A paradigmatic and methodological examination of knowledge management research: 2000 to 2004

Zining Guo, James Sheffield *

University of Auckland, New Zealand

Received 9 February 2006; received in revised form 3 September 2007; accepted 30 September 2007

Abstract

Knowledge management (KM) research has been evolving for more than a decade, yet little is known about KM theoretical perspectives, research paradigms, and research methods. This paper explores KM research in influential journals for the period 2000–2004. A total of 160 KM articles in ten top-tier information systems and management journals are analyzed. Articles that may serve as useful exemplars of KM research from positivist, interpretivist, and critical pluralist paradigms are selected. We find that KM research in information systems journals differs from that in management journals, but neither makes a balanced use of positivist and non-positivist research approaches.

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Keywords: Knowledge management research; Theoretical perspectives; Paradigms; Research methodology; Positivism; Interpretivism; Critical pluralism

1. Introduction

The knowledge management literature is expanding rapidly. Database searches suggest that the first reference to "knowledge management" is in 1987, and that the total of scholarly papers published since 1995 is more than 2500 [27]. Yet very few of these papers reflect on what is known about the KM discipline as a whole. It is therefore not surprising that at present there is minimal consensus on what constitutes the centre of the discipline, or the paradigms and methodologies that unite members of KM communities. We briefly review two aspects of KM research — theoretical perspectives, and critical reviews of the KM literature — before identifying our research objectives.

1.1. Theoretical perspectives

A new discipline requires definitional papers that focus on basic theory by defining terms and establishing relationships between concepts [7]. The KM literature already contains a rich variety of conceptual papers that build theoretical foundations for knowledge management. Conceptual papers have been provided from disciplinary perspectives such as information systems [2,11,13,28,31,32], management (including organizational behaviour) [9,10,22,23], and systems thinking (including critical systems) [17,20,26,29]. The problem is that interconnections that may exist among the theoretical frameworks appear to be largely unexplored. Three perspectives on organizational knowledge are discernable that may support such an exploration. One perspective proposes that organizations have different types of knowledge, and that identifying and examining these will lead to more effective means for generating,
sharing and managing knowledge in organizations. Orikowski (2002) [25] cites Tsoukas (1996) as characterizing such a perspective as “taxonomic”, with researchers developing classifications of knowledge and then using these to examine the various strategies, routines, and techniques through which different types of knowledge are captured, represented, codified, transferred, and exchanged [22,23]. For example, Holsapple and Joshi (2004) adopt a taxonomic perspective in developing a general-purpose KM ontology [16]. The authors provide evidence that the panel of KM researchers and practitioners who collaboratively engineered the ontology judge that it unifies KM concepts, is comprehensive, and has utility.

A second perspective on organizational knowledge proposes that knowledge is inseparable from knowing how to get things done in complex organizational work. This perspective proposes that organizations enact a collective capability in organizing. It examines ‘practice’, i.e., the “situated and ongoing accomplishment that emerges from people’s everyday actions” [25, p. 269]. This perspective recognizes the utility of discrete knowledge resources and activities, but also examines the nature of work practices, and human agency.

A third perspective on organizational knowledge proposes that knowing how to get things done in organizations cannot be separated from politics, i.e., how power is attached to knowledge and vice versa. Pozzebon and Pinsonneault (2006) describe the conflicting views of clients and consultants in customizing complex software artifacts such as ERP systems. The authors describe the initial organizational configuration of client-consultant relationships, and the way this arrangement evolves through mediation, in terms of power relations [28].

An examination of the above KM conceptual papers reveals that these theoretical perspectives illuminate at least some of the differences in disciplinary approaches to KM research. The perspective that prioritizes utility, human agency, and power relations appears to be dominant in the information systems, management, and critical (and critical systems) literatures, respectively. The third perspective is largely ignored in KM research, perhaps because of the practical difficulties in the honest reporting of empirical evidence on power relations [34]. However, its influence can be seen in the not insignificant constellation of definitional papers composed of three elements — the fluidity and interconnectedness of knowledge, theories of knowledge (epistemology) that arise through discourses, and a critical (or critical systems) approach to knowledge phenomena sensitive to dissensus, conflict and power [17,20,26,28,31].

1.2. Critical reviews of the KM literature

No critical reviews and few descriptive reviews of the KM literature exist. Croasdell et al. (2003) [7] examines the 76 research papers presented at the Hawaii International Conference on System Sciences (HICSS) for the period 1998–2002. Three findings are as follows. Firstly, conceptual difficulties are limiting the development of a common vocabulary among members of the KM research community — “Unfortunately, it appears that knowledge is often formed from bonds that are hard to understand from the outside looking in and difficult to explain from the inside looking out.” Secondly, KM is an interdisciplinary research area in which the references most frequently cited by the (information systems) researchers are from the management rather than information systems literature. Finally, KM is in the early definitional or theory-building stage of being a discipline. KM researchers still have to “build their field anew — first principles, justification of concepts, questions and methods.” Interestingly, a review of the research methods indicates that the HICSS community has responded by “a focus on conceptual, case based, and action research” methods. Croasdell et al. (2003), and two other reviews [4,27] provide classifications of KM topics that are not dissimilar to those of some other authors [2,9].

