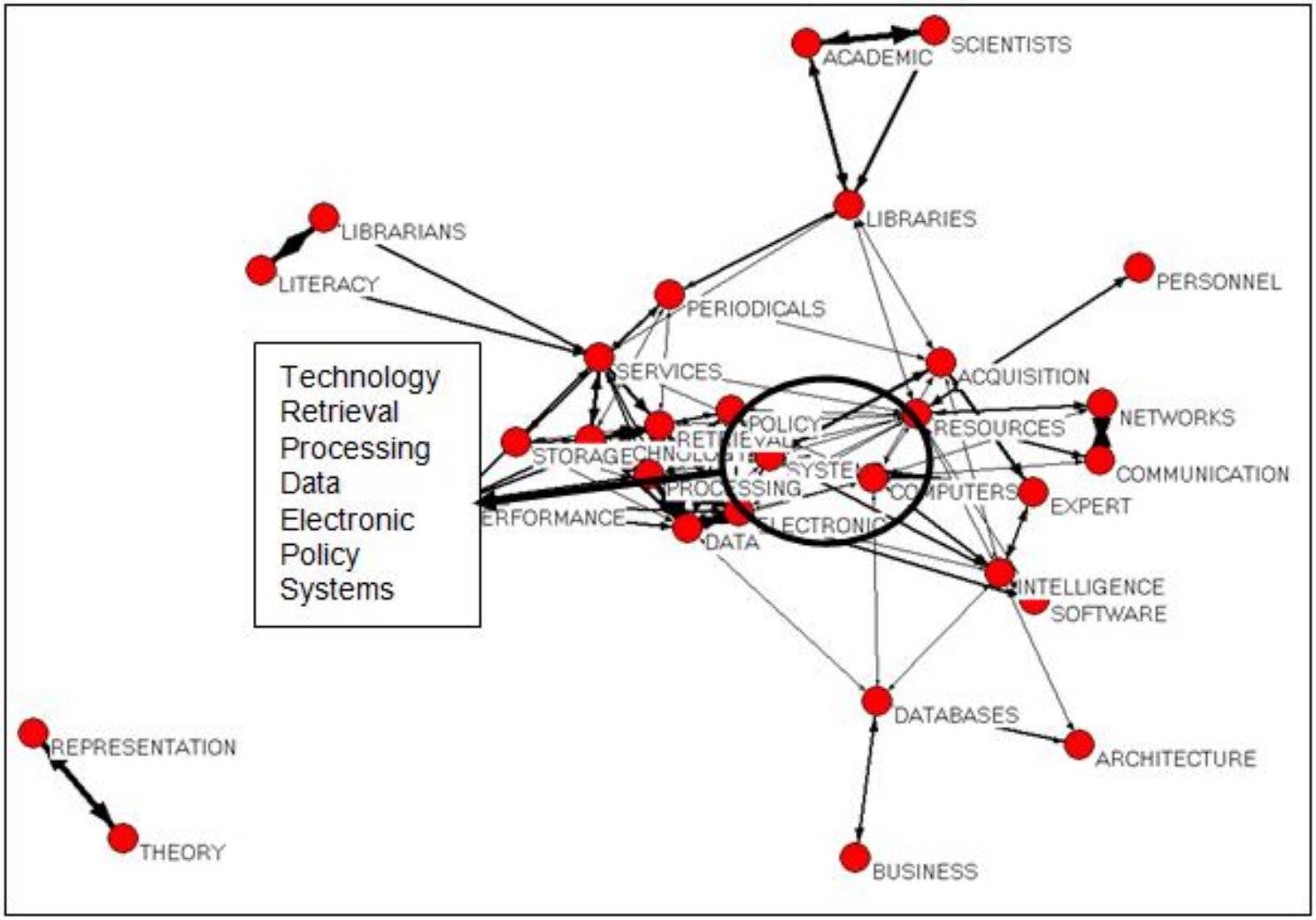
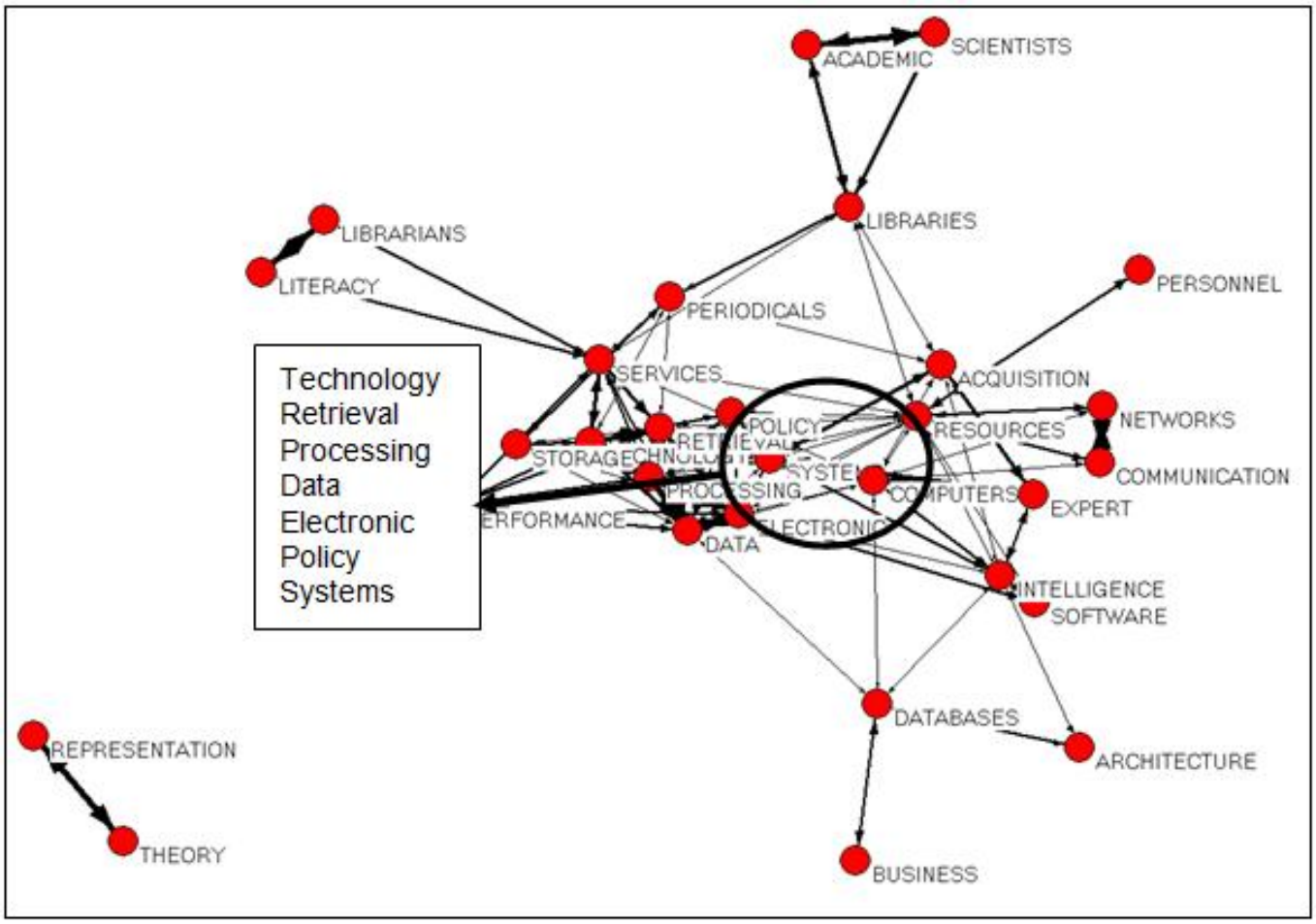


