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Trends in Research Methodological Procedures Used in Knowledge Management Studies

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Abstract

Drawing on extant literature, this methodological study provides a content analysis of research procedures employed in knowledge management (KM) research between 2009 and 2013. A total of 303 articles published in the Journal of Knowledge Management were critically reviewed and subjected to a descriptive content analysis research approach. Non-empirical studies were on the decline. Positivist epistemologies and quantitative research approaches predominated research in knowledge management (KM). Surveys, case studies and content analysis were the most favoured research approaches. Other major research approaches such as field experiments, ethnography, grounded theory and phenomenology were conspicuous by their absence. Questionnaires and interviews were commonly used for data collection, but the use of more than one research method was not prevalent. Based on the findings, many implications emerge that improve our understanding of research procedures used in KM research. One research method was used in this study. The use of more than one research paradigm and research method may extend our understanding of research in KM. The findings revealed good practices and gaps in using research methods. The results from this article can be used to relook or reanalyse the research methodologies that are used in the KM field. Consequently, it will assist KM researchers in making informed decisions about method selection and deployment in their studies. The study used a broader and systematic multi-stage conceptual framework to comprehensively analyse the research procedures used in the KM field.

Introduction

Knowledge that is produced in any scientific field primarily depends on the methodology that is used. An investigation into the research procedures used by researchers in a subject field to acquire and generate new knowledge and validate knowledge claims is pertinent. Researchers should investigate the tools a "field is deploying to generate knowledge about its knowledge" (Chauvel and Depres, 2002) in order to deepen their understanding of the methodological approaches that scholars use to develop a subject field. Prospective studies rely on accumulated knowledge as a basis for their research. The norms and standards in a subject field are determined and mapped out by research. The development of the conceptual, theoretical and methodological foundation of a subject field depends on sound research. Studies have demonstrated that research quality and practice complement each other (Grönlund, 2008). Rigorous research also has positive influences on practice and enhances the quality of life (Serenko and Bontis, 2013).

Appropriate research methods are required to conceptualise research problems and describe the phenomena that are being investigated. A study by Stallings and Ferris (1988) in the field of public administration demonstrated that researchers in the field had initially used inappropriate methodologies to conduct research. In this regard, our concern is how knowledge in the knowledge management (KM) field has accumulated thus far. We partly dealt with this concern by investigating the research procedures

that are used in the *Journal of Knowledge Management*. Other scholars who examined the contents of scholarly journals were also interested in the research procedures followed (Jordaan, Wiese, Amade and De Clercq, 2013). Studies that investigate research procedures in a specific discipline are imperative, because scientific research methods are employed and interpreted "within the context of a particular disciplinary tradition" (Piekkari, Welch and Paavilainen, 2009).

Although, KM is an emergent and young management discipline, a lot of research on KM has been conducted to shape KM into an independent academic field (Marymalavi and Leidner, 2006; Serenko, 2013; Serenko and Bontis, 2009). The unprecedented growth of research in the field warrants research into how knowledge has been accumulated, and the knowledge claims that account for the accumulation. As an applied field with its various disciplinary influences, knowledge management requires explicit attention to research methodologies. This should form part of reflective evaluation.

Thus, the article poses the question: How have research methodological procedures been applied in the field of knowledge management? Articles that were published between 2009 and 2013 in the *Journal of Knowledge Management* were used to attend to the research question. The subjective indicators that were used to determine the time span selected for analysis are explained later under the methods and materials section. The extant literature shows that previous research into the state of journals has focused on research 'output factors' such as methodologies used in the study (Jordaan, Wiese, Amade and De Clercq, 2013).

There are many published texts on research methodologies, but there are a few studies that have been conducted on how these research procedures have been applied in developing a field such as KM which has become increasingly important (Serenko and Bontis, 2009; Serenko and Bontis, 2013). The aim of this study is to complement the increase in literature on the analysis of methodological procedures in a subject field.

Theoretical Background

The social science research methodology landscape is a minefield that can be "notoriously slippery" (Rule and John, 2011). The situation is compounded by the fact that some methodologists at times use research methodology-related terms loosely, contradictorily and inconsistently. Consequently, there are many "shapes" of research methodologies in as much as there are many shapes of knowledge (cf van den Berg, 2013). Many researchers have difficulty in identifying the conceptual differences between epistemology, ontology, paradigm, methodology, research approaches, techniques and other core concepts in research methods (Given, 2013; Ngulube, 2015).

For instance, there are some authors who call a case study approach a method, methodology or research design (VanWynsberghe and Khan, 2007). Methodology and research approach have not been spared the confusion and contradiction that will be explained later in this article. Della Porta and Keating (2008) averred that "[approaches] is a general term that is wider than theory or methodology". What is conceptualised in figure 1 as concepts constituting a research methodology is referred to as a research approach by Chu (2015). Further, Neuman (2011) equated research approaches to paradigms. These variations may be partly attributed to the fact that researchers in different parts of the world may have diverse approaches to social research. It is evident from the classification in figure 1 that we think that approaches are different from paradigms, and that the term is narrower than methodology.

Apart from the area of methodology being represented differently in the literature, some researchers in the field of KM have not helped the situation. A statement such as: "Research methodology used in this study is based on a combination of other methodologies such as action research, group discussion, documentary study and questionnaire research" (Kazemi and Allahyari, 2010) may be confusing to a novice researcher who may be trying to understand the research procedures used in a field. This statement lumps together research designs and data collection methods and refers to them as research methodologies. Another noteworthy example of the tendency is of McNichols (2010) who described the Delphi data gathering procedure as a method, technique and methodology. Such statements may bring about confusion and "paradigmatic uncertainty among authors and readers of scientific papers" (Graneheim and Lundman, 2004).

The purpose of this theoretical background is to clarify issues of using concepts in research methodology. Figure 1 diagrammatically outlines the various components of the research methodology enterprise and illustrates the hierarchical connections and relationships. It is noteworthy that figure I is only illustrative since it does not give an exhaustive picture of all the research procedures that are available in the extant literature. It only shows the relationships among the various components of the research methodology landscape so that the reader appreciates the perspective which was adopted in this article.