All three reviews of the KM literature suggest that KM research is part of the mainstream of information systems research, and management research in general, and that influential journals across the management spectrum serve as outlets for a significant quantity of KM research. The classifications of KM topics in the reviews are not systematically related to any theoretical perspective. None of the three reviews examines first tier journals in which KM research articles are typically linked to theoretical perspectives.

1.3. Research objectives

For the purposes of the current research, KM is seen as a discipline that overlaps and extends information systems, and that both are integral aspects of the management literature. Progress in KM will therefore be marked (among other indicators such as the introduction of new journals) by influential papers in established tier-one journals (Fig. 1).

Our objective is to examine the KM theoretical perspectives, research paradigms, and research methods reported in influential journals in order to see what they tell us about KM research as a whole. In particular, we wish to determine if KM research in information systems
and/or management journals employs paradigms and methods that are broad enough to capture the full range of theoretical perspectives — utility, human agency, and power relations. KM is a relatively new discipline, and no comprehensive reviews exist to which our findings can be compared. To resolve this problem we adopt a two-pronged strategy. Firstly, we compare our KM findings to baseline data developed from recent surveys of the information systems and DSS literature, and Croasdell et al’s survey of KM at the HICSS conference. Secondly, we compare KM research in information systems journals with KM research in management journals.

This paper is organized in the following way. Section 2 develops criteria for classifying KM research paradigms and methods. Section 3 describes the survey methodology, and Section 4 presents the survey findings. Section 5 discusses the findings and presents research exemplars, while some implications are explored in Section 6.

2. Classifying paradigms and methods

2.1. Research paradigms

There are various categorizations of research paradigms. A four-paradigm scheme, viz. functionalist, interpretive, radical structuralist, and radical humanist, has been proposed for the analysis of social theory and information systems development [15]. The first two paradigms seek more or less concrete evidence about the existing state of affairs, while the second two paradigms criticize, and offer radical alternatives to, the status quo. This scheme has been developed into four paradigms for a discourse theory of organizational inquiry and knowledge management, viz. normative discourse, interpretive discourse, dialogic discourse, and critical discourse [10,31]. Positivism, interpretivism, and critical inquiry — aligned with the first, second, and remaining paradigms, respectively — are frequently identified as the main paradigms for social and business research [5] (Table 1).

The positivist research paradigm is concerned with the discovery of universal laws that can be used to predict human activity, and the physical and technological world. It is associated with the objectivist and ‘hard’ system assumption of belief in an objective world which

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science can measure and “mirror” with expert, privileged knowledge. The perspective of the researcher is that of standing aloof and apart from stakeholders and subject matter so that decisions can be made objectively. The goodness or quality criteria of research findings are conventional benchmarks of “rigor”, internal and external validity, reliability and objectivity. An initial example of KM research conducted under the positivist research paradigm may be found in Section 1.1. Holsapple and Joshi (2004) build a general-purpose KM ontology that consists, in part, of categories of operations required to manage different types of knowledge. While the categories are engineered collaboratively, they are seen as representational devices or objects. The research “stands aloof” from the day-to-day application of the ontology in contexts defined by potential users. Evidence of goodness of the ontology is obtained via a survey. The quality criteria are that the ontology unifies KM concepts, is comprehensive, and has utility.

The interpretivist research paradigm is concerned with uncovering socially constructed meaning of reality as understood by an individual or group. It is associated with the constructionist and ‘soft’ system assumption of belief in an inter-subjective world which science can represent with concepts and indicators, and the social construction of reality. The perspective of the researcher is to become more fully involved with stakeholders and subject matter to achieve a good understanding of the stakeholders’ world. The goodness or quality criteria of research findings are trustworthiness and authenticity, and fit with social norms and values. Orlikowski (2002) is an example of research conducted under the interpretivist paradigm. The author’s concern is about the nature of ‘practice’ which she describes as “situated and ongoing accomplishment that emerges from people’s everyday actions”. Her assumption is that organizational knowledge is inseparable from knowing how to get things done in complex organizational work. The author became fully involved with practice through extended visits to a large organization. Goodness or quality criteria are the authenticity of qualitative evidence for work practice, i.e., human agency.

The critical paradigm is concerned with uncovering surface illusions so that people will be empowered to change their world. It is associated with the critical systems assumption that the material world is one of structured contradictions and/or exploitation which can be objectively known only by removing tacit ideological biases. The perspective of the researcher is that of active involvement with stakeholders to surface illusions and to implement alternatives that will improve their world. The goodness or quality criteria of research findings are historical situatedness; erosion of ignorance and mis-apprehensions; sincerity of beliefs; action stimulus. Pozzebon and Pinsonneault (2006) are concerned with uncovering the surface illusion that power and knowledge are separate issues. Their assumptions are that power structure materially influences knowledge structure and vice versa. The perspective of the researchers is active involvement in negotiations between clients and consultants. The authors report qualitative evidence gathered from seven case studies over a period of two years. The goodness or quality criteria are that the findings may reduce the destructive aspects of power relations.