Figure 4
Visual map of core/periphery terms describing KM literature, 1981–1990



Core terms in 1991–2000

This period is widely seen as a time when there was a lot of emerging interest in KM (Ponzi 2002). It is also believed that it is during this period that the term *knowledge management* was introduced (Jacobs 2004). The number of the core terms with which KM was described in 1991–2000 rose to 26 from the previous year's total of 12 terms, thereby indicating an increased interest from various scholars belonging to a variety of disciplines or same disciplines but with different perspectives on KM. An analysis of the 'associatedness' of terms reveals that the highest strengths of association (represented by the normalised frequency count) were between *data* and *processing* (0,795), *electronic* and *processing* (0,746), *education* and *universities* (0,745), *education* and *colleges* (0,745), *expert* and *systems* 0,709), *data* and *mining* (0,707), *electronic* and *data* (0,678), *databases* and *retrieval* (0,586), *computer(s)* and *systems* (0,555), *data* and *analysis* (0,530), *storage* and *retrieval* (0,504) and *analysis* and *mining* (0,500). The linkage of two or more of these words defines the perceptions of LIS scholars about KM during 1991–2000. Seemingly, electronic data processing (including storage and retrieval) in academic libraries dominated the KM literature, thereby being the main activity or process defining KM in the said period of study. This observation is corroborated by Gu (2004a:285–286) who observed that information storage and accessibility by all kinds of information technologies were the main focus in 1998 while the year 2000 ushered in an era wherein 'KM was a more accepted part of the business agenda'.