Philosophical assumptions about the nature of knowledge, or the nature and existence of social reality (ontology) and what constitute that knowledge and ways of knowing (epistemology) make up a paradigmatic base of research in a subject field. These are the foundations on which social research is framed. Philosophical assumptions assist researchers in choosing the problems to study, the questions to ask and the theories to utilise in their production of valid knowledge (Cecez-Kecmanovic and Kennan, 2013; Creswell, 2013; Saunders, Lewis and Thornhill, 2009). Creswell (2014) refers to these philosophical assumptions as worldviews. Following Guba and Lincoln (2005), we call them paradigms. According to Sarantakos (2013), "Ontological, epistemological and methodological prescriptions of social research are 'packaged' in paradigms which guide everyday research." The discussion of these research assumptions is the concern of the next few paragraphs.

Positivism and interpretivism are the broad frameworks or paradigms in which research is conducted. Paradigms are influenced by realist or objectivist and constructionist ontology (Fraser, 2014; Sarantakos, 2013). The realist ontology is informed by the positivist paradigm while the constructivist one, or what Neuman (2011) called nominalist, is influenced by interpretivism. For instance, social constructivism, postmodernism, feminism and critical theory draw on interpretivist frameworks, because they all assume a relativist ontology. Ontological assumptions define the epistemology of knowledge. Knowledge that is generated in the interpretivist paradigm is subjective while epistemologically, positivists generate objective knowledge that is 'out there'. Pragmatism or methodological pluralism was born out of an attempt to bridge the gap between interpretivist and positivist epistemologies.

Methodology is central to the research process, because it is the lens through which a researcher looks when making decisions on acquiring knowledge about social phenomenon and getting answers to the research questions. In other words, it specifies the types of research designs and research methods that may be employed to gain knowledge about a phenomenon. However, it is a misunderstood concept in the field of KM (Mingers, 2003). The findings of the current study partially confirm this statement.

The methodology of positivism is quantitative while that of interpretivism is qualitative as illustrated in figure I. Qualitative research is inductive and exploratory in nature while quantitative research is hypothetico-deductive, since it is theory-led and tends to be confirmatory. Mixed methods research (MMR) is in the realm of multi-paradigms since it employs both the positivist and the interpretivist paradigms. It is important to note that MMR goes beyond the boundaries of triangulation which utilises a number of research techniques in the same research design (Romm and Ngulube, 2015). MMR combines the strengths of the qualitative and quantitative methodology to produce a comprehensive and broad-based research

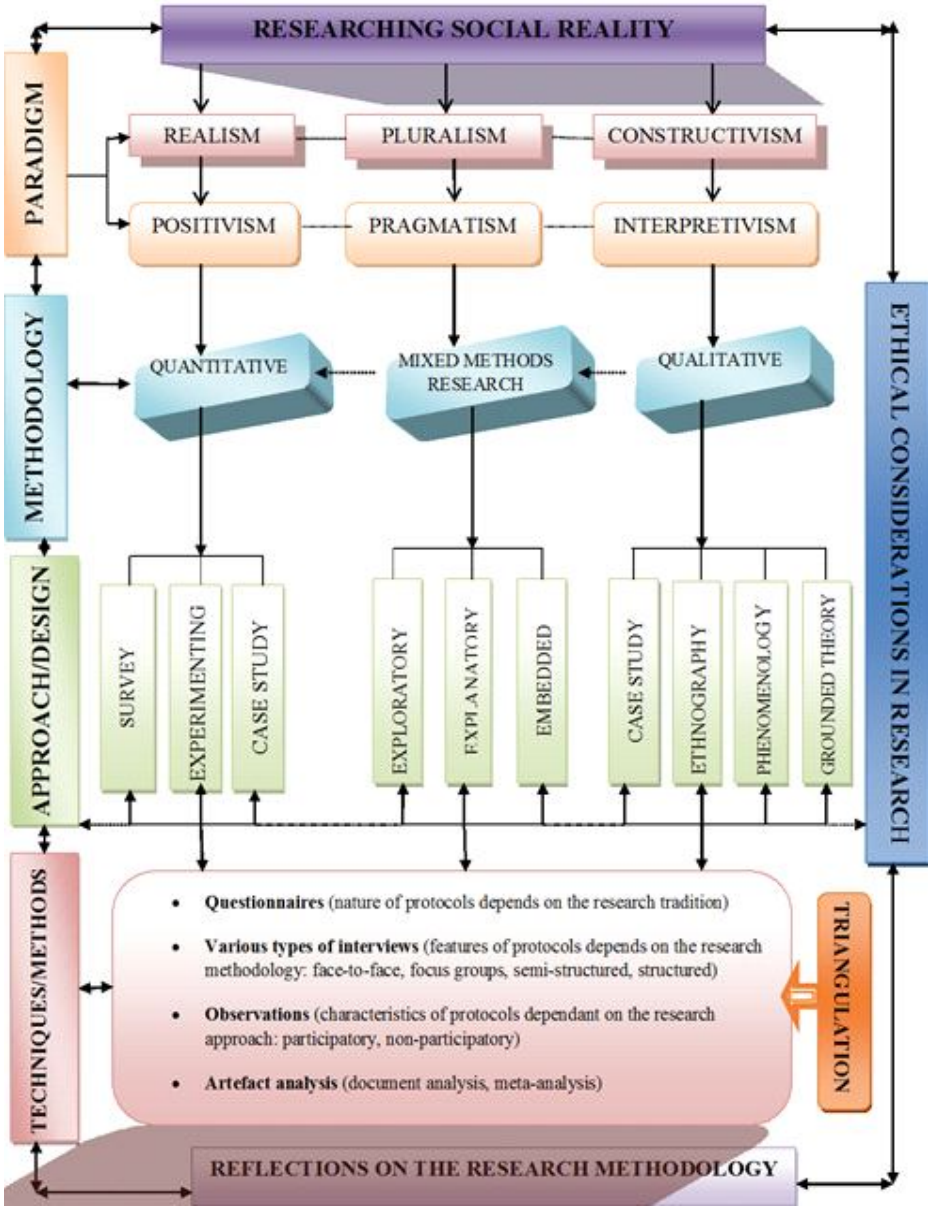

Figure 1: Mapping the research methodology discourse (author's own work)

