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UNPACKING THE PEOPLE, PROCESS AND TECHNOLOGY DIMENSIONS OF ORGANISATIONAL KMS

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Abstract

Although the benefits of knowledge management systems (KMS) have been clearly articulated, there remains a gap between KM theory and practice. One explanation for this gap can be attributed to the dichotomy between the people versus technology approaches to research that characterize the academic literature on KM and KMS. This paper describes an adaptive theory approach to unpack the people, process and technology dimensions of organisational KMS based on evidence gathered from two in-depth case studies of global consultancy companies that are considered exemplars of KM practice. This study makes a contribution to theory and practice by delineating the people, process and technology dimensions of organizational KMS. The output of this approach is a process-based conceptual model that captures the technological and non-technological features of a KMS, and which incorporates people-based dimensions such as roles and values, as well as the technology platform and supporting technologies employed. The model is informed by theory and grounded in practice, and, as such, it can be used by practitioners as a starting point to plan future KMS implementations or to examine current KMS implementation. Conversely, the model may be used by KM theorists as a starting point for more parsimonious, detailed research studies.

Keywords: Knowledge Management, Sociotechnical Systems, Adaptive Theory, Framework.

1 Introduction

Although practitioners paved the way for knowledge management (Serenko *et al.,* 2011), the relevance of knowledge management (KM) research has been called into question (Metaxiotis, 2005). Furthermore, it has been argued that KM lacks a foundation which aligns research outcomes with the needs of practitioners (Booker *et al*., 2008). If KM research is to prove beneficial, it is necessary to ensure that research outcomes are compatible with the needs of practitioners (Booker *et al.,* 2008). According to Maier (2002) there is a significant gap between theoretical models and KM tools and organisational KMS. Providing practical KM frameworks represents an opportunity to bridge the academic/practitioner KM divide (Wickramasinghe, 2003). Moreover, much of the earlier academic discourse is polarised by the various merits of the people versus technology KM approaches. This paper's objective is to answer the question "what constitutes a KMS in practice?" The paper therefore represents a starting point in addressing the aforementioned gap by providing a holistic KMS model that incorporates people, process and technology dimensions. The KMS model provides a useful research lens for future sociotechnical KMS research based on a KMS model which is grounded in both theory and praxis.

The remainder of this paper is structured as follows. Section 2 provides a brief literature review of the field of knowledge management. The literature review points to a divergence between KM research and practice and also between those who view knowledge management systems (KMS) as primarily technical systems versus those who view KMS as predominantly social systems. The literature review concludes with a call for a holistic KMS model that incorporates people and technology dimensions. Section 3 discusses an adaptive theory research design that was used to achieve the research objective of the study. Section 4 discusses the findings of study in relation to the research objective and research questions. Section 5 provides a summary of the conclusions of the paper.

2 Literature Review and Theoretical Development

Knowledge management (KM) has been deemed "*an obvious imperative in the knowledge economy*" (Earl, 2001, p. 231). Enhanced organisational learning (Damodaran and Olpert, 2000), innovation (Von Krogh *et al*., 2000), productivity (Ekbia and Hara, 2007) and flexibility (Mårtensson, 2000) are just some of the many benefits that have been attributed to KM implementation. Consequently, KM has experienced explosive growth and a substantial increase in the number of conferences, dedicated journals and KM consultants (Spender, 2006). However, the rapid growth of KM has caused many to speculate whether the field of knowledge management is little more than a fad (cf. Tanriverdi, 2005). According to Spender (2006, p. 127) *"[a]s KM has risen in importance and managerial fashionability the hype and confusion has multiplied, leading some to argue that KM is a fad of little long-term significance*". However, the focus of such discourse is misplaced and may result in "*a missed opportunity to understand how knowledge is developed, gained and used in organisations*" (Dalkir, 2011, p. 444). Indeed, there is evidence to suggest that rather than being a fad, KM has proven to be a more enduring discipline (Booker *et al*., 2008). A study by independent research company AMR indicated that US companies spent $73 billion on KM software in 2007 (Murphy and Hackbush, 2007). Knowledge management exhibits many of the characteristics of a scientific field including its own theories, journal ranking system and empirical studies (Booker *et al*., 2008). Despite the decline in research interest that followed the field's rapid growth in the nineties, KM shows little sign of disappearing. Rather, KM displays the characteristics of an enduring fashion with approximately 2,000 citations per annum (Grant, 2011). Such figures indicate that KM is active both from an academic and practitioner perspective.