Figure 5
Core/periphery model of terms describing KM literature, 1991–2000

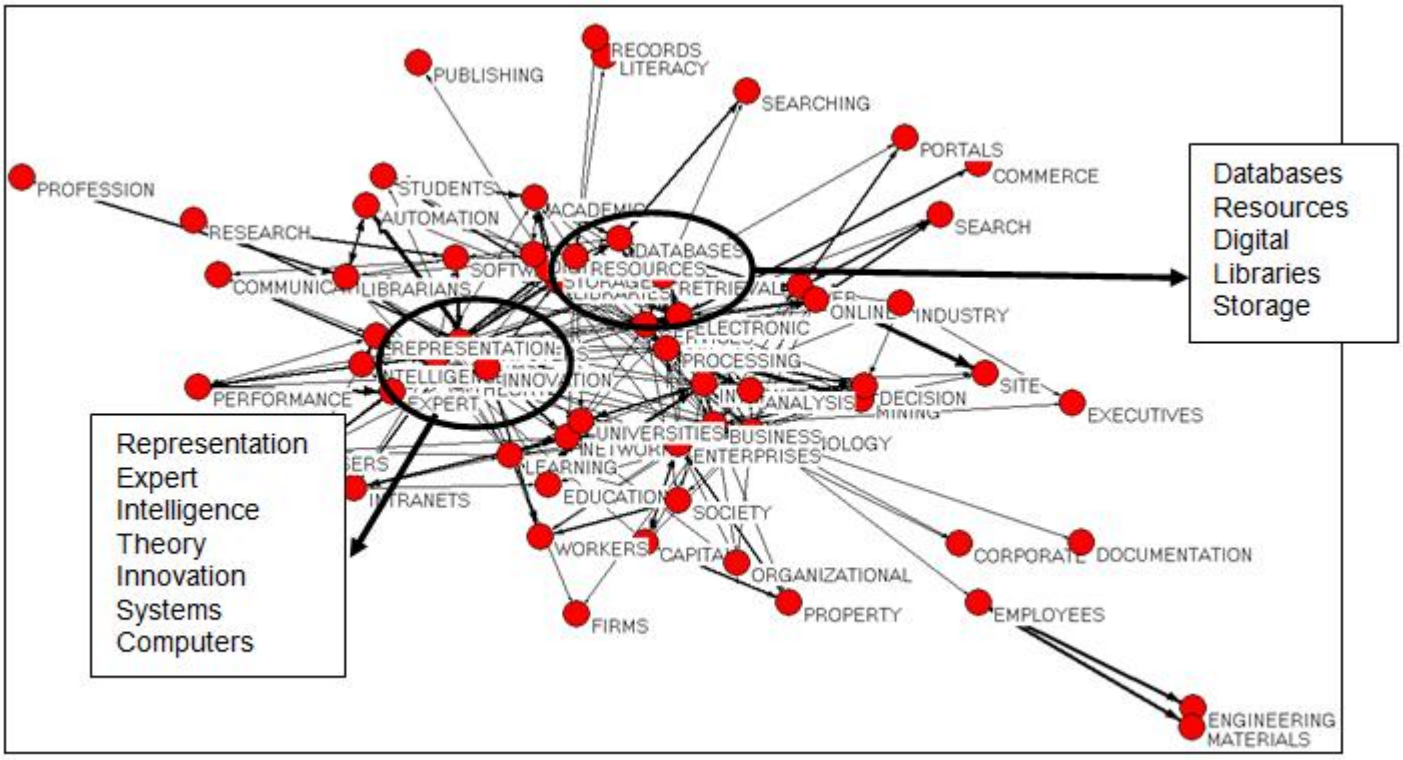
Core/Periphery Class Memberships:

1: RESOURCES TECHNOLOGY SYSTEMS LIBRARIES SERVICES COMPUTERS RETRIEVAL BUSINESS ELECTRONIC DATA THEORY EDUCATION NETWORKS SOFTWARE PROCESSING STORAGE EN
2: RESEARCH ORGANIZATIONAL LEARNING WEB CAPITAL COMMUNICATION INTERNET DIGITAL INTELLIGENCE LIBRARIANS CORPORATE ORGANIZATION WORKERS PROFESSION SITE EM