The choice of a research methodology is determined by the "underlying theoretical paradigm" (Sarantakos, 2013), the purpose of the research, and the research question. Research questions determine the methodology that should be used to understand reality. Among other things, a good research question should be interesting, relevant and ethical (Green, 2008). Figure 1 shows that ethics is one of the overarching aspects of the research methodology landscape. Ethical standards and considerations should be upheld throughout the entire research process. Researchers should be ethical at every stage of the research. Participants should be treated with respect from the time they come into contact with the researcher up to the data collection, analysis and dissemination of the findings. Hence, research is ethically intensive (Johanson, 2013).

The research design or approach determines and controls data collection and analysis procedures. Although there is an agreement that research action

is guided by the research design (David and Sutton, 2011; Sarantakos, 2013) or the plan of the research, there is no consensus among methodologists as to what a research design is.

For instance, Creswell (2013) and Myers (2009) conceptualised it as a plan for the entire project, including all the components depicted in figure 1. On the other hand, Fraser (2014) classified research designs as methodologies. There is also confusion regarding the difference between research design and research method (David and Sutton, 2011; Ngulube, 2015). According to De Vaus (2001), "It is not uncommon to see research design treated as a mode of data collection rather than as a logical structure of the inquiry." Chu (2015) confirms the observation made by De Vaus (2001) since she does not distinguish between research designs and research methods.

Creswell (2013) and Saunders, Lewis and Thornhill (2009) use the term "research methods" to refer to techniques and procedures such as questionnaires, interviews, observation, document analysis; and artefact analysis. Following Creswell (2013) and Rule and John (2011), we use the term "research methods" to refer to techniques for gathering data, while research designs or research approaches are ways of designing and conducting research. Hider and Pymm (2008) labelled these as research strategies.

Figure 1 illustrates some of the qualitative, quantitative and mixed method research designs. Qualitative designs or approaches include the case study (situated knowledge); historical research (knowledge of history); grounded theory (knowledge of process and outcome); ethnography (knowledge of culture); content analysis (knowledge of content); phenomenology (knowledge of lived experience); action research (knowledge of process, outcome and change); hermeneutics (knowledge and interpretation of the scriptures or text) and discourse analysis (knowledge of discourse) (Mills, 2014). The major quantitative designs are experimentation survey and case study. Mixed method research designs are diverse, but Romm and Ngulube (2015) suggested that explanatory, exploratory, convergent, embedded and multiphase designs are some of the research designs that MMR researchers may use, although there are other typologies that are available, depending on what one reads.

Research methods are concerned with data collection techniques such as observations, interviews, questionnaires, physical traces, document reviews and audio-visual materials. Plowright (2011) argues for the use of "artefact analysis" to describe objects or events that are produced by people. The research instruments may be either inductive or deductive. Hence, researchers talk of qualitative and quantitative interviews. Qualitative interviews are generally unstructured and unstandardised when compared to their quantitative counterparts. These protocols may be combined to achieve triangulation whether one is using qualitative or quantitative approaches.

There is a need for researchers to reflect on the research procedures they deploy because no methodology is perfect (Ngulube, 2005). Reflection on the research methodology entails questioning the appropriateness and adequacy of the methodology one would have used to conduct a study against the available options. This also involves highlighting the limitations of the methodology used. For instance, in the field of KM, Cockrell and Stone (2010) used 52 certified management accountants as respondents in their research; and on evaluating their procedures, they pointed out that the use of a larger sample and triangulating research methods would have enhanced the validity of the study and strengthened their conclusions.

On the other hand, after assessing the validity of Davenport's classification system of knowledge work using a quantitative survey, Margaryan, Milligan and Littlejohn (2011) admitted that follow-up qualitative studies were necessary to better understand the phenomenon, while Zhou and Chen (2011) pointed out that quantitative research was needed to verify the models they were proposing. McNichols (2010) acknowledged that the unrepresentative sample size and the methodology were some of the limitations of the study. Such reflections are necessary because they are likely to enlighten the reader as to what information was needed, and how it was collected and analysed, including the advantages and pitfalls of using the research procedures (Ngulube, 2005). Such reflections were found to be prevalent among the KM researchers.

Statement of the Problem

The systematic investigation of the natural world is dependent on the use of research procedures for knowledge creation (Serenko and Bontis, 2013). Methodological assumptions and approaches determine the validity, reliability and conformability of quantitative studies, on one hand, and the dependability, credibility and transferability of qualitative ones, on the other hand.

Although research is determined by the research question and is "diverse and pluralistic, varying in focus, purpose, procedures and theoretical foundations" (Sarantakos, 2013), it is important to investigate the methodological nuances in a given subject field to understand how knowledge is produced in the discipline. Knowledge management is increasingly growing as a field of study, but little research has yet appeared on the various methodologies used by researchers in this field. Research on research procedures used in KM has been the focus of a handful of studies, but they made a partial and limited analysis of the area.

For instance, Chauvel and Despres (2002) reviewed the use of survey research in knowledge management between 1997 and 2001 and theorised about the elements they measured. Serenko, Bontis, Booker, Sadeddin and Hardie (2010) looked at the research techniques, (i.e. mainly data collection methods) used in KM research without clearly motivating the framework they used to categorise the research methods; thus, diminishing the usefulness of the findings. Serenko and Dumay (2015) only looked at the research methods used by KM articles and discovered that there were a handful of empirical studies with case studies and surveys being dominant.

Our study goes beyond what was covered by previous research, because it investigated the epistemological and methodological issues that researchers in KM used in their inquiry and their implications for the validity of the findings and conclusions, using a broader and systematic multi-stage conceptual framework.