2.1 People versus Technology Approaches to Knowledge Management

The domain of knowledge management borrows from a number of reference disciplines including philosophy, economics, organisational theory, information systems, marketing, management and organisational learning (Kakabadse *et al.*, 2003). The diversity and richness of the KM reference disciplines represents a dual-edged sword for KM researchers and practitioners alike (Dalkir, 2011). On the one hand, "*almost anyone can find a familiar foundation on which to base their understanding and even practice*" (*ibid.*, p. 8), whilst on the other, the KM literature has been accused of lacking a standard definition and exhibiting conceptual confusion (Spender, 2006; Onions, 2010). The broad scope of KM has forced KM researchers to propose ever-narrower, and divergent, streams of research to differentiate their work (Gray and Meister, 2003). Moreover, each stream exhibits its own perspectives and terminology (Grant, 2011). This divergence has served to dilute the overall KM concept rather than build a cumulative research base (*ibid.*). Nowhere is this divergence more evident than in the split between the techno-centric and people-centric approaches to KM.

Many of the KM implementations described in the knowledge management literature are dependent, to some degree, on the use of technology (Edwards *et al.*, 2005; Holsapple, 2005; Tseng, 2008). Indeed in the IS field, many of the earliest descriptions of KM describe static processes that have been facilitated by the use of information technology (Malhotra, 2000). The KM literature contains a number of articles which describe how IT tools can be used to support the knowledge management processes (cf. Alavi and Leidner, 2001; Edwards *et al.*, 2005), while others describe sample knowledge management systems (KMS) architectures (cf. Maier, 2002; Chua, 2004). However, this techno-centric view has led many executives to view technology as a panacea for all knowledge management problems (Chawla, 2010). Moreover, there has been a tendency to concentrate on the stock of knowledge as opposed to flow (McDermott, 1999).

In stark contrast to the techno-centric view of KM, an opposing human-centric view has emerged (cf. Hsieh, 2009). Such an approach challenges the degree to which technology can be used to facilitate knowledge sharing. Some proponents of human-centric KM approach are sceptical of the espoused benefits of IT-enabled knowledge management (cf. Hislop, 2002), whilst others unequivocally reject the notion of IT-enabled KMS in theory and in practice (cf. Galliers and Newell, 2003). Human-centric KM scholarly research has tended to focus on a preoccupation with the epistemological debate over the conceptualisation of knowledge, the various merits of tacit versus explicit knowledge (cf. Nonaka, 1991) and whether knowledge can be managed at all (Coakes, 2004).

According to Gray and Meister (2003, p. 262) the lack of general KM theories has resulted from "*a lack of consensus about what KM is (and is not) which has forced researchers step back from any attempt to articulate general theory and instead pursue ideas about KMS that are both focused and dissimilar*". Consequently, disparate theories abound yet core theories are scarce. Conceptual plurality, posit Nonaka and Peltokorpi (2006), represents one of the most significant barriers to the establishment of a separate KM academic discipline. The multi-disciplinary background of KM has resulted in a rich tapestry of ideas and research methods imported from other disciplines. However, much like the origins of the IS field itself the KM field has been criticised for the scarcity of core theories and the growing lack of integration between the practitioner and academic KM community (Ekbia and Hara, 2007; Booker *at al.*, 2008). As a result, there remains "*many unresolved issues, challenges and opportunities for information systems in the domain of knowledge management*" (Sambamurthy and Subramani, 2005, p. 2).

2.2 Towards an Integrated Socio/Technical KMS Model

The first step in advancing KM research is to bridge the social/technical divide that is evident in the KM literature. Organisational theorists tend "*to assume employees hold knowledge, perhaps as tacit skills, while IT or management information systems (MIS) theorists and economists normally treat*

knowledge as separable from the people who generate and use it in their decision-making" (Spender, 2006, p. 128). Such ideological differences do little to advance a cumulative research tradition in KM. Indeed, the emphasis on technology "*adds little to our broader understanding of knowledge's place in the organisation, or the management problems arising from knowledge's special characteristics and challenges*" (*ibid*, 2006, p.130), whilst, on the other hand, a preoccupation with the epistemological debate is similarly unhelpful. Von Krogh (1998, p. 135), for example, states that *"[a]t the level of individual organizational member, knowledge as justified true belief is not a matter of any particular concern. It is part of everyday life*". In order to address the divergence in the academic discourse and simultaneously address the gap between KM theory and practice, new holistic KM models are required.

A growing number of researchers have called for practical, holistic KM solutions that incorporate technical and social dimensions (cf. Tseng, 2008; Handzic, 2011). This paper seeks to examine the factors that influence the design, development and implementation of knowledge management system to manage organisational knowledge. Rather than taking a techno-centric view, the research process is informed by the people, process and technological dimensions of knowledge management systems. The investigation of IS as socio-technical systems has a well-established pedigree. Bostrom and Heinen (1977, p. 25), for example, discuss the importance of "*attitudes, motivations, and the interpersonal behaviour of the individuals*" within systems. Such systems mirror many of the characteristics of KM as described by contemporary KM researchers who state that cultural and social issues most also be addressed in parallel with the technology infrastructure (cf. Handzic, 2011). Hlupic *et al*., (2002) call this approach to KM an integrated approach.