Blocked Adjacency Matrix

		1 RESOU	2 TECHN	3 SYSTE	4 LIBRA	5 SERVI	6 COMPU	7 RETRI	8 BUSIN	9 ELECT	10 DATA	35 EXPER	20 SOFTW	45 ACADE	14 THEOR	15 EDUCA	24 ENTER	17 NETWO	42 ANALY	23 STORA	36 DECIS	25 MININ	22 PROCE	3 COLL
1	RESOURCES			0.076	0.167	0.049	0.067	0.137	0.076	0.126				0.147				0.295		0.120					0.24
2	TECHNOLOGY				0.046	0.243	0.110	0.075	0.188	0.155	0.214					0.177	0.065	0.061	0.121		0.099	0.121	0.182	0.19
3	SYSTEMS	0.076			0.049	0.043	0.555	0.359		0.165	0.046	0.709	0.091	0.129	0.204			0.129	0.129	0.316			0.065	
4	LIBRARIES	0.167	0.046	0.049		0.063	0.128	0.058	0.049				0.267	0.378			0.101							
5	SERVICES	0.049	0.243	0.043	0.063		0.113	0.309	0.129	0.355	0.295		0.118		0.053			0.083		0.136			0.417	
6	COMPUTERS	0.067	0.110	0.555	0.128	0.113		0.140		0.097	0.040	0.489	0.480		0.107	0.124		0.340		0.092			0.057	0.09
7	RETRIEVAL	0.137	0.075	0.359	0.058	0.309	0.140		0.040	0.526	0.382		0.109	0.154	0.098					0.504			0.540	
8	BUSINESS	0.076	0.188		0.049	0.129		0.040		0.055	0.137				0.041	0.189	0.483	0.258	0.129		0.105	0.129	0.065	0.10
9	ELECTRONIC	0.126	0.155	0.165		0.355	0.097	0.526	0.055		0.678		0.151	0.213	0.135		0.114	0.107	0.213	0.348	0.174	0.213	0.746	
10	DATA		0.214	0.046		0.295	0.040	0.382	0.137	0.678					0.056		0.283		0.530	0.144	0.433	0.707	0.795	
35	EXPERT			0.709			0.489								0.186									
20	SOFTWARE			0.091	0.267	0.118	0.480	0.109		0.151					0.112									
45	ACADEMIC	0.147		0.129	0.378			0.154		0.213										0.408				
14	THEORY			0.204		0.053	0.107	0.098	0.041	0.135	0.056	0.186	0.112				0.085			0.129			0.079	
15	EDUCATION		0.177				0.124		0.189									0.091						0.74
24	ENTERPRISES		0.065		0.101				0.483	0.114	0.283				0.085				0.267		0.218	0.267	0.134	
17	NETWORKS	0.295	0.061	0.129		0.083	0.340		0.258	0.107						0.091								
42	ANALYSIS		0.121	0.129					0.129	0.213	0.530						0.267				0.408	0.500	0.250	
23	STORAGE	0.120		0.316		0.136	0.092	0.504		0.348	0.144			0.408	0.129								0.204	
36	DECISION		0.099						0.105	0.174	0.433						0.218		0.408			0.408	0.204	
25	MINING		0.121						0.129	0.213	0.707						0.267		0.500		0.408		0.250	
22	PROCESSING		0.182	0.065		0.417	0.057	0.540	0.065	0.746	0.795				0.079		0.134		0.250	0.204	0.204	0.250		
39	COLLEGES	0.241	0.198				0.092		0.105							0.745								
46	DATABASES	0.093		0.327	0.120	0.105	0.143	0.586		0.270	0.112		0.224	0.316						0.258			0.158	
33	ONLINE		0.070			0.481		0.178	0.075	0.246	0.204												0.289	
41	UNIVERSITIES	0.241	0.198				0.092		0.105							0.745								1.00
16	WEB		0.065		0.101	0.089		0.082	0.069															
12	ORGANIZATIONAL		0.038						0.082								0.085	0.079						
11	RESEARCH						0.340						0.354											
18	CAPITAL		0.061						0.258						0.079		0.401							
27	INTELLIGENCE			0.152			0.133					0.154			0.434									
32	PROFESSION																							
21	INTERNET	0.060	0.149				0.046	0.063	0.158							0.596								0.50
34	SITE								0.091															
19	COMMUNICATION														0.316									
28	LIBRARIANS	0.093			0.239	0.211	0.072						0.224											
29	CORPORATE		0.171						0.183															
38	SEARCHING							0.218																

Figure 6
Visual map of core/periphery terms describing KM literature, 1991–2000



It was observed that the strengths of association between these and other terms in the cluster consisting of the core terms in the previous period recorded lower values during this year period. This is contrary to our expectation of higher values, which would have meant stronger 'associatedness' between the terms. This scenario may imply a shift in research focus areas to include more

aspects whose terms comprised the terms in the periphery. It may also mean that scholars were trying to gain a deeper understanding of KM and had not found common terms with which to define the 'new' concept. These assumptions could not, however, be substantiated in this study. At the periphery were terms such as the *Web, organisational*, *research*, *capital*, *intellectual*, *profession*, *Internet*, *site*, *communication*, *librarians*, *corporate*, *searching* and *records*, among others. Figure 6 illustrates this pattern more clearly than Figure 5. Although some terms appeared frequently in the KM subject headings, they were not associated with any of the other terms. There were only 65 out of 90 terms that were inter-linked with at least one other term, unlike in 1981–1990 when only 30 terms were associated with at least one other term. There was therefore an increase in the number of terms (i.e. in the core or the periphery) that were associated with KM on the one hand and with each other, on the other hand. This trend may have been brought about by interdisciplinary research.

Another emerging aspect is the formation of several small clusters of terms as demonstrated in Figure 6. Two of these clusters that produced a relatively higher number of terms each are circled. Whereas the cluster to the left of the sociogram describes KM in relation to the use of computer systems in data representation, expert intelligence, theory and innovation, the other cluster focuses on the storage of digital resources (including the application of e-databases) by libraries.

Core terms in 2001–2007

This period witnessed an increase of the number of terms (both in the core and periphery clusters) that were used to describe KM from 65 in the previous year period to 90, implying that all the selected terms used for the core/periphery model analysis were associated with at least another term, on the one hand, and KM on the other. This implies that most of the terms were introduced between 2001 and 2007 or have increasingly become more closely associated with KM. Although several theoretical frameworks on KM existed prior to the 2001–2007 period (Cohen and Levinthal 1990; Crossan, Lane and White 1999; and Nonaka and Takeuchi 1995), the search for holistic theories of KM dominated the 2001–2007 period (Yang 2003; Yang, Zheng and Viere 2009), a situation that may have contributed to the introduction of several new subject terms with which KM literature was indexed in the LISTA database. Interdisciplinary research would have also contributed to the patterns exhibited in Figures 7 and 8, where all the terms were inter-linked with each other. Different technologies and tools (e.g. intranets, institutional repositories, internet, data mining tools, project collaboration software tools, expert systems and portals) are increasingly being applied to KM (Sutton 2007). Various different services, resources and systems are also falling under the umbrella of KM practices. A large number of disciplines have become contributors and/or utilisers of KM theories and methods as observed by Hazeri and Martin (2009), Hazeri, Martin and Sarrafzadeh (2009), Jacobs (2004), Onyancha and Ocholla (2006), Ponzi (2002:268), Roknuzzaman and Umemoto (2008), Sutton (2007) and Rehman and Chaudhry (2005). This diversity is therefore likely to complicate the search for a unified definition of KM within the context of LIS.