The following research questions were formulated bearing in mind the statement of the problem.

(i) What are the trends in the use of non-empirical and empirical research procedures in knowledge management research?

(ii) Which are the commonly utilised philosophical assumptions in knowledge management research?

(iii) Which are the most frequently deployed research methodologies to analyse knowledge management matters?

(iv) Which recurring research approaches are employed in knowledge management research?

(v) What data collection techniques are exploited in knowledge management research, and extent they are triangulated?

(vi) What implications does the research procedures used have on knowledge management research?

Methods and Materials

A subjective indicator was used to select the journal for analysis. Previous studies used the same approach to select a journal for analysis (Jordaan, Wiese, Amade and De Clercq, 2013; Ngulube and Ngulube, 2015). First and foremost, the disciplinary focus of the study dictated the choice of the journal for analysis. The *Journal of Knowledge Management* was selected because it is the leading KM-centric scholarly journal in the subject field (Serenko and Bontis, 2009; Serenko and Bontis, 2013). Furthermore, it provides a broad-based coverage of issues on knowledge management (Serenko and Bontis, 2013). The assumption was that it reflected the trends in best practice KM research. Journal articles were selected instead of other avenues of scholarly communication, because academics mainly use journal articles to disseminate knowledge and obtain knowledge about developments in a discipline (Nord and Nord, 1995).

A total of 303 articles published in the *Journal of Knowledge Management* between 2009 and 2013 were analysed in order to categorise the research procedures used in each article. The number of articles that were analysed was considered enough when compared with the number of articles used by other scholars. For instance, Serenko and Bontis (2013) used 63 articles for their analysis, and Durst and Edvardsson (2012) analysed 36 articles in their research on knowledge management in small

and medium-sized enterprises. The period covered by the current analysis is also five years. Besides, Thomson Reuters recommends a period of at least five years when deciding which years of publications and citations to use in order to measure research impact (Pendlebury, 2010). It is evident that the time span chosen for analysis resonates with the suggestion that methodological approaches tend to stabilise within a period of five years (Hutchinson and Lovell, 2004).

The article-type classification or the descriptors used by the *Journal of Knowledge Management* were not used, because in some cases it did not meet the requirements of our definition and framework. Articles were first classified as empirical and non-empirical. Building on Bolivar, Munoz and Hernández (2014), Chu (2015) and Ngulube and Ngulube (2015) editorials, letters to the editor, book reviews, brief communications and commentaries were excluded from the analysis. Those articles that did not report data were considered to be non-empirical as suggested by Bergh, Perry and Hanke (2006), Hanson and Grimmer, (2007), Myers (2009) and Ngulube and Ngulube (2015).

After identifying the empirical articles, the abstract was checked to determine if the methodology was mentioned. The methodology section was then checked to determine if there was an explanation of the methodology used. Data collection and analysis methods were also checked. Finally, the analysis section was checked to find out whether the analysis was aligned with the methodology. Checking the alignment between the research design and the data analysis methods enhanced the validity of the coding. The study focused on these variables because they have been used before to show research trends in various fields (Bolivar, Munoz and Hernández, 2012; Ngulube and Ngulube, 2015). Bolivar, Munoz and Hernández (2012) analysed 157 articles published from the year 2000 to 2008, while Ngulube and Ngulube (2015) evaluated 332 articles published between 2003 and 2011 (inclusive).

A trained research assistant undertook the initial coding; and the author of this article checked for coding accuracy, and there were no significant disagreements. Following Hanson and Grimmer, (2007), another researcher independently coded a sample of 10% of articles to achieve "investigator triangulation" (Denzin, 1989). Inter-coder reliability is considered as one of the ways of assuring quality in content analysis (Kolbe and Burnett, 1991). Explaining the content analysis approach is beyond the scope of this article. Suffice to point out that content analysis is the most commonly used strategy for analysing the content of journals (Jordaan, Wiese, Amade and De Clercq, 2013; Ngulube and Ngulube, 2015).

Results and Discussions

The discussion section is based on the research questions posed above. The trends in the research procedures used in knowledge management research are discussed followed by commonly utilised paradigms in knowledge management research and the most frequently deployed research methodologies to analyse knowledge management matters. The discussion then turns to the recurring research approaches employed in knowledge management research, and the data collection techniques often exploited in knowledge management research including triangulation. We conclude this section by looking at the implications of the research procedures for knowledge management research.

Trends in the Use of Non-Empirical and Empirical Research Procedures

Results from the current study revealed that 27.1 % of the 303 articles that were analysed used non-empirical methods as compared with 72.9% which deployed empirical ones. Researchers who published in the *International Journal of Advertising* between 1992 and 2006 had 70% of the articles using empirical procedures (West, 2007). In public administration, Bolivar, Munoz and Hernández (2012) observed that 15.29% were non-empirical and 84.71% empirical. From the analysis of articles on e-government published in public administration, information science and library science journals, Bolivar, Munoz and Hernández (2012; 2014) revealed that 15.29% to 12.23% of the articles were non-empirical.

The ratio of empirical to non-empirical articles in KM research is not drastically different from trends in other cognitive subject fields. Table I shows that the number of non-empirical studies dropped from 28 articles in 2009 to 14 in 2013. Serenko, Bontis,

Booker, Sadeddin and Hardie (2010) revealed that non-empirical studies were declining between 1994 and 2008 without giving figures. In that regard, there is no basis for comparison between the results of their study and ours except to say that the current study confirms a gradual downward trend. The other trends are depicted in table 1 and explained in the subsequent sections.