2.3 Research Objective

This paper looks at the development of a KMS from a socio-technical perspective. Kling and Courtright (2003, p. 222) define sociotechnical as "*an ensemble, a practice, or even an analysis of any of these that integrates social and technical elements in a way that reveals their interactions and interpenetration*". A sociotechnical approach to KM recognises the inseparability of modern knowledge management and technology (Holsapple, 2005), but also acknowledges that successful knowledge management implementations only result if IT is used as part of a broader system encompassing people and process also.

The researchers categorised key concepts in the KM literature in terms of "people, process and technology" dimensions. These concepts were chosen because the people, process and technology approach is used frequently in the practitioner KM literature and represents what Sarker and Lee (2002) refer to as a practitioner-theory-in-use. However, despite the term being used in an almost axiomatic fashion in the KM practitioner literature (cf. Marling, 2004; Milton, 2008), there remains a lack of research as to what actually constitutes these dimensions and how the various dimensions interact (Metaxiotis *et al.,* 2005). Thus, the overall of objective of this paper is to investigate what constitutes a KMS in practice. To meet this research objective the following research questions are posed:

RQ 1: What are the people dimensions of organisational KMS?
RQ2: What knowledge processes are supported by organisational KMS?
RQ3: What are the technology dimensions of organisational KMS?

3 Adaptive Theory Research Design

Adaptive theory is a practical research methodology that seeks to build new theory, or extend existing theory, by leveraging the relationship between extant theory and emerging data (Layder, 1998). The 'adaptive' in adaptive theory refers both to the nature of the enquiry and the nature of the theory developed using the approach. Knowledge management systems research has been criticised for an

artificial focus on technology, or social dimensions alone. Moreover, the gap between academic KM and theory has widened. Adaptive theory provides a research approach that deals well with complex socio/technical systems, such as KMS, and recognises the inseparability of research and practice by exploiting the synergies between extant theory and emerging research data.

In effort to build adaptive theory, this study incorporated two case studies of global consultancy companies. Company A is a market leader in global IT and strategic management consultancy, while Company B is one of the world's most successful design consultancy companies. Layder (1998) advocates a form of "purposive sampling" where cases are chosen based on information richness and representativeness. Both organisations, chosen for the study, are established knowledge-based service organisations. Moreover, consultancy companies are considered exemplar of the KM phenomenon (Fincham *et al.,* 2008), while "*significant opportunities are associated with knowledge management activities in large and geographically dispersed companies*" (Leidner *et al.,* 2006, p. 22). The lead researcher engaged with the consultancy companies over a period of two years. In total, the researcher conducted approximately sixty hours of semi-structured interviews with key personnel including senior executives, knowledge managers, consultants, IT personnel, and KMS end users. Document analysis and participant observation were also used to augment the research database by facilitating the triangulation of data sources (cf. Yin, 2003; Denzin, 2009).

Multiple cases were used to "*improve the likelihood of accurate and reliable theory…[and] enhance the probability that the investigators will capture novel finding which may exist in the data*" (Eisenhardt, 1989, p. 541). The researchers visited all of the research sites at least once, and data was gathered via interview, participant and documentation. Subsequently, within-case and cross-case analysis was performed. Within-case and across-case analysis facilitated the process of intuiting and identification of common themes in data (Ayres *et al*., 2003). Within-case analysis also allowed the researcher to deal with large volumes of data (Eisenhardt, 1989) while cross-case analysis allowed the researcher to seek differences and similarities between cases. Conducting "within-case" and "across-case" analysis is a widely accepted method of data analysis for theory building (cf. Eisenhardt, 1989; Yin, 2003). Moreover, cycling between cases allows for the researcher to quantify similarities between cases, thus making the study design more rigorous in a positivist sense (cf. Paré, 2002). Coding techniques including pre-coding, provisional coding, and core and satellite coding were performed with the aim of adaptive theory building (Layder, 1998).

The people, process and technology concepts, emerging from the KM literature, were used as a preliminary research framework to analyse data collected from the first case study. A chain of evidence was maintained using qualitative data analysis (QDA) software in conjunction with evidence tables, while concepts maps were used to illustrate the relationship between concepts. Evidence from the first case was used to strengthen existing concepts, or modify the framework accordingly, with the aim of analytic generalisation (cf. Paré, 2002; Yin, 2003). The resulting framework was used to analyse data from the subsequent case study.