In combination, positivism and interpretivism – the paradigms most frequently employed in practice – capture much of the fluidity and interconnectedness of knowledge. Yet neither provides a standard against which to critique the selective application of facts, or aberrant norms, or conflict about work practices. Only the critical paradigm prioritizes approaches that are sensitive to dissensus, conflict and power relations. For the purpose of the present study the three paradigms are considered as not mutually exclusive or incommensurable [19], but as points of triangulation on knowledge that emerges from discourse among KM researchers and practitioners [31] about theoretical perspectives, research paradigms, and research methods [18].

2.2. Research methods

Various schemes have been used to classify research methods in information systems, decision support systems, and KM research. More recent surveys include [1,3,6,7,12,24]. We develop baseline data for our survey by reporting the common elements in the findings of these surveys in a standardized format (Table 2).

The six papers are organized in ascending order by the period of the literature sampled. Because the six papers adopt different approaches to the classification of non-empirical research these data are not shown — the percentages reported here are for empirical research. One reason for the statistical spread in the frequencies of research methods is that the concepts underlying the classification of research methods are not the same across all six papers. For example, Croasdell et al. (2003) omit survey, but presumably include survey research in the quantitative class. This class is labeled “survey” in the baseline data. Not all papers include aspects of design science as an empirical research method. Empirical design science constructs innovative technical artifacts and applications that have utility [14].
In contrast, empirical research methods such as surveys, experiments, field studies, etc, construct theories with explanatory power or truth. The first paper (Alavi and Carlson 1992) and the fifth (Arnott and Pervan 2005) include the “objects” (technical artifacts and applications) of design science — a class that is not specifically included in the other four papers. Artifacts are defined as “descriptions of types or classes of products, technologies, systems, etc”. Applications are defined as “a description of a specific application system, installation, program, etc”. To align with current terminology, these are represented in the baseline data as sub-classes of design science.

2.3. Criteria

Some lessons about the criteria for classifying KM research can be learned from the findings of the baseline data. Collectively, these are not without their problems. The findings are difficult to compare as the definitions of research methods – particularly non-empirical research methods – are not the same across all six papers. For empirical research methods the problem is exacerbated when some surveys include categories that are combinations of other categories, and some do not. While the findings of the Croasdell et al. (2003) survey of KM articles is the most relevant for the purposes of the current study, the distinctions among the classes of research methods (field study, quantitative, action research and experiment) are not articulated. As Walsham points out, what counts as evidence has a different status based on the research paradigm adopted and the interests served by the research [34]. Only three of the papers provide opportunity for a two-level “best fit” approach via simultaneous consideration of paradigmatic and methodological concerns.

The current research requires a classification of research methods that meet three criteria.

Criterion 1: The classification should include explicit guidelines to assist the triangulation of research paradigms and research methods so as to reduce the number of articles classified as belonging to multiple categories, or ‘mixed/other’, and to assist in identifying research exemplars.

Criterion 2: The classification should separate empirical research from non-empirical.

Criterion 3: The classification should include all of the more important empirical methods in Table 2 — survey, various types of experiment, field study, and design science. As a class, case-related papers are characterized by the breadth of the multiple sources of evidence, and the breadth of the paradigms (positivist, interpretive and critical) that they support. No attempt will be made to distinguish case study and field study (because most case studies take place in the field), and action research (because most action research studies are field studies in which the researcher is part of the study for the purposes of obtaining incremental improvement) [7].

A classification adapted from (McGrath 1982) meets the first criterion by classifying eight research methods in a circumplex, that is, a conceptual model that contains both radial and rectangular coordinates (Fig. 2). Eight methods are positioned as pie segments located within a triangle of measures of validity. The sample survey method delivers maximum performance against desideratum A (generalizability or external validity). The laboratory experiment (differentiated from sample survey
by the inclusion of a control) delivers maximum performance against desideratum B (precision or internal validity). The field study method delivers maximum performance against desideratum C (concern for the understanding of the systemic character of a particular, existentially real social context). McGrath points out that reliance on a single method will inevitably produce research that is “flawed” in the sense that it cannot perform well against all three desiderata — generality, precision, and existential realism. The rectangular coordinates locate each method within two other dimensions — obtrusiveness of the research operation and universality of the findings. McGrath points out that a single method cannot deliver both an unobtrusive and an obtrusive research operation, and findings that apply both universally and in a particular social setting. The radial and rectangular coordinates provide two sets of concepts useful in linking research methods to research paradigms. Positivist methods provide greater internal and/or external validity in the measure of universal constructs. Interpretive and critical pluralist paradigms provide participant’s understanding of particular social settings.