Table 1	**Research trends in KM research (N=303)**				
Year	**Non-empirical**	**Empirical**	**Qualitative**	**Quantitative**	**Mixed methods research**
2009	28	45	19	26	-
2010	15	44	12	30	2
2011	10	48	19	28	-
2012	15	42	19	26	-
2013	14	42	17	23	-
Total	**82**	**221**	**86**	**133**	**2**

Commonly Utilised Philosophical Assumptions in Knowledge Management Research

Social research is guided by ontology, epistemology and methodology (Cecez-Kecmanovic and Kennan, 2013; Creswell, 2013; Sarantakos, 2013). Although it is not the convention that philosophical assumptions are mentioned in research articles (Platt, 1996), we checked on the philosophical position of the researchers. In fact, one becomes "a better researcher by considering assumptions and being explicit about them" (Neuman, 2011). It cannot be ruled out that some researchers do not make their philosophical positions clear because they are not "aware of the philosophical assumptions underlying their knowledge claims" (Piekkari, Welch and Paavilainen, 2009). Acknowledgement of knowledge claims helps the researchers to avoid inconsistencies in their research. For instance, some researchers use a variable-oriented language, employ qualitative designs to conduct their research, and present their data in a primarily quantitative manner (Piekkari, Welch and Paavilainen, 2009).

By declaring their philosophical claims upfront, researchers become ethically accountable for their choices and make the whole research enterprise transparent. Furthermore, such declarations give context to the researcher's scholarly work (Lowery and Evans, 2004). A handful of researchers in the sampled articles made their philosophical assumptions explicit. For instance, Chen, Sun and McQueen (2010) and Parboteeah and Jackson (2011) mentioned in the abstract and methodology sections of their articles that their research approaches were interpretive case studies. These were among the 23 articles that made their interpretivist philosophical assumptions explicit as compared to six positivist ones. The failure of researchers to disclose philosophical assumptions is not peculiar to the field of KM. In public administration, Lowery and Evans (2004) found that, "[e]xplicit linkages that tied the respective paradigms, theoretical perspectives, research methods, and techniques together were generally lacking and were also distinguishable by their absence as well."

Despite the fact that many researchers did not acknowledge their philosophical assumptions, it was apparent from the research design to the analysis and writing up of the findings that the research procedures deployed in the *Journal of Knowledge Management* were dominated by positivistic assumptions during the period under review. The same situation was reported by (Schultze and Leidner, 2002). Perhaps, this is not surprising, given that that positivism has dominated research in social sciences as pointed out by Sarantakos (2013).

Most Frequently Deployed Research Methodologies

The methodology is mainly concerned with how knowledge is understood, described, explained, verified, judged, evaluated, tested, explored, investigated and interpreted. First, we checked if the abstract or methods and material sections explicitly described the research methodology and explained

the choice of a specific methodology. Numerous scholars who use bibliometrics (Bolivar, Munoz and Hernández, 2012), informetrics (Ngulube 2013), scientometrics (Bolivar, Munoz and Hernández, 2014; Serenko and Bontis, 2013) and content analysis (Piekkari, Welch and Paavilainen, 2009) are interested in determining the trends and patterns in scholarly communication in a scientific community using such classifications as research methodologies employed in a study, which means that it is important that the authors of research pay attention to reporting on these matters.

Acknowledging the type of methodology used by researchers makes the categorisation of the research procedures used in the field easier and more accurate instead of relying on the various typologies that have been suggested by various authors. In fact, "[u]nderstanding and categorising the various research methods can be a daunting task if they are no explicit explanations of the research methodology" (Ngulube, 2012).

The findings show that 29 (33.7%) of articles were acknowledged by KM researchers as qualitative and 17 (12.8%) were recognised as quantitative. It would be worthwhile to use other research approaches to determine the reasons behind this trend. It is apparent from figure 2 that 38.9% of the studies used qualitative methodologies while 60.2% used quantitative ones.

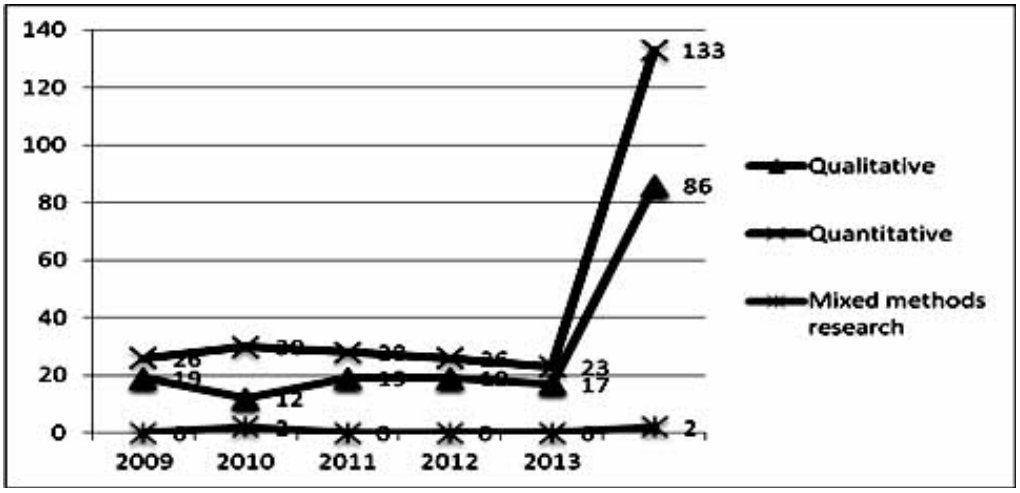

Figure 2: Prevalent research methodologies (N=221)

In marketing, Svensson (2006) revealed that 80% of researchers used quantitative methodologies. In the field of economic and management sciences, Ngulube and Ngulube (2015) discovered that 89% of studies used quantitative methodologies and 9% employed qualitative ones. In the analysis of international business journals, Piekkari, Welch and Paavilainen (2009) found that 56.5% used quantitative methodologies. Matayong and Mahmood (2013) reviewed methodological perspectives used in knowledge management systems studies between 2003 and 2013 and revealed that 15% of researchers used qualitative methodology as against 85% who used quantitative methodology. It is evident that the dominance of quantitative methodologies is not unique to KM research since other fields suffer the same methodological trap.

While quantitative studies are useful to support testing and enriching existing theories from a deductive perspective, they are poor in developing theory and explaining why there might be differences between the variables influencing a phenomenon under study. Furthermore, quantitative studies have a limited capacity to produce surprising research results (Lukka, 2010) and new insights. There is a need to strengthen the use of qualitative approaches in KM research.