4 Findings

Figure 1 illustrates the people, process and technology dimensions of organisational KMS based on the findings of the two case studies. The diagram illustrates how the knowledge processes of creation, storage/retrieval, transfer and application are facilitated through people and technology dimensions. The knowledge processes take place in, and are influenced by, a *culture of knowledge sharing*. Moreover, a *culture of knowledge sharing* is embedded in the overall KMS ecosystem and exists in the context of a wider *organisational culture*. KMS exhibit both *organisational* and *technology features* which enable the knowledge management processes. *Technology features* are facilitated via a technology *platform* and underlying *supporting technologies*, whilst non-technology, or *organisational features,* are enabled via a combination of dedicated KM *support roles* and *core values*. In effect, *core values* play a *platform* role for the *organisational* KMS features. The diagram illustrates

that rather than representing opposing dimensions, there are clear symmetries between the people and technology dimensions of KMS.

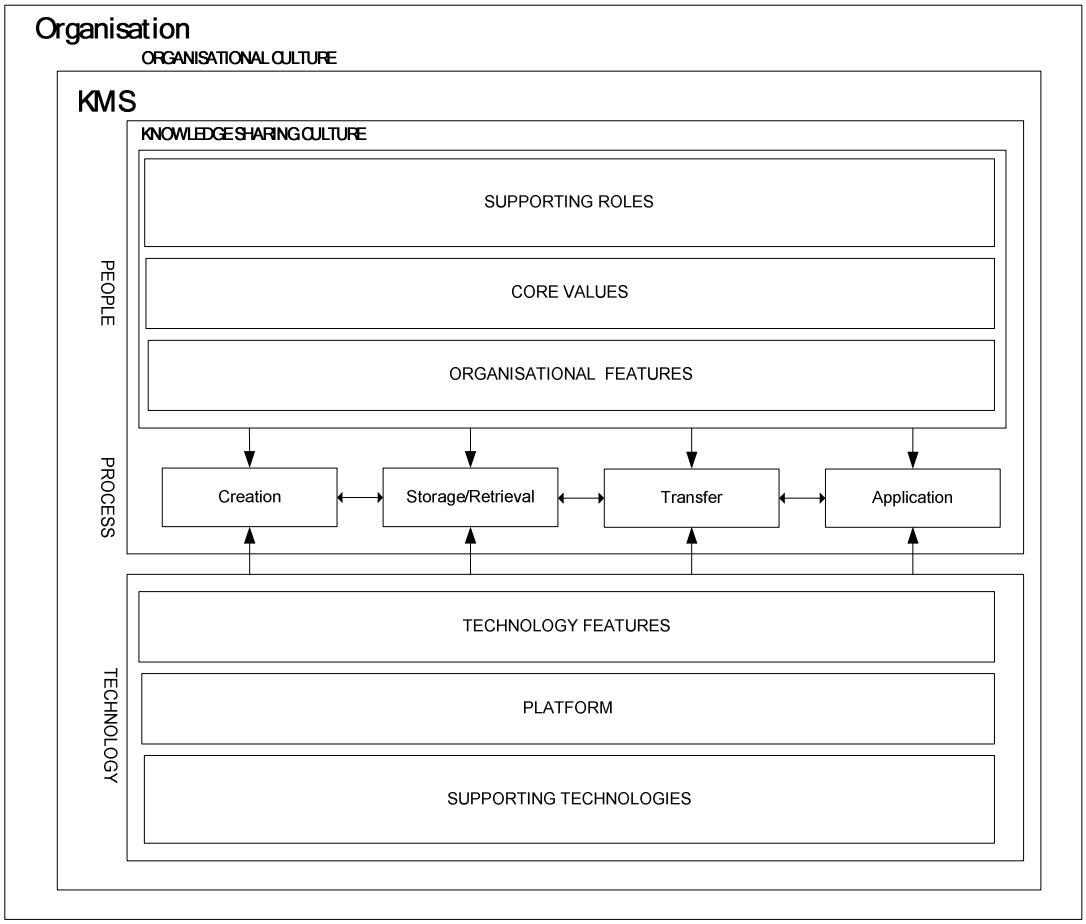

Figure 1. The People, Process and Technology Dimensions of Organisational KMS

4.1 People Dimension

This section unpacks the people dimension of organisational knowledge management systems in practice. Based on evidence from the cases, the people dimension of KMS can be categorised in terms of culture, core values and non-technology features. The concepts and relationships between the concepts are described in detail below.

4.1.1 Culture

A culture of knowledge sharing was identified as a major contributor to KM success in both of the organisations that were studied. However, the cases demonstrated that a knowledge sharing culture was one of a number sub-cultures that were evident in the context of an overall organisational culture. Both organisations viewed a culture of knowledge sharing as something that could be actively managed and fostered. Furthermore, the cases exhibited a reciprocal relationship between knowledge sharing culture and knowledge sharing behaviours. Efforts to foster a culture of knowledge sharing resulted in increased knowledge sharing behaviours, whilst knowledge sharing behaviours served to reinforce the overall knowledge sharing culture within in the organisation. The link between culture, organisational processes and technology usage has been clearly established in the literature (cf. Alavi *et al*., 2006).