A comparison of the core terms in Figure 5 and Figure 7 reveals that whereas the number of terms has increased from 26 to 28, there are seven terms in Figure 7 that did not feature in Figure 5, namely, *research*, *Web*, *materials*, *searching*, *Internet*, *corporate* and *digital*. The terms that featured in Figure 5 but did not comprise the core terms in Figure 7 include *academic*, *enterprises*, *analysis*, *decision* and *universities*. A relatively high number of terms have been consistent in their appearance in the cluster of core terms, for example, *resources*, *technology*, *systems*, *libraries*, *retrieval*, *services*, *computers*, *business*, *electronic*, *data* and *expert*. The emergence, and high ranking, of the *Web* and *Internet* in 2001–2007 heralds new approaches of KM. This may also imply the shift in the type of resources that are increasingly managed by various knowledge managers. It is widely acknowledged that information is increasingly becoming available on the Internet and more so in the World Wide Web, thereby requiring new approaches and techniques in its management. The use of the Internet and the Web in managing knowledge (including information) is therefore becoming common in the LIS profession. Citing various sources such as KPMG (2003) and Blair (2003), Gu (2004a:286) observes thus:

'In 2002/2003, KM is approaching a higher maturity level and becoming explicitly linked with the capturing of missed business opportunities… KM is seen as a process that has been heavily influenced by the growth and application of computer technology to IM and in large part concerned with establishing, maintaining, and facilitating communication between both experts and novices'.

One other aspect worth mentioning is that the strengths of association for the majority of the core terms in 2001–2007 were below average (i.e. 0,5). The highest strength of association (i.e. 0,713) was recorded between *data* and *mining* followed by *storage* and *retrieval* (0,664), and *computer* and *networks*. Apparently, data mining and information storage and retrieval have increasingly become the core activities of KM within the LIS profession. The core concepts that can be used to describe KM in the information age include those highlighted in Figure 8 (as circled and outlined).

Figure 7
Core/periphery model of terms describing KM literature 2001–2007

Core/Periphery Class Memberships:

1: RESOURCES TECHNOLOGY SYSTEMS LIBRARIES SERVICES COMPUTERS RETRIEVAL BUSINESS ELECTRONIC DATA RESEARCH THEORY EDUCATION WEB NETWORKS SOFTWARE INTERNET
2: ORGANIZATIONAL LEARNING CAPITAL COMMUNICATION ENTERPRISES INTELLIGENCE LIBRARIANS CULTURE ORGANIZATION WORKERS PLANNING PROFESSION SITE ARCHITECTURE