The limited use of qualitative approaches in KM cannot be attributed to the difficulty of getting qualitative research articles published in top journals as claimed before (Myers, 2009), because some qualitative articles were accepted by the *Journal of Knowledge Management*. Maybe, it is a lack of "adequacy of the researcher's grasp of the tools and craft associated with qualitative methodology" as

claimed by Perry and Kraemer (1994) in the case of public administration. The use of qualitative methodologies may lead to the development of theory and acceleration of the maturity of the field of KM as suggested by Mendenhall, Beaty and Oddou (1993) and Ngulube and Ngulube (2015).

A total of 0.9% of the articles used MMR. The incidence of MMR in economics and management finance was 2% (Ngulube and Ngulube, 2015), while Alise and Teddlie (2010) found the prevalence rate in social sciences to be 5%. The incidence of MMR articles seems to be very low despite MMR being touted as a paradigm whose time has come (Johnson and Onwuegbuzie, 2004). The frequency of qualitative and quantitative methodologies was relatively higher than MMR.

Recurring Research Approaches Employed in the Studies

The worldview assumptions inform the research approaches used by researchers to understand a phenomenon (Creswell, 2014). It is evident from figure 3 that the survey design dominated research approaches in the quantitative tradition. About half the total number of articles in marketing journals used survey methods (Bush and Grant, 1994). Ngulube and Ngulube (2015) found a prevalence rate of the utilisation of survey in the subject of economics and management science to be 42%. Serenko and Dumay (2015) discovered that case studies and surveys were dominant. Leedy and Ormord (2005) averred that the survey design is a common approach used in business. That may partly explain why researchers in the KM field are trapped in the positivist cage.

Many social scientists do not use the experimental method (David and Sutton, 2011). Bolivar, Munoz and Hernández (2012) in their study of research methodologies used by e-government researchers revealed that 0.64% of the studies used an experimental research design. In KM research, Serenko, Bontis, Booker, Sadeddin and Hardie (2010) pegged the experimental design at 0.33%. Figure 3 illustrates that the occurrence rate of experimentation is 2.3%, which confirms the limited use of the experiment method by social scientists.

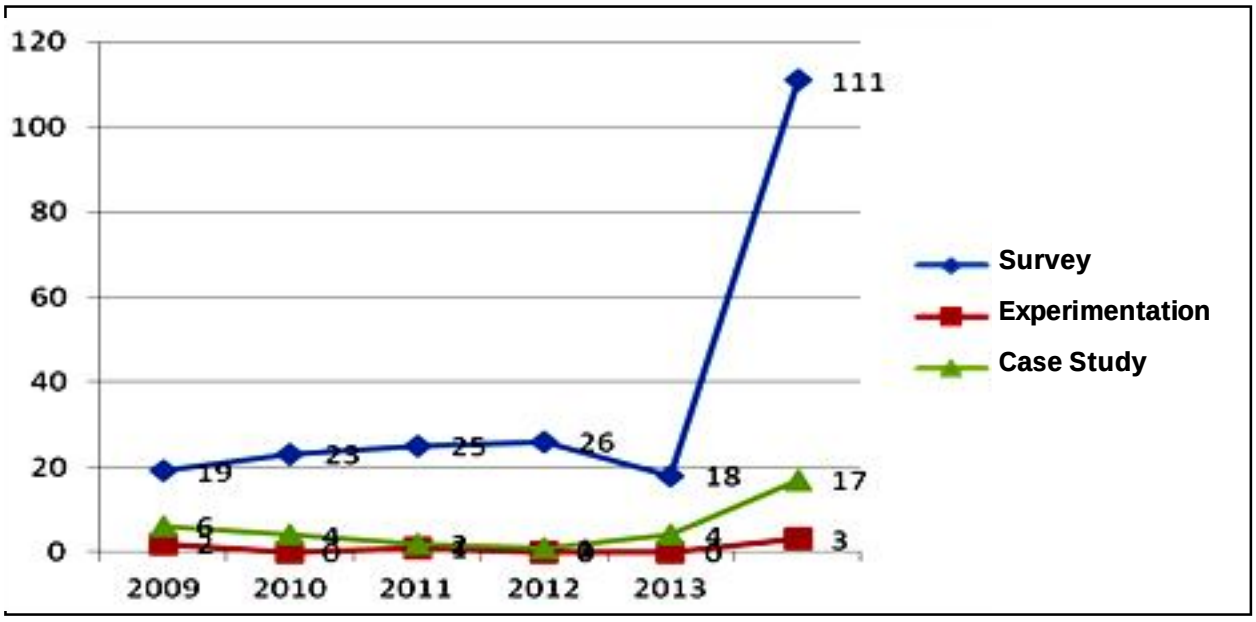

Figure 3: Quantitative approaches used in KM (N=133)

The case study approach is "an increasingly popular and relevant research strategy'' (Eisenhardt and Graebner, 2007). Case studies were the most frequently used research design with a score of 48.31% (Bolivar, Munoz and Hernández, 2012). Contrary to these trends, Ngulube and Ngulube (2015) found the prevalence rate of case studies in the field of economics and management sciences to be 30%. In the current study, case study approaches are less popular than survey design with a score of 37% as compared to the latter which accounted for 50% of all the research designs used by researchers in the field of KM.

Case study research assists in providing a description of phenomenon, testing theory, or generating theory (Eisenhardt, 1989). From the perspective of theory, the findings of a qualitative case study may bridge the gap between inductive and deductive research (Eisenhardt and Graebner, 2007). Theory development from case study approaches is traditionally associated with multiple case studies rather than single cases. There is no agreement as to the optimum number of case studies that may offer "analytical generalization". However, Eisenhardt (1989) and Yin (2009) are of the opinion that multiple case studies are better than one. Theory is developed as the cases are replicated. Out of the 64 articles that used the qualitative case study approach, 19 (30%) employed multiple case studies. We did not determine whether the 19 studies developed theory. This may be the subject of another study that is focused on the use of theory in KM research.