McGrath’s circumplex also goes some way towards meeting the second and third criteria. It separates two non-empirical research classes – formal theory and computer simulation – from various classes of empirical research. Classes of empirical research include survey, three types of experiment (lab, experimental, and field), and field study, but not the empirical aspects of design science. To meet all three of the criteria, the McGrath circumplex is modified by replacing the two non-empirical classes, originally located in the two lower quadrants, with the two empirical aspects of design science identified by baseline authors [1,3]. Both of these empirical aspects of design science are therefore classed as unobtrusive and lacking the control associated with the precision and internal validity of lab experiments. The more universal “artifact” subclass is positioned adjacent to survey and the more particular “application” subclass is positioned adjacent to field study. While a separate classification is required for non-empirical research, the modified circumplex meets all three criteria for empirical research (Fig. 2).

3. Survey methodology

3.1. Classification scheme

Each article included in the literature survey is classified by the following five concepts.

3.1.1. Demographics

The demographics of journal type (information systems or management), journal name, year of publication, author name [7].
3.1.2. Evidence type: empirical or non-empirical

Most (if not all) articles have a conceptual element, but only some include evidence that is intended to be independent of the conceptual element so as to serve as an exploration, illustration, application, test, or proof. We call this independent evidence or sense data empirical data. Empirical data may be obtained in various ways including the active building and testing of design science “objects”, responses to questionnaires, secondary sources, observation, experience and any other of the multiple sources associated with the research methods in Fig. 3. An article is classified as non-empirical if it devotes less than one third of the space to the linking of concepts to empirical data, otherwise it is empirical. A non-empirical article that develops a computer simulation is classified as computer simulation; one that develops concepts and/or proposes theory is classified as theory-building; others are classified as literature review.

3.1.3. Research paradigm

The research paradigm of an empirical article is judged to be positivist, interpretivist, or critical pluralist based on the criteria in Table 1. Because not all authors explicitly identify their research paradigm, careful attention is given to these criteria. Because the majority of articles are likely to be positivist (and readily classifiable as such) particular care will be taken in classifying articles with interpretive or critical elements. Empirical articles that devote more than one quarter of the space to a second research paradigm are classified as belonging to the class of each. For example, an article structured around a positivist survey and an interpretive field study is counted twice.

3.1.4. Research method

The research method of an empirical article is judged as design science (artifact and application), field study (including case study and action research), field experiment, experimental simulation, laboratory experiment, judgment task, or sample survey. Not all authors employ this terminology to define their research method(s). On occasion an article may contain elements of research methods from more than one class. Empirical articles that devote more than one quarter of the space to a second research method are classified as belonging to the class of each. In more difficult cases the distinction between one or more research methods (and support for a dominant research paradigm) is made in the light of the radial and rectangular coordinates of the circumplex (Fig. 2). Particular attention is paid to the way the researcher designs and undertakes the research (and the purpose of the research), i.e. its generality, precision, and realism of context; universal vs. particular behavior systems; and obtrusive vs. unobtrusive research operations. To distinguish design science from other research methods we draw on [1,3]. If the research focuses primarily on the technical artifact or application it is classed as design science. When the focus is on the less technological aspects of design science by empirical methods such as survey, experiment, and field study, the research article is classified under that category.

3.1.5. Theoretical perspective

The theoretical perspective of an empirical article is classified holistically as utility, human agency, and power relations. Because measurement difficulties are expected, this concept is not considered a part of the formal classification scheme, but is included in the study to enrich the discussion of the findings (Fig. 3).

3.2. Sample frame

Journal rankings including those on the AIS website are employed to identify tier-one journals. No rankings are located that include among top journals the recently-
established journals devoted to KM research, such as Knowledge Management Research and Applications, Knowledge and Process Management, Journal of Knowledge Management, and International Journal of Knowledge Management. These journals are therefore beyond the scope of the present study. To aid a comparison of KM in the information systems and management literatures, five top tier journals are selected from each. The management journals selected are Management Science, Organization Science, Decision Sciences, Academy of Management Journal, and Administrative Sciences Quarterly.

Information systems journals are chosen to facilitate a comparison with the baseline surveys. The baseline surveys also examine influential journals and their authors provide considerable justification for their choice. For the purpose of comparing influential US and European information systems publications, Chen and Hirschheim (2004) [6] chose four mainstream US publications (MISQ, ISR, JMIS and ICIS) and included EJIS as one of four main European journals. The four US publications are said to “represent the largest forums of IS publications and arguably, the most influential IS researchers.” (p. 203). Communications of the ACM, included in previous surveys, is excluded as it had by this time “changed to appeal more to general readers...thereby reducing the scholarly nature of its publication.” (p. 204). The same set of journals is selected by the only other paper in Table 2 that provides both a paradigmatic and methodological critique [24]. To facilitate a comparison of our findings with those of [6,24] similar journals will be used. For the current study another US journal consistently rated in the first tier, DSS, replaces the ICIS conference proceedings. The five first-tier information systems journals examined are therefore MISQ, ISR, JMIS, DSS, and EJIS (Table 3).