Blocked Adjacency Matrix

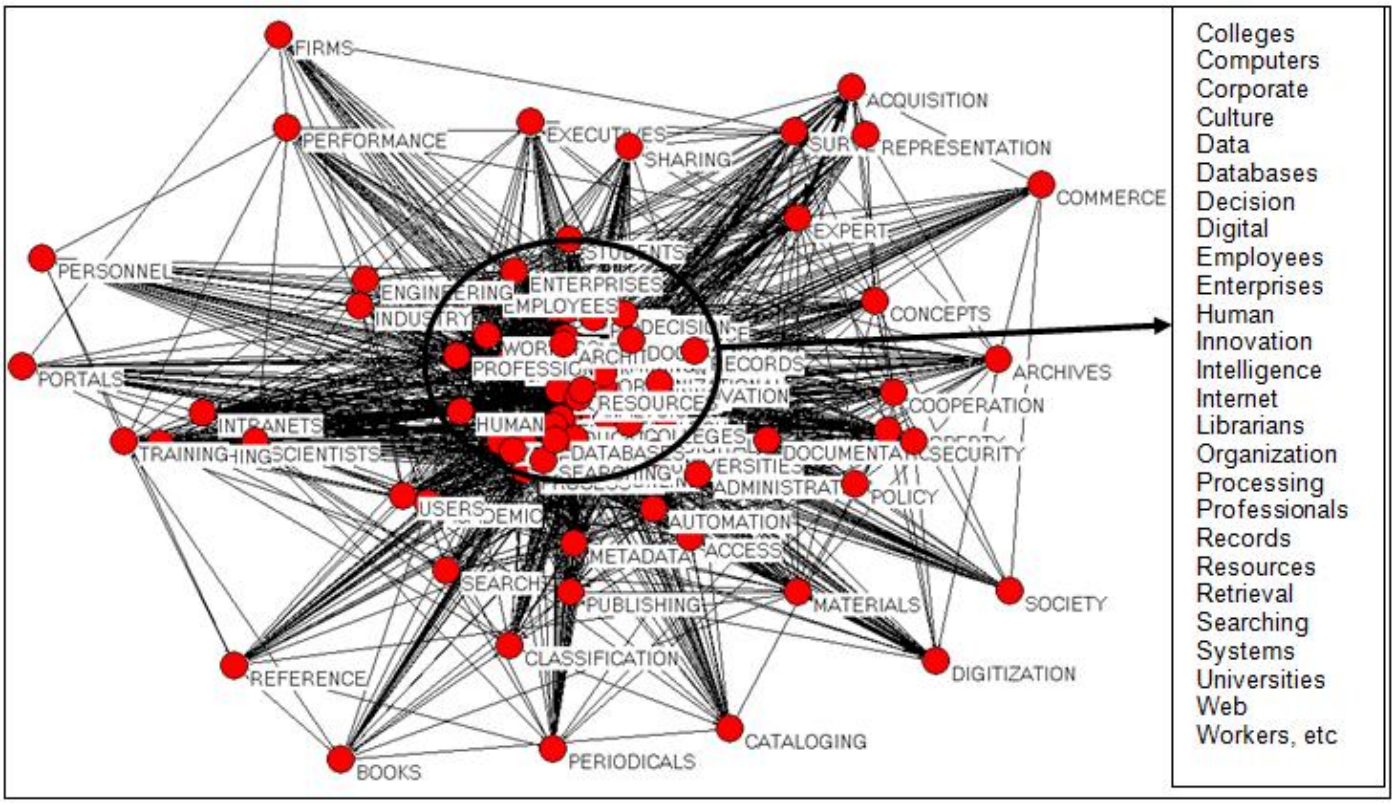
		1 RESOU	2 TECHN	3 SYSTE	4 LIBRA	5 SERVI	6 COMPU	7 RETRI	8 BUSIN	9 ELECT	10 DATA	11 RESEA	23 STORA	35 ONLIN	14 THEOR	15 EDUCA	16 WEB	17 NETWO	62 MATER	41 SEARC	20 SOFTW	21 INTER	22 PROCE	5 DATA
1	RESOURCES		0.374	0.340	0.244	0.262	0.255	0.278	0.184	0.386	0.179	0.167	0.182	0.148	0.096	0.108	0.200	0.202	0.080	0.161	0.144	0.152	0.093	0.16
2	TECHNOLOGY	0.374		0.300	0.125	0.232	0.238	0.209	0.146	0.168	0.144	0.161	0.145	0.094	0.074	0.115	0.091	0.129	0.030	0.059	0.112	0.119	0.107	0.07
3	SYSTEMS	0.340	0.300		0.170	0.143	0.313	0.389	0.128	0.209	0.149	0.094	0.464	0.063	0.194	0.092	0.120	0.087	0.057	0.061	0.141	0.081	0.079	0.14
4	LIBRARIES	0.244	0.125	0.170		0.297	0.076	0.192	0.052	0.170	0.055	0.093	0.164	0.119	0.038	0.227	0.057	0.051	0.224	0.066	0.047	0.067	0.052	0.06
5	SERVICES	0.262	0.232	0.143	0.297		0.142	0.242	0.116	0.179	0.112	0.110	0.083	0.332	0.044	0.108	0.077	0.062	0.040	0.063	0.106	0.101	0.114	0.09
6	COMPUTERS	0.255	0.238	0.313	0.076	0.142		0.106	0.112	0.154	0.135	0.067	0.072	0.078	0.104	0.047	0.247	0.550	0.021	0.066	0.462	0.155	0.122	0.08
7	RETRIEVAL	0.278	0.209	0.389	0.192	0.242	0.106		0.039	0.254	0.200	0.064	0.664	0.096	0.060	0.045	0.096	0.036	0.070	0.203	0.077	0.107	0.222	0.13
8	BUSINESS	0.184	0.146	0.128	0.052	0.116	0.112	0.039		0.054	0.064	0.071	0.050	0.020	0.050	0.033	0.031	0.145		0.021	0.071	0.058	0.011	0.02
9	ELECTRONIC	0.386	0.168	0.209	0.170	0.179	0.154	0.254	0.054		0.282	0.061	0.155	0.167	0.022	0.041	0.119	0.046	0.072	0.217	0.062	0.123	0.413	0.16
10	DATA	0.179	0.144	0.149	0.055	0.112	0.135	0.200	0.064	0.282		0.067	0.101	0.150	0.049	0.051	0.022	0.025	0.022	0.247	0.093	0.050	0.592	0.28
11	RESEARCH	0.167	0.161	0.094	0.093	0.110	0.067	0.064	0.071	0.061	0.067		0.024	0.052	0.148	0.111	0.040	0.021	0.094	0.018	0.013	0.052	0.029	0.03
23	STORAGE	0.182	0.145	0.464	0.164	0.083	0.072	0.664	0.050	0.155	0.101	0.024		0.013	0.029	0.032	0.043		0.124	0.097	0.078	0.078	0.110	0.11
35	ONLINE	0.148	0.094	0.063	0.119	0.332	0.078	0.096	0.020	0.167	0.150	0.052	0.013		0.021	0.026	0.083	0.043		0.179	0.042	0.108	0.118	0.19
14	THEORY	0.096	0.074	0.194	0.038	0.044	0.104	0.060	0.050	0.022	0.049	0.148	0.029	0.021		0.006	0.088	0.051		0.044	0.039	0.018	0.026	0.02
15	EDUCATION	0.108	0.115	0.092	0.227	0.108	0.047	0.045	0.033	0.041	0.051	0.111	0.032	0.026	0.006		0.067	0.005	0.035		0.026	0.110	0.036	0.02
16	WEB	0.200	0.091	0.120	0.057	0.077	0.247	0.096	0.031	0.119	0.022	0.040	0.043	0.083	0.088	0.067		0.265	0.012	0.088	0.062	0.251		0.04
17	NETWORKS	0.202	0.129	0.087	0.051	0.062	0.550	0.036	0.145	0.046	0.025	0.021		0.043	0.051	0.005	0.265			0.018	0.045	0.118	0.022	0.04
62	MATERIALS	0.080	0.030	0.057	0.224	0.040	0.021	0.070		0.072	0.022	0.094	0.124			0.035	0.012						0.048	0.01
41	SEARCHING	0.161	0.059	0.061	0.066	0.063	0.066	0.203	0.021	0.217	0.247	0.018	0.097	0.179	0.044		0.088	0.018			0.067	0.256	0.088	0.45