A case study is relevant to all research traditions because it is transparadigmatic and transdisciplinary (VanWynsberghe and Khan, 2007). Therefore, we classified the case study approach into quantitative and qualitative research traditions. Seventeen quantitative studies used the case study approach as compared to the 64 (79%) studies that used the design in the qualitative tradition (see Figures 2 and 3). Many studies do not seem to make this categorisation when classifying case studies (Piekkari, Welch and Paavilainen, 2009; Ngulube and Ngulube, 2015). In our categorisation, we did not distinguish between variable-oriented and case-oriented utilisation of case studies as Ragin (1997).

Our focus was to trace the trends of using the case study approach in KM research through the qualitative and quantitative traditions as a lens rather than on how each article theorised the case study design. We suffice to point out that the major advantage of a case-oriented approach over variable-oriented one is that the former provides the possibility of getting a comprehensive context-specific understanding and explanation of the nuances of the case under study (Piekkari, Welch and Paavilainen, 2009).

There are various classifications of qualitative research designs or research strategies (Creswell, 2013; Mills, 2014; Silverman, 1993). In spite of the various classifications suggested in the extant literature, Creswell (2013) and Leedy and Ormord (2005) identified common qualitative research designs, including case study, ethnography, phenomenology, grounded theory, content analysis and narratives.

We mainly used the classification of Creswell (2013) and Leedy and Ormord (2005) to categorise the qualitative approaches used in KM research. The attraction of these approaches in evaluating qualitative studies in knowledge management research was that they have systematic procedures of inquiry as suggested by Creswell (2013). There were two exceptions to the classification as shown in figure 4. Four (4.8%) articles used discourse analysis and participatory action research with the research designs split equally between the four articles.

Although 86 studies used a qualitative methodology (see table 2), three articles could not be categorised under any qualitative approach in the schema because it was not clear what design was used. Two pointed out that they used qualitative interviews without mentioning the approach used; and a third one pointed out that interviews were used without mentioning the methodology or research design. One can only guess that the studies were qualitative because the interview protocols used were open-ended and the samples that were studied were very small – the independent coder concurred. These three studies were dropped from the analysis of the findings reported in this section. This underscores our plea that researchers should elaborate on their choice of research for the sake of easy categorisation, transparency and accountability. Scholars must be transparent and accountable to their readers; it is an ethical responsibility.

Figure 4 summarises the results for 83 out of the 86 qualitative articles.

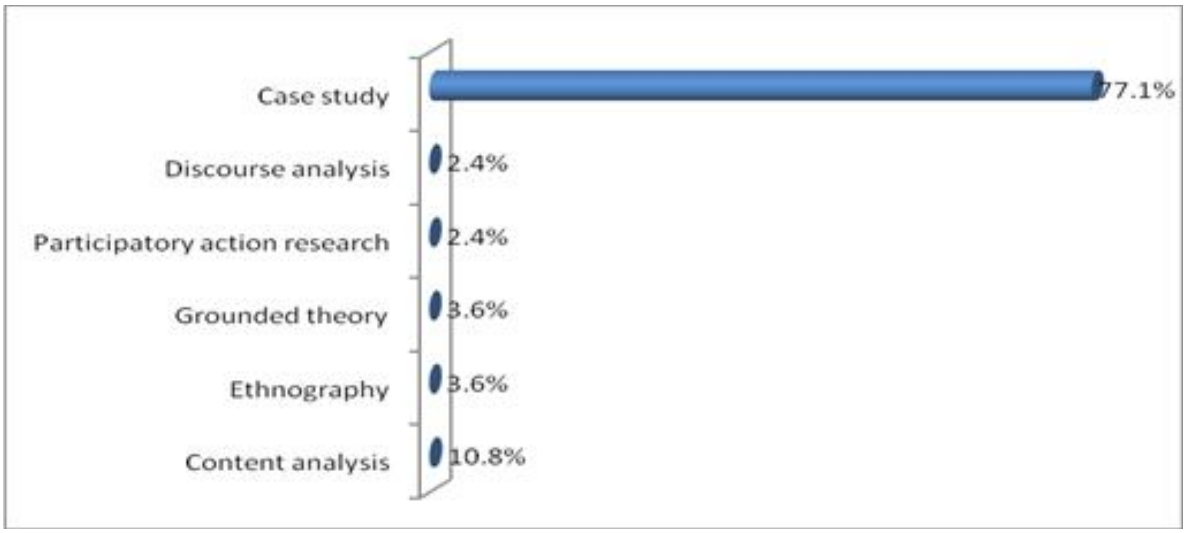

Figure 4: Qualitative approaches used by KM researchers (N=83)

The case study approach was dominant with 64 (77.1%) articles out of 83 studies using qualitative approaches. A total of 29.7% of case studies were multiple case studies. Nine of the qualitative articles used content analysis design. Bryman (2012) and Graneheim and Lundman (2004) differentiate between latent and manifest content analyses, since they are both quantitative and qualitative respectively. We did not distinguish between studies that focused on manifest content and those that dealt with latent content, because both qualitative and quantitative researchers use latent and manifest content analysis to interpret a phenomenon in varying degrees in relation to depth and abstraction (Graneheim and Lundman, 2004). Although, infometric studies appear to be more quantitative than qualitative, they were categorised under this approach. One could have easily categorised them under quantitative case studies, but following Bolivar, Munoz and Hernández (2014), we classified them under qualitative designs. In essence, the use of numeric data does not necessarily make a study quantitative and we need to move beyond these arbitrary proscriptions when defining the boundaries of research approaches.

Ethnography and grounded theory approaches were at equilibrium in three articles. The low uptake of ethnography designs partly explains why Serenko, Bontis, Booker, Sadeddin and Hardie (2010) suggested the need for an increased use of qualitative methods such as ethnography which seemed to be underrepresented in the repertoire of KM researchers. The low use of the grounded theory approach may be attributed to the fact that researchers in management and organisation studies that practise grounded theory are "a minority and generally loosely coupled group" (Locke, 2015).