3.3. Classification procedure

The classification procedure involved four phases — training of the examiners, refining the classification scheme, independent classification by two examiners, and final critique to establish reliability of the examination process.

In the first phase two graduate teaching assistants are trained by the authors in a formal face-to-face one-hour class, followed by collaborative practice in the examination of sample articles. Both teaching assistants have previous experience as students, then as teaching assistants, in a postgraduate research methods course taught by the second author with the assistance of the first author. In the second phase, each author and teaching assistant pair trialed the classification scheme and practiced the classification process by classifying the same articles. This phase ended with agreement on the changes required to the classification scheme in McGrath (1982), and confidence in the multi-level triangulation by research paradigm and research method via the modified protocol summarized in Section 3.1.

In the third phase an author and non-author pair mostly examined different articles. When more important and/or more difficult articles are identified, the examiners meet to discuss their classifications. The time required to classify each KM article varies considerably. Straightforward classifications are completed in 15 min, more complex classifications take more than one hour. In the fourth phase all examiners meet to compare classifications of those articles that are been completed independently. A high level of agreement is found. This is taken as evidence that articles classified by a single examiner are classified by the consistent application of the scheme in Section 3.2. In summary, the four phases of the classification process produce the conceptual equivalent of a high inter-rater concordance or reliability.

4. Findings

A total of 160 KM articles are classified. In this section we concentrate firstly on an analysis of the distribution of all of the articles, and then on a comparison of articles published in information systems journals with those published in management journals.

4.1. Analysis of all KM articles

4.1.1. Distribution by journal

The distribution of the 160 articles among the 10 first-tier journals is shown in Fig. 4. The two journals publishing the most articles are the management journals, Organization Science (33 articles) and Management Science (28 articles). The 27 articles in Decision Support Systems placed the first information systems journal in third position overall. For the entire
2000–2004 period, a total of 66 articles (41%) appeared in IS journals and 94 articles (59%) in Mgt journals. This is consistent with the finding by Croasdell et al. (2003) that KM is an interdisciplinary research area. Research published after the end of the period studied will change the number of articles in each journal. For example, *MIS Quarterly* published two special issues on KM in 2005. However, KM research is likely to remain essentially interdisciplinary (Fig. 4).

### 4.1.2. Distribution by evidence type

When all 160 KM articles are analyzed by evidence type, 120 (75%) are found to be empirical, and 40 (25%) non-empirical. The percentage of empirical articles is considerably higher than those found in more recent studies of the information systems (60%), DSS (66%) literatures, and in Croasdell et al.’s study of the KM (55%) literature (Table 2). It appears that KM research published in influential journals over the period 2000–2004 contains a much higher percentage of empirical articles than that presented at the HICSS conference over the period 1998–2002. Our result is consistent with the trend identified in recent studies towards more empirical research (Table 2). However our result may also be explained by the fact that we set out to sample influential journals, and these contain more empirical content than less influential journals and conference proceedings. For example 34 of the 39 empirical papers published in 2003 come from three journals noted for their empirical focus — *Management Science* (13), *Decision Sciences* (11), and *Organization Science* (10) (Fig. 5).

### 4.1.3. Distribution by research paradigm

Among the 120 empirical articles, 92 (77%) are positivist; 28 (22%) are interpretivist; and only 1 (1%) is critical pluralist. One article, to be described in Section 5.1, reports both an interpretive field study and a positivist sample survey, making the total 121 rather than 120.

Our result that 23% of empirical KM articles are non-positivist is consistent with a modest trend in the information systems literature towards greater acceptance of non-positivist research paradigms. Non-positivist research in information system appears to have increased from around 3% (Orlikowski and Baroudi 1991) to 19% (Chen and Hirshheim 2004). The authors of these and previous studies have consistently called for a much more balanced use of positivist and non-positivist research. While we do report a higher percentage of non-positivist research, our data may indicate that the trend has reversed. Our results show that the percentage of non-positivist empirical research peaked at 38% in 2001, largely due to the empirical non-positivist articles that year in *Decision Support Systems* (2), *European Journal of Information Systems* (3), and *Organization Science* (2). The average for the two year period 2001–2002 is 37%, and the average for 2003–2004 is 16%. The
low count for 2003–2004 results from the 28 positivist articles published in 2003 in Management Science (11), Decision Sciences (11), and Organization Science (6).

The single critical pluralist article – Marshall and Brady (2001) – is also described in Section 5.1. It is published in the journal – European Journal of Information Systems – which published more non-positivist research than any of the other journals in our sample. The number of critical pluralist KM research articles that have been published in the nine prestigious North American journals listed in Table 3 for the five-year period 2000–2004 appears to be zero. This matches precisely the findings of Orlikowski and Baroudi (1992), Chen and Hirschheim (2004), and Arnott and Pervan (2005) (Fig. 6).