20	SOFTWARE	0.144	0.112	0.141	0.047	0.106	0.462	0.077	0.071	0.062	0.093	0.013	0.078	0.042	0.039	0.026	0.062	0.045		0.067		0.072	0.018	0.08
21	INTERNET	0.152	0.119	0.081	0.067	0.101	0.155	0.107	0.058	0.123	0.050	0.052	0.078	0.108	0.018	0.110	0.251	0.118		0.256	0.072		0.040	0.08
22	PROCESSING	0.093	0.107	0.079	0.052	0.114	0.122	0.222	0.011	0.413	0.592	0.029	0.110	0.118	0.026	0.036		0.022	0.048	0.088	0.018	0.040		0.13
50	DATABASES	0.164	0.076	0.143	0.062	0.096	0.088	0.138	0.029	0.161	0.283	0.030	0.112	0.192	0.027	0.029	0.047	0.044	0.016	0.458	0.081	0.082	0.131	
29	CORPORATE	0.130	0.119	0.107	0.020	0.069	0.020	0.029	0.105	0.022	0.065	0.042	0.026		0.030		0.009	0.017		0.015	0.020			
25	MINING	0.159	0.106	0.130	0.045	0.040	0.074	0.063	0.051	0.051	0.713	0.017	0.050	0.067	0.030	0.041	0.035			0.257	0.131	0.034	0.135	0.29
26	DIGITAL	0.158	0.100	0.199	0.393	0.101	0.084	0.167	0.019	0.165	0.039	0.008	0.199	0.120	0.020	0.049	0.052	0.016	0.216	0.043	0.070	0.023	0.101	0.03
38	EXPERT	0.047	0.040	0.321		0.051	0.155	0.010	0.029	0.022	0.047	0.037			0.178			0.037	0.027		0.075			0.01
42	COLLEGES	0.142	0.055	0.069	0.154	0.078	0.017	0.081	0.059	0.058		0.057	0.043	0.108	0.011	0.179	0.020		0.063	0.033	0.023	0.053		0.05
12	ORGANIZATIONAL	0.012	0.012	0.007	0.003	0.006	0.001	0.007	0.007	0.003	0.004	0.018	0.010	0.002	0.017	0.007	0.002	0.001	0.002		0.002	0.001	0.003	
30	CULTURE	0.136	0.110	0.094	0.021	0.059	0.021	0.029	0.100	0.015	0.074	0.035	0.026		0.021	0.026		0.017		0.015	0.021			0.01
24	ENTERPRISES	0.140	0.148	0.081	0.013	0.071	0.116	0.019	0.678	0.007	0.043	0.075	0.034		0.036		0.024	0.141		0.013	0.054	0.010		0.01
32	WORKERS	0.113	0.142	0.118	0.021	0.097	0.080	0.060	0.096	0.054	0.042		0.054		0.032	0.035	0.028	0.018		0.031	0.075	0.025	0.024	0.02
33	PLANNING	0.144	0.086	0.154	0.031	0.020	0.036	0.025	0.262	0.052	0.036	0.023	0.023		0.018	0.044		0.022		0.052		0.010	0.020	0.03
34	PROFESSION	0.157	0.090	0.014	0.089	0.128	0.028	0.027	0.024	0.048	0.008	0.016		0.064		0.132	0.025	0.047	0.017	0.027		0.044	0.011	0.02
13	LEARNING	0.129	0.141	0.076	0.064	0.030	0.030	0.037	0.088	0.049	0.036	0.114	0.029	0.010	0.075	0.161	0.020	0.019	0.041	0.022	0.015	0.009	0.017	0.00
36	SITE	0.166	0.070	0.087	0.040	0.046	0.242	0.064	0.013	0.066	0.016	0.008	0.038	0.041	0.041	0.033	0.786	0.277	0.018	0.058	0.041	0.176		0.03
37	ARCHITECTURE	0.140	0.118	0.100	0.046	0.060	0.139	0.066	0.015	0.059	0.093	0.029	0.015	0.047	0.058	0.010	0.113	0.135			0.047	0.108	0.079	0.05
27	INTELLIGENCE	0.083	0.081	0.100		0.087	0.053	0.033	0.357	0.043	0.065		0.044	0.032	0.070	0.010	0.010			0.017	0.059	0.027	0.013	0.04
39	DECISION	0.060	0.066	0.141	0.011	0.051	0.039	0.024	0.116	0.016	0.108	0.019		0.076	0.067	0.028	0.010	0.019		0.065	0.011	0.026	0.025	0.10
18	CAPITAL	0.093	0.145	0.068	0.030	0.034	0.025	0.024	0.176	0.006	0.068	0.043	0.021	0.011	0.034	0.021	0.015	0.007			0.034			