At the tail-end of the articles that were analysed were participatory action research and discourse analysis with a score of two each. It is evident that phenomenology and narratives were not that common in the field of KM as articulated by Creswell (2013) and Leedy and Ormord (2005).

Romm and Ngulube (2015) identified and described some major MMR designs, including explanatory, exploratory, convergent, embedded and multiphase designs. The two studies that used mixed research methods employed exploratory and explanatory mixed method approaches. Levy, Hadar, Greenspan, and Hadar (2010) employed an explanatory MMR design as they collected quantitative and qualitative data concurrently, and explained quantitative data using qualitative data. Gururajan and Fink (2010) used the exploratory MMR approach, since they explored major attitudes of academics to transferring knowledge to colleagues using qualitative methodology and then initiated a quantitative phase in a sequential manner. It is evident that the use of MMR was limited.

Data Collection Techniques Exploited and Triangulation

Figure 1 illustrates a repertoire of data collection techniques available to researchers. The

questionnaire is included among the qualitative data collection methods. It is noteworthy that Creswell (2013) described four basic types of data collection, including observations, interviews, documents, and audiovisual materials, but excluding questionnaires. Romm (2013) demonstrated that questionnaires can be used "without operating from an epistemological position". This implies that questionnaires may be used by both qualitative and quantitative researchers in varying degrees of fluidity and rigidity.

All the KM empirical studies that were analysed explained data gathering techniques. A study on methods used in e-government research by Heeks and Bailur (2007) found that 60% of researchers did not explain how data had been gathered. Some of the papers had no heading on research methods employed by the study.

Survey designs used the questionnaire as the primary instrument of data collection in quantitative studies. Qualitative studies used in-depth interviews, questionnaires, focus group discussions, semi-structured interviews observation and document analysis. The use of questionnaires was not prevalent among qualitative studies.

There were also other less prevalent data collection methods such as the Delphi technique used by McNichols (2010) and the vignette method used by Geiger and Schreyögg (2012). The Delphi technique can be used through both interviews and questionnaires with a panel of experts. Vignettes, which are complete stories about hypothetical scenarios, are useful for studying sensitive topics and topics where participants lack personal experience and knowledge about the matter (Braun and Clarke, 2013).

Thirty-one (14%) KM studies that were analysed used triangulated data collection methods. This implies that 86% of researchers did not use strategies to overcome the deficiencies of using a single method. However, some researchers were aware of the problems of using one method and underscored the limitations of the procedure. Serenko, Bontis, Booker, Sadeddin and Hardie (2010) found that 76.3% of researchers used one method and 23.7% used triangulated methods. This implies that studies that used triangulation have relatively declined. The triangulation of methods was also not prevalent in other fields such as e-government (Heeks and Bailur, 2007).

The articles that used triangulated methods were analysed using the triangulation mix of Cohen, Manion and Morrison (2007) as a lens. Triangulation is important to qualitative and quantitative research. It is one of the ways of enhancing rigour and trustworthiness in qualitative studies, and the validity and reliability of quantitative studies. Triangulation also allows researchers to thoroughly deal with aspects of a phenomenon and increase the amount of research data collected (Sarantakos, 2013).

Building on Denzin (1989), Cohen, Manion and Morrison (2007) outlined six different types of triangulation:

- Time triangulation employs cross-sectional and longitudinal designs.
- Space triangulation uses comparative or cross-cultural approaches instead of researching one culture.
- Combined levels of triangulation involve more than one level of analysis (individual level, group level and organisational level).
- Theoretical triangulation uses multiple theories to explain research findings.
- Investigator triangulation utilises more than one observer independent of the other.
- Methodological triangulation entails multiple methods.

The articles that used more than one technique of data collection only used methodological triangulation or what Patry (2013) refers to as critical multiplism, which is rooted in 'multi-trait, multi-method matrix' and was conceptualised by Campbell and Fiske (1959).

Another form of methodological triangulation identified was in the form of deploying multiple approaches within the same methodology and philosophical assumptions. An example of a study that used multiple approaches in the field of KM research is that of Chua and Banerjee (2013) who used multiple qualitative approaches, namely case study and netnography which is some kind of online ethnography to understand customer knowledge management. This example is used to demonstrate that although the study used multiple approaches, it is different from those of Gururajan and Fink (2010) and Levy, Hadar, Greenspan and Hadar (2010) which used specific MMR designs. Christ (2010) recently

discussed a combination of more than one qualitative approach in one study in the context of MMR, but it should technically be discussed from the perspective of methodological triangulation.

Conclusions and Recommendations

This article holds implications for research methodologies in the *Journal of Knowledge Management*. The results showed that mentioning the paradigms, methodology, approaches and data collection methods add to the quality of an inquiry. It raises awareness of developments in the field and points towards directions for future engagement with research methodologies. The number of non-empirical studies was declining. Researchers in knowledge management field are in a positivistic methodological trap. The incidence rate of triangulation and MMR is low. A limited range of qualitative research approaches was used. The use of qualitative approaches is key to developing home-grown theories that may assist in explaining the intricacies of KM.

Methodological pluralism will enhance the validity of the results and enrich the research while providing KM researchers with an opportunity to have a deeper and balanced understanding of the complex KM phenomenon. In turn, they will be able to deal with the broader issues of KM that are relevant to society.

This study has two major limitations that merit discussion. Firstly, a lack of agreed "operational definitions for the codes associated with methodological indicators" was an obvious handicap (Alise and Teddlie, 2010). The reliability of the coding schema should be evaluated in the context of the description of the research procedures that were used. Secondly, the content analysis approach used gives a partial picture and did not triangulate data collection methods. For instance, the use of multiple methods may actually explain why, for example, the use of qualitative research procedures is lower than quantitative ones. It may even establish whether or not the trend is due to the fact that the KM subject field is more amenable to quantitative methods than qualitative ones, and partly explain why KM researchers are in the methodological positivist cage.

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