4.1.2 Values and Supporting Roles

Although the literature review identified that beliefs represent an important enabler of culture, beliefs are difficult to reify (Nonaka and von Krogh, 2009). Core values, on the other hand, though socially validated, can be easily articulated and represent a manifestation of organisational culture (Leidner *et al*., 2006). Core values are deeply held, embody an organisation's value system, and represent the root of organisational culture (McDermott and O'Dell, 2001). In both of the case studies, core values were identified as an important enabler of a knowledge sharing culture. Moreover, each of the organisations had a clearly articulated set of core values that were openly communicated with employees during training and induction.

All of the knowledge management systems that were investigated for this study revealed KM-specific *roles* and teams. Although the cases differed with regard to the names of roles and teams, and whether or not roles were dedicated, it is possible to categorise these roles based on function. All of the case data has been coded and KM roles have been given generic titles based on the function that they perform. In effect, the researcher has identified a number of first order concepts, comprising organisation specific titles, which have been mapped to second order concepts which reflect terminology used in the KM literature. Table 1 illustrates the KMS support roles identified in the study.

Role	**Description**
KMS Sponsor	Executive support for KM
KMS Team	A multidisciplinary team tasked with KM delivery
Knowledge Manager	Tasked with creation and coordinator of organisational KM strategy
Subject Matter Experts	Employees who are recognised as experts in domains of knowledge which represent strategic importance to the organisation
Knowledge Activists	A knowledge champion responsible for garnering support for, and generating commitment to, knowledge sharing.
Community Coordinators	Tasked with increasing the participation rates and efficiency of communities of practice

Table 1. Common KMS Support Roles

4.1.3 Organisational Features

Despite differing approaches to KM strategy, both organisations utilised a knowledge taxonomy to categorise knowledge. Knowledge taxonomy has been demonstrated to play a crucial role in the creation, storage/retrieval and transfer of organisational knowledge. On the one hand, it aids knowledge creation by describing what constitutes organisational knowledge while on the other hand it enables classification, thus facilitating storage and transfer. Incentives and motivation for knowledge sharing, both implicit and explicit, also represented a common feature of the KMS in this study. Another common organisational feature is leadership in the form of executive support for KM initiatives and active participation in the knowledge sharing processes, such that actions match the espoused values of the organisation. Such a feature, clearly demonstrates the relationship between KM *Supporting Roles*, *Core Values*, and *Organisational Features*. Both organisational KMS had a community of practice (CoP) feature. Often the CoP feature is supported via a community coordinator role and supporting technology.

Provision of knowledge sharing training was deemed a key *organisational* feature of the organisations that were studied and was shown to provide support for all of the key knowledge management processes. Training was implemented in the organisations through a variety of means including training packs, formal classroom training and mentoring programmes. Both cases featured evaluation mechanisms which facilitated the knowledge creation processes. Evaluation features include: post-action review sessions, exit interviews, project debriefings and feedback notes.

Feature	Description
Incentives	Explicit or implicit rewards for knowledge sharing behaviours
Knowledge Taxonomy	A standardised schema which can be used to categorise and structure organisational knowledge
Training	Dedicated training programmes designed to promote and educate users about knowledge management practices including
Communities of Practice	Networks of organisational members who collaborate to share expertise and knowledge on areas of mutual interest
Evaluation	Post-project evaluation sessions which are used as the raw material for lessons learned.
Leadership	Executive support for knowledge management

Table 2. Common Organisational KMS Features

4.2 Process

This study examined the people, process and technology dimensions of knowledge management systems. The study takes the knowledge processes, as articulated by Alavi and Leidner (2001), and shows how these processes can be enabled in terms of technology and people. In this regard, the study adds additional context and detail on how the knowledge processes can be enabled. Moreover, the study illustrates the relationship between technology and non-technology features and individual knowledge processes. To this end, the study examined the people and technology dimensions in the context of their relationship with all of the knowledge processes including: *creation*, *storage/retrieval*, *transfer* and *application*. There has been a tendency in the KM literature to concentrate on knowledge stock as at the expense of knowledge flow (see Section 2.1). However, this study revealed that knowledge transfer and knowledge application are equally as important.

During the interview process, interviewees were asked to provide examples of knowledge creation, storage/retrieval, transfer and application in the context of the people and technology KMS features at their disposal. Such an approach allowed the researcher to examine the relationship between discrete KMS features and individual knowledge processes. Moreover, this study found that the technology and organisational KMS features differ with regard to the support they provide for individual knowledge processes.

4.3 Technology

Technology is widely accepted to play an important KM enabling role. This section unpacks the technology dimensions of KMS in relation to empirical evidence from the case studies. The study revealed that technology could be best described in terms of *technology features*, *platform* and *supporting technologies*. In relation to the assumption that KMS represent a single tightly integrated application, the case evidence was not unanimous. Company A's KMS, for example, consists of a number of discrete technology applications which have been integrated post-implementation. From a user perspective the KMS appears to be a single tightly integrated application but this is not the case in practice. Company B also leverages a number of separate knowledge sharing applications which collectively provide knowledge creation, storage, application and transfer functionality. Although the KMS is comprised of discrete KM applications, the applications are tightly integrated and accessible from a central portal.