4.1.4. Distribution by research method

Our analysis of all articles (empirical and non-empirical) by research method shows that sample survey occurs most frequently, followed by field study, theory building, and literature review (Fig. 7).

Because the baseline surveys use different classification schemes for non-empirical research, we focus our analysis on the research methods employed in empirical research. Our results show that the first and second most frequent empirical research methods are sample survey (50%) and field study (31%). This result is almost identical to that reported by two baseline surveys of the information systems literature. Faroomand and Drury (1999) found 53% sample survey and 28% field study, and Chen and Hirschheim (2004) found 41% sample survey and 36% field study. Croasdell et al. (2003) also report the same two research methods in first and second place but the percentages are reversed (52% field study and 26% sample survey). It appears that KM research published in influential journals over the period 2000–2004 contains a much higher percentage of sample surveys than those presented at the HICSS conference over the period 1998–2002.

In our study the third and fourth most frequent research methods are design science (9%) and laboratory experiment (7.5%). Our top four research methods – sample survey, field study, design science, and laboratory experiment – are identical to those found by Alavi and Carlson (1992) and Arnott and Pervan (2005). The rankings within the top four are not the same, however. Design science, the method ranked first in Arnott and Pervan’s study of the DSS literature (42%), and second
in Alavi and Carlson’s study of information systems (33%), is ranked a poor third in our study (9%). Design science is not a dominant paradigm for KM research. While our 11 design science articles happen to consist of 6 articles focusing on design science artifacts, and 5 articles focusing on design science applications, this distinction is not pertinent to our analysis of the KM literature. The distinction between artifact and application is preserved in our circumplex of empirical methods, and included in our classification procedure, but is not included in the results.

Interestingly, the first, second and fourth most common research methods, comprising more than 87% of the total, are those that are associated with points A, C and B respectively on McGrath’s circumplex (Fig. 2). This concordance attests to the convergent validity of the constructs in McGrath’s circumplex and strengthens the validity of the findings (Fig. 8).

Research methods in articles classified as positivist, and non-positivist (i.e., interpretivist, and critical pluralist) are analyzed separately. The 92 positivist articles are distributed as follows: 60 (65%) sample survey, 11 (12%) field study, 11 (12%) design science, 8 (9%) laboratory experiments, 1 (1%) field experiment, and 1 (1%) experimental simulation. The 29 non-positivist articles are distributed: 26 (90%) field study, 1 (3.3%) laboratory experiment, 1 (3.3%) field experiment, and 1 (3.3%) experimental simulation. Included in the field study figure is the single critical pluralist article. No interpretive or critical research articles are supported by sample survey, the method most common in positivist research. Research methods are clearly aligned with research paradigms (Fig. 9).

In summary, we find that our sample comprises considerably more empirical articles than all of the baseline surveys. While our sample continues the modest trend in the IS literature towards more non-positivist research, we find evidence that this trend reversed after reaching a peak in 2001. Sample survey, followed by field study, are the dominant research methods.
4.2. Comparison of KM articles in Information Systems and Management journals

This section compares KM research in IS and Mgt journals based on the evaluation criteria — research paradigms, evidence type, and research method.

4.2.1. Comparison by evidence type

An analysis of the distribution of empirical and non-empirical KM articles reveals that the profiles of IS and Mgt journals are distinctly different on this criterion. The IS journals published 26 (39%) non-empirical articles, and 40 (61%) empirical articles. Empirical articles in IS journals constitute exactly one quarter of the total of all KM articles. This profile contrasts with that of the Mgt journals, which published 14 (15%) non-empirical articles, and 80 (85%) empirical articles. Empirical articles in Mgt journals constitute exactly half of all KM articles. This finding clearly identifies the dominance of Mgt journals in publishing empirical KM research (Fig. 10).

4.2.2. Comparison by research paradigm

An analysis of the distribution of research paradigms among empirical KM articles in IS and Mgt journals reveals that the profiles are markedly different on this criterion also. The IS journals published 1 (2.5%) critical pluralist article, 13 (32.5%) interpretivist articles, and 26 (65%) positivist articles. This profile contrasts with that of the Mgt journals, which published zero critical pluralist articles, 15 (18.5%) interpretivist articles, and 66 (81.5%) positivist articles. IS and Mgt journals contribute almost equally to the number of non-positivist articles, but Mgt contributes the lion’s share (72%) of the positivist articles. This result clearly identifies the dominance of Mgt journals in publishing positivist KM research (Fig. 11).

4.2.3. Comparison by research method

For completeness, we report the frequency of all research methods (non-empirical and empirical) separately for IS and Mgt journals (Fig. 12).