4 Conclusion and recommendations

The terms that frequently co-occurred with KM, in descending order of intensity, include the following: *information resources management*; *information science*; *information technology*; *information services*; *information retrieval*; *library science*; *management information systems*; *organisational learning*; and *data mining*. These and several other terms are indicative of the LIS professionals' understanding/ perception of KM. The subject term *Information resources management* co-appeared with KM in most records (i.e. 555). This term is used instead of *information management* in the LISTA thesaurus, a situation that implies that LIS scholars view KM as embodying or constituting information management. Actually, we can safely conclude that *information resources management* (or simply, *information management*) is seen by LIS scholars as a related term (RT) of KM. Information resources management is defined as the 'management (planning, organisation, operations and control) of the resources (human and physical) concerned with the systems support (development, enhancement and maintenance) and the servicing (processing, transformation, distribution, storage and retrieval) of information (data, text, voice, image) for an enterprise' (Schneyman in Nantz and Laribee 1992: 91). Evidently, therefore, information resources management goes beyond the mere management of information to include systems, tools/facilities, processes and people. A comparative study to assess the strengths of association between as

well as the coverage overlap among KM and related terms such as *information resources management* and *records management* is likely to expose, in clear terms, how these terms relate to each other and possibly form the basis upon which a KM thesaurus can be built.

Figure 8
Visual map of core/periphery terms describing KM literature 2001–2007



It was also observed that LIS professionals view KM's scope as encompassing institutions that practise KM (libraries, information services, universities and colleges, business enterprises, archives, etc); activities or processes (information retrieval, organisational learning, data mining, electronic data processing, database searching, knowledge acquisition, information organisation, documentation, knowledge representation, library automation, information sharing, classification, Website development, etc); different types of management and/or management functions (e.g. information resources management, industrial management, records management, information services management, database management, personnel management, document management, resource management and library administration); and people engaged in KM (knowledge workers, information professionals, librarians, executives, information scientists, library employees, etc) in LIS-related disciplines or subject domains (e.g. information science, information technology, library science, business, management science, education and computer science). This essentially forms the basis upon which KM can be defined in the context of LIS. Thus, knowledge management is a discipline that involves the management and organisation of knowledge/information through services, activities and processes of knowledge-based institutions fulfilled by knowledge workers in various disciplines or subject domains such as information and library science. Furthermore, the core/periphery model analysis of the terms that most frequently co-occurred with KM produced the following terms: *resources*, *technology*, *libraries*, *systems*, *services*, **retrieval**, *computers*, *electronic*, *data*, and *storage*. All these terms play a big role in KM practices and processes in the information age.

In conclusion, LIS scholars view KM as comprising largely the management of information resources, services, systems and technologies using various technologies and tools through activities such as information acquisition/creation, information retrieval and storage, data mining, classification and cataloguing, and information use in different information handling institutions or centers such as libraries, archives and museums. These activities are carried out by information professionals (e.g. librarians, archivists, knowledge workers, executives, etc). This view is not so different from that held by Skyrme (1998) and Gu (2004b:171) who suggest that KM is about:

- Managing information – explicit/recorded knowledge
- Managing processes – embedded knowledge
- Managing people – tacit knowledge
- Managing innovation – knowledge conversion
- Managing assets – intellectual capital.

Anderson and Perez-Carballo in Schneider and Borlund (2004:524) opine that 'knowledge organization within library and information science denotes classification, indexing, and cataloguing, applied to storage, access, and retrieval of documents in information retrieval systems'. Indeed, although only 'classification' featured among the top 100 subject terms, 'cataloguing' co-appeared with KM nine times while 'indexing' co-occurred eight times. 'Abstracting' appeared only twice. We did, however, observe that KM processes were overwhelmingly information retrieval oriented, which may combine the areas of knowledge organisation listed above. In a nutshell, KM focuses on IRM (information resources management); its major functions are people and document/records management oriented; and it largely involves IR (information retrieval) processes while the resources and systems managed are overwhelmingly IT (conduit, content, networks, etc) oriented. We believe that a survey involving LIS professionals should be conducted to ascertain whether the observations made in this conclusion about KM practices, activities and processes within library and information science/studies are valid. The findings of this study can only be validated through such a survey. Still, can informetric methods be applied to define a concept? We think it is possible.

For purposes of inter-disciplinary understanding of KM, further research employing several analytic approaches as those used in this study is recommended to examine how other professions such as computer science, business, management science, financial management, information technology and systems, etc view KM.

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