4.3.1 Platform and Supporting Technologies

The cross-case analysis of the cases revealed a large variation in the type of technology platform and supporting technologies used to support the knowledge management processes. Despite this variation, the fidelity of the constructs was deemed appropriate to describe the technology dimensions of the different KMS implementations. For example, to provide a knowledge repository feature a developer

is faced with a choice of appropriate platform and support technology. If an open platform is deemed beneficial, the developer will need to select supporting technologies such as Java and MySQL which are platform independent and open source. If on the other hand, the developer wishes to build a KMS which supports legacy systems, comprised of different technologies, a platform of abstraction and integration is appropriate. In such a scenario, the developer will have little choice over the supporting technologies that are used. Thus, little value is added in going beyond describing generic supporting technologies and platform characteristics. Company A, for example, migrated to Microsoft SharePoint as a result of their previous technology platform supplier entering the strategic management consultancy sector and effectively becoming a competitor. In this regard, the organisation chose their technology platform based on external market factors over which the system designers had very little influence. Regardless of the supporting technologies used by organisations in the study, the two common platform characteristics were extensibility and integration. Based on the case data, the supporting technologies cannot be generalised beyond the following constructs: database technologies, programming languages, and development tools.

4.3.2 Technology Features

Although the platform and supporting technologies varied from implementation to implementation, a common set of features emerged. Moreover, these features were evident regardless of the supporting technology and platform that were used in the KMS. For example, Company A used Microsoft SharePoint while Company B uses a variety of different technologies including Roxen CMS and Autonomy. The study also revealed that users differed widely with regard to the manner with which they applied individual technology features. In effect, users acted as bricoleurs, selecting whichever tools best served their needs. This goes to demonstrate the sheer complexity of organisational KMS whereby organisations find it impossible to predict, with any degree of certainty, how the users will interact with individual KMS elements. Table 3 illustrates a subset of the technology KMS features that were common to both organisations investigated for the study.

Feature	Description
Intranet	A corporate website used to facilitate inter-organisational communication and collaboration
Portal	A central point of access to organisational information resources (often hosted on a corporate intranet
Knowledge Repository	An electronic store of organisational knowledge assets
Discussion Boards	Electronics forums created to provide a platform for collaborative discussion
CMS	Online file and content management systems for managing an organisation digital knowledge resources
Universal Search	Integrated search functionality to allow users to search disparate knowledge sharing tools
Corporate Yellow Page	A searchable, online directory of staff members, incorporating personal details and areas of expertise, which can be leveraged to promote person-to-person communication

Table 3. Common Technology KMS Features

5 Conclusions and Contribution

The objective of this study was to answer the question ‘what constitutes a KMS in practice?’ The resulting KMS framework clearly answers the research questions posed earlier by demonstrating the relationship between people, process and technology dimensions of organisational KMS. Additional tables illustrate common KMS features. Given the heterogeneous nature of the KM field, the holistic nature of the KMS framework (figure 1) provides a useful starting point for future KM research. Based on the interrelated nature of the KM concepts it is clear that KM research cannot be limited to

either human or technological dimensions. In addition to highlighting the reciprocal relationship between people, process and technology dimensions, the framework also attempts to unpack the dimensions to reveal their constituent components.

The KMS model clearly illustrates *what* factors should be considered in the design of a KMS. In this regard, the author has made every attempt possible to be comprehensive yet parsimonious. The KMS model also clearly shows *how* the factors are related. The relationship between the organisational knowledge processes and the people and technology dimensions of KMS is depicted. Moreover, the logic behind *why* variables were chosen for the KMS framework is clearly justified based on the KM literature and emerging data from the cases. These what, how and why questions represent the building blocks of theory development (Dubin, 1978).

Holsapple and Joshi (2000) have categorised knowledge management frameworks as either: (1) prescriptive; (2) descriptive; (3) or a combination of the two. Prescriptive frameworks *"provide general directions about the types of KM procedures, without providing specific details of how those procedures can/should be accomplished*" (Metaxiotis *et al*., p. 7). Descriptive frameworks, on the other hand, characterise or describe KM (*ibid*.). Based on these criteria, the KMS framework presented in Table 2 is both descriptive and prescriptive. Moreover, by minimising the people versus technology dichotomy, the framework provides a single coherent model which integrates techno-centric and people-centric KM approaches. Furthermore, it is clear from the KMS framework that not only does organisational KMS have people and technology dimensions but that the two dimensions have close parallels. For example, the non-technology KMS features are facilitated via the provision of a technology platform and supporting technologies, while the non-technology features are enabled via a platform of core-values and supporting roles. The KMS model is unique in this regard, and performs an important bridging function between technology and people dimensions. Moreover, it may explain why organisational KMS often fail by concentrating on technology or people dimensions alone.