The results of the comparison of empirical research methods shows clear differences between the IS and Mgt journals. As expected, IS journals dominate the design science research, publishing 9 of the 10 empirical design science articles. Somewhat more field studies are published in Mgt journals (22 articles) than in IS journals (15 articles). The distinction that swamps these two, however, is that Mgt journals published 51 sample surveys, and IS journals published only 9. The clear distinction between the profile of research methods in IS journals and Mgt journals is clearly evident (Fig. 12).
and Mgt journals is captured by just the top four empirical methods reported in each. Of the 40 empirical articles published in IS journals, 15 (37.5%) are field studies, 10 (25%) are design science, 9 (22.5%) are sample surveys, and 4 (10%) are laboratory experiments. Of the 80 empirical articles published in Mgt journals, 51 (63.75%) are sample surveys, 22 (27.5%) are field studies, 5 (6.25%) are laboratory experiments, and 2 (2.5%) are experimental simulations (Fig. 13).

In summary, the 60% of KM research that is published in Mgt journals accounts for 85% of the empirical articles, 72% of the positivist articles, and 85% of the reporting of sample surveys. IS journals currently contributes the same number of non-positivist research articles as Mgt journals for the period 2000–2004.

5. Discussion

Perhaps the most surprising finding is the historical trend towards increased reporting of non-positivist research peaked in 2001, and steadily declined in 2002–2004. Our paradigmatic and methodological examination reveals that KM research in management journals, and to a lesser extent in information systems journals, is dominated by a single research paradigm – positivism – and the sample survey research method. We now introduce findings from a third level of analysis, theoretical perspective, a holistic measure excluded from the formal survey. Of the 40 empirical articles published in IS journals, 27 (67.5%) are found to have the theoretical perspective of utility, 12 (30%) have the theoretical perspective of human agency, and 1 article (2.5%) has the theoretical perspective of power relations. This contrasts with the profile of the 81 empirical articles published in Mgt journals, where 68 (85%) have the theoretical perspective of utility, 13 (16.25%) have the theoretical perspective of human agency, and 0 articles have the theoretical perspective of power relations. IS and Mgt journals contribute (almost) equally to the number of articles with the theoretical perspective of human agency, while Mgt contributes the lion’s share (72%) of articles with the theoretical perspective of utility. These percentages are similar but not identical to those for the distribution of research paradigms (Fig. 11). Mgt journals are clearly the dominant source of the empirical KM research articles with the theoretical perspective of utility. The distribution of theoretical
perspective among all 121 articles classified is 95 (78.5%) utility, 25 (20.7%) human agency, and 1 (0.8%) power relations (Fig. 14).

5.1. Exemplars

We present some brief characterizations of some of the articles included in our sample, along with our analysis on all three levels — theoretical perspective, paradigm, and methodology. Four articles are selected as exemplars, in the sense that they are particularly transparent representatives of one or more paradigms. The first two articles and the fourth are examples of the positivist, interpretivist, and critical pluralist research, respectively. The third is an example of a paper that is equally positivist and interpretivist.

An exemplar of positivist KM research is Sorenson (2003). This article is published in the April 2003 Management Science Special Issue on Managing Knowledge in Organizations. The concern of the author is to explain how firm structure affects organizational learning over time. The author develops and tests quantitative models that predict the effect of one aspect of firm structure — vertical integration — on two aspects of organizational learning — growth and exit rates — under two market conditions — stability and volatility. Three hypotheses are tested by analyzing empirical data gathered from secondary sources on all organizations that manufactured workstations in North America between 1980 and 1996. Various analytical strategies are trialed. A parsimonious model is found that accounts for almost two thirds of the observed variance \( R^2 = 0.646 \) and validates the statistical significance of the factors \( p < 0.01 \) in the hypothesized relationships. The results show that firms face a trade-off. Vertical integration increases organizational learning in a volatile market, and decreases it in a stable market. These findings are interpreted in terms of Simon’s theory of bounded rationality and the ability of managers to obtain optimal manufacturing strategies [33].

An exemplar of interpretivist KM research is Orlikowski (2002). As described in Section 1.1, the author is concerned with knowing in practice. She suggests that this perspective is often overlooked by researchers who adopt a purely taxonomic approach (knowledge capture, knowledge representation, knowledge stocks, knowledge flows, etc). Knowing in practice is described with reference to concepts including human agency, self-organizing systems, enactment (i.e., action followed by retrospective sense making) that support Ryle’s (1949) claim that knowledge is essentially ‘knowing how’ [30]. Findings of an empirical study conducted in a geographically dispersed high-tech organization are reported. An interpretive approach to the exploration of work practices is adopted. The field study is conducted over a period of 6 months during which time is spent at six sites. Data are collected by multiple methods and sources-observation, interviews and documents. A total of 78 interviews is conducted each lasting from 45 min to over three hours in length. Qualitative analysis reveals five clusters of work practices — sharing identity, interacting face to face, aligning effort, learning by doing, and supporting participation. The evidence is that these five practices embody participant’s understanding of the knowledge considered important to the success of their day to day activities.