The KMS framework is based on data collected from two consultancy organisations who have achieved an international reputation for best-practice in the field of knowledge management. As such, the framework generalises from two KMS exemplars. The use of adaptive theory ensures that the findings of the cases can be generalised, in an applied way, to other organisations. It provides a theoretical framework for KM researchers which can be used for further theory testing or developing more sophisticated models based on discrete knowledge processes. The authors have begun the process of integrating the KMS framework with KMS features based on data from additional KM cases. From a practitioner perspective, the framework provides a conceptual matrix which can be used to inform KMS design or evaluate why a particular KMS approach is not working. For example, if organisations attach the same weight to the people, process and technology dimensions illustrated in the KMS framework they should be able to achieve the same level of success as the two KMS exemplars. Future quantitative studies could corroborate the findings of this research, and provide further empirical evidence for practitioners of the efficacy of various KMS features presented above.

References

Alavi, M., Kayworth, T.R. and Leidner, D.E. (2006). An empirical examination of the influence of organizational culture on knowledge management practices. Journal of Management Information System. 22(3), 191-224.

Alavi, M. and Leidner, D.E. (2001). Knowledge management and knowledge management systems: conceptual foundations and research issues. MIS Quarterly, 25(1), 107-136.

Ayres, L. Kavanaugh, K. and Knafl, K.A. (2003). Within-Case and across-case approaches to qualitative data analysis. Qualitative Health Research, 13(6), 871-883.

Booker, L.D. Bontis, N. and Serenko, A. (2008). The relevance of knowledge management and intellectual capital research. Knowledge and Process management, 15(4), 235-246.

Bostrom, R.P. and Heinen, J.S.(1977). MIS problems and failures: A socio-technical perspective: Part I: The causes. MIS Quarterly, 1(3), 17-32.

Chawla, D. (2010). Knowledge management practices in Indian industries: A comparative study. Journal of Knowledge Management, 14(5), 708-725.
Chua, A. (2004). Knowledge management system architecture: A bridge between KM consultants and technologists. International Journal of Information Management, 24(1), 87-98.
Coakes, E. (2004). Knowledge Management: A primer. Communications of the Association for Information Systems, 14(21), 406-489.
Dalkir, K. (2011). Knowledge Management in Theory and Practice, 2nd Edition, MIT Press, MA.
Damodaran, L., and Olphert, W. (2000). Barriers and facilitators to the use of knowledge management systems. Behaviour & Information Technology, 19(6), 405-413.
Denzin, N. (2009). The Research Act: A Theoretical Introduction to Sociological Methods, Paperback Edition, New Jersey.
Dubin, R. (1978). Theory Development. Free Press, New York
Earl, M.J. (2001). Knowledge management strategies: toward a taxonomy. Journal of Management Information Systems, 18(1), 215-233.
Edwards, J.S., Shaw, D. and Collier, P.M. (2005). Knowledge management systems: Finding a way with technology. Journal of Knowledge Management, 9(1), 113-125.
Eisenhardt, K.M. (1989). Building theories from case study research. Academy of Management Review, 4(4), 532-550.
Ekbia, H.R. and Hara, N. (2007). The quality of evidence in knowledge management research: Practitioner versus scholarly literature. Journal of Information Science, 20(10), 1-17.
Fincham, R., Clark, T., Handley, K. and Sturdy, A. (2008). Configuring expert knowledge: The consultant as sector specialist. Journal of Organizational Behavior, 29(8), 1145-1160.
Galliers, R.D. and Newell, S. (2003). Back to the future: from knowledge management to the management of information and data. Information Systems and E-Business Management, 1(1), 5-13.
Grant, K. (2011). Knowledge management: an enduring but confusing fashion. The Electronic Journal of Knowledge Management, 9(2), 1117-1131.
Gray, P. and Meister, D. B. (2003). Introduction: fragmentation and integration in knowledge management research. Information Technology & People, 16 (3), 259-265.
Handzic, M. (2011). Integrated socio-technical knowledge management model: an empirical evaluation. Journal of Knowledge Management, 15(2), 198-211.
Hislop, D. (2002). Mission impossible? Communicating and sharing knowledge via information technology. Journal of Information Technology, 17(3), 165-177.
Hlupic, V., Pouloudi, A. and Rzevski. (2002). Towards an integrated approach to knowledge management: 'Hard','Soft' and 'Abstract' issues. Knowledge and Process Management, 9(2), 90-102.
Holsapple, C.W. (2005). The inseparability of modern knowledge management and computer-based technology. Journal of Knowledge Management, 9(1), 42-52.
Holsappe, C.W. and Joshi, K.D. (2000). An investigation of factors that influence the management of knowledge in organizations. Journal of Strategic Information Systems, 9(3), 235-261.
Hsieh, M.H. (2009). Human centric knowledge seeking strategies: A stakeholder perspective. Journal of Knowledge Management, 13(4), 115-133.
Kakabadse, N.K., Kakabadse, A. and Kouzmin, A. (2003). Reviewing the knowledge management literature: Towards a taxonomy. Journal of Knowledge Management, 7(4), 75-91.
Kling, R. and Courtright, C. (2003). Group behaviour and learning in electronic forums: A sociotechnical approach. Information Society, 19(3), 221- 235.
Layder, D. (1998). Sociological Practice: Linking Theory and Social Research, Sage Publications, London.
Leidner, D., Alavi, M. and Kayworth, T. (2006). The role of culture in knowledge management: A case study of two global firms. International Journal of e-Collaboration, 2(1), 17-40.
Maier, R. (2002). Knowledge Management Systems: Information and Communications Technologies for Knowledge Management, Springer-Verlag, Heidelberg.