An exemplar of positivist and interpretivist KM research is Cross and Sproull (2004). The concern of the authors is to distinguish two perspectives on the actionable knowledge shared in groups doing knowledge-intensive work. The first perspective, that knowledge is abstract and readily transferable from one setting to another, has a taxonomic, objectivist character. The second perspective, that knowledge is constructed as an integral part of social interaction in an historical context, has an inter-subjective character. The study places equal weight on positivist and interpretivist research paradigms (Table 1). Two
independent empirical studies are reported. The first develops themes found in qualitative unstructured and semi-structured interviews in a Big Five accounting firm; the second tests hypotheses against the quantitative results of a stratified sample survey of randomly selected managers from the same firm. In summary, the authors place equal importance on interpretivist and positivist paradigms, and equal weight on a qualitative interview-based field study, and a positivist sample survey [8].

An exemplar of critical pluralist KM research is Marshall and Brady (2001). The authors are concerned with the adequacy of conceptualizations of knowledge in the KM literature to address the relationship between knowledge, power and interests. Objectified, static, abstract, and explicit accounts of knowledge are seen as prioritizing an ‘epistemology of possession’ of discrete knowledge objects over an epistemology of practical action. Social, situated, contingent, and context-dependent accounts of knowledge are seen as prioritizing intersubjective understanding. These two accounts – based on objective and inter-subjective assumptions, respectively – are not enough to cover all cases, however, because “Shared understanding…in no way implies mutual agreement about the validity of the positions of the participants”. The authors draw on insights from Habermas to develop a third account that prioritizes dissensus and “the politics of knowledge”. Habermasian models for social action and the interests served by knowledge provide an account of knowledge sensitive to the relationships between knowledge, power, and interests. Aspects of the argument are illustrated with case examples from the authors’ research into inter-project learning and knowledge management in companies providing and using complex products and systems where success is by no means assured.

Sorenson (2003) is classified as exhibiting the theoretical perspective of utility, a positivist research paradigm and an empirical survey research method. While reference is made to existing theories, almost all of the space is devoted to (quantitative) empirical evidence. Orlikowski (2002) is classified as exhibiting the theoretical perspective of human agency, an interpretivist research paradigm, and an empirical field study research method. Two thirds of the space is devoted to (qualitative) empirical evidence. Marshall and Brady (2001) is classified as exhibiting the theoretical perspective of power relations, a critical research paradigm, and an empirical field study research method. Half of the space is devoted to empirical evidence. A close reading of these exemplars may throw some light on the vexed question of why research appears to be dominated by utility. Some initial possibilities are as follows. Interpretive field studies appear to require considerable time and this increases the opportunity costs of research on human agency. Critical field studies appear to involve more costs than interpretive field studies because of theoretical complexities, and the difficulties in gaining access to, and honestly reporting empirical evidence on power relations.

6. Implications

In Section 1.1 we expressed a judgment based on a relatively small sample of definitional papers that the theoretical perspective prioritizing utility, human agency, and power relations appear to be dominant in the information systems, management, and critical (and critical systems) literatures, respectively. The second part of this supposition is not supported by the results of our study (Fig. 14). In retrospect, our initial supposition is made on the basis of a sample of definitional (i.e., literature review and theory building) articles. Our results indicate that our sample is biased because definitional papers occur more frequently in Information Systems journals than in the Management journals that constitute the majority of KM research (Fig. 12). We hope that our findings inform this and other debates about KM practice.

Previous studies have found that KM is in the early, theory-building stage of being a distinct discipline. On this view a lack of consensus on ways to integrate research topics is sometimes taken as evidence that KM as a discipline lacks a theoretical foundation. We disagree. We would point out that many of the articles in our sample closely resemble our exemplars in that they are based on concepts enunciated in research published before the rubric of knowledge management existed. Our findings indicate that KM research in influential journals has always had well-articulated theoretical perspectives, research paradigms, and research methods. We conclude that KM is a vibrant and integral aspect of an information systems and management disciplinary community that prioritizes utility over human agency and power relations.

Acknowledgements

The authors are grateful to two anonymous reviewers whose suggestions facilitated major improvements to the paper.

References

Mr. Zining Guo graduated with a Master of Commerce (First Class Honours) from the University of Auckland in 2005. His master’s research focused on conceptual issues underlying knowledge management research. He has published in Australia and New Zealand Systems Conference, Hawaii International Conference on System Sciences (HICSS), International Journal of Applied Systemic Studies, and Systems Research and Behavioural Science. Current research interests include knowledge management, organizational learning, inquiring systems, decision making, and triangulation of research methods.

Dr Jim Sheffield graduated with a PhD from the University of Arizona in 1990. His doctoral work in group support systems led to the creation of a Decision Support Centre at the University of Auckland and participation in major policy development exercises. Action research initiatives include the development of economic strategy, science policy, and comprehensive regional planning. He has published in various journals including Journal of MIS, Group Decision and Negotiation, Journal of Arts Management, International Journal of Applied Systemic Studies, International Journal of Business Information Systems, People and Performance, and Systems Research and Behavioural Science. Current interests include: Design theory, group support systems, health knowledge management, and research methods.