Malhotra, Y. (2000). From information management to knowledge management: Beyond the 'hi-tech hidebound' systems. In Knowledge Management for the Information Professional (Srikantaiah, K. and Koenig, M.E.D. Eds.), p. 37, Information Today Inc., Medford, N.J.

Marling, L. (2004). Knowledge management: People, process, technology, Cutter IT Journal, 17(2), 5-10.

Mårtensson, M. (2000). A critical review of knowledge management as a management tool. Journal of Knowledge Management, 4(3), 204-216.

McDermott, R. (1999). Why information technology inspired but cannot deliver knowledge management. California Management Review, 41(4), 103-117.

McDermott, R. and O'Dell, C. (2001). Overcoming cultural barriers to sharing knowledge. Journal of Knowledge Management, 5(1), 76-85.

Metaxiotis, K., Ergazakis, K. and Psarras, J. (2005). Exploring the world of knowledge management: agreements and disagreements in the academic/practitioner community. Journal of Knowledge Management, 9(2), 6-18.

Milton, N. (2008). Assigning roles and accountability in KM. Knowledge Management Review, 11(1), 18-23.

Murphy, J. and Hackbush, J. (2007). The knowledge management spending report 2007-2008. AMR Research Report.

Nonaka, I. (1991). The Knowledge-Creating Company. Harvard Business Review, 69(6), 96-104.

Nonaka, I. and Peltokorpi, V. (2006). Objectivity and subjectivity in knowledge management: a review of 20 top articles. Knowledge and Process Management, 13(2), 73-82.

Nonaka, I. and von Krogh. (2009). Tacit knowledge and knowledge conversion: Controversy and advancement in organizational knowledge creation theory. Organization Science, 20(3), 635-652.

Onions, P. (2010). Umbrellas, alphabet soup and knowledge management theory, 11th Conference on Knowledge Management, ECKM 2010, Famalicão, Portugal, 2-3 September.

Paré, G. (2002). Enhancing rigor of qualitative research: Application of a case methodology to build theories of IT implementation. The Qualitative Report, 7(4).

Sambamurhty, V. and Subramani, M. (2005). Foreword: Special issue on information technologies and knowledge management. MIS Quarterly, 29(1), 1-7.

Sarker, S. and Lee, A.S. (2002). Using a positivist case research methodology to test three competing theories-in-use of business process redesign. Journal of the Association for Information Systems, 2(7), 1-72.

Serenko, A., Bontis, N. and Hull, E. (2011). Practical relevance of knowledge management and intellectual capital scholarly research: Books as knowledge translation agents. Knowledge and Process Management, 18(1), 1-9.

Spender, J.C. (2006). An overview: What's new and important about knowledge management? Building new bridges between managers and academics. In Managing Knowledge: An Essential Reader (Little, S. and Ray, T. Eds.), Sage Publications, London, 127-154.

Tanriverdi, H. (2005). Information technology relatedness, knowledge management capability, and performance of multi-business firms. MIS Quarterly, 29(2), 311-334.

Tseng, S. (2008). The effects of information technology on knowledge management systems. Expert Systems with Applications, 35(1), 150-160.

Von Krogh, G. (1998). Care in knowledge creation. California Management Review, 40(3), 133-153.

Von Krogh, G., Ichijo, K. and Nonaka, I. (2000). Enabling Knowledge Creation: How to Unlock the Mystery of Tacit Knowledge and Release the Power of Innovation, Oxford University Press, Oxford.

Wickramasinghe, N. (2003). Do we practice what we preach? Are knowledge management systems in practice truly reflective of knowledge management systems in theory? Business Process Management Journal, 9(3), 295-316.

Yin, R.K. (2003). Case Study Research: Design and Methods, 3rd Edition, Sage Publications, Newbury Park, CA.