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Understanding Knowledge Management Software Acquisition in Organisations: A Conceptual Framework

Khuong Le-Nguyen
University of London, k.le-nguyen@rhul.ac.uk

G Harindranath
University of London, g.harindranath@rhul.ac.uk

Romano Dyerson
University of London, r.dyerson@rhul.ac.uk

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Khuong Le-Nguyen
Royal Holloway College, University of London
k.le-nguyen@rhul.ac.uk

G. Harindranath
Royal Holloway College, University of London
g.harindranath@rhul.ac.uk

Romano Dyerson
Royal Holloway, University of London
r.dyerson@rhul.ac.uk

Abstract

The increasing importance of Knowledge Management (KM) has prompted many researchers to examine facets of the topic. However, understanding the acquisition of KM software in organisations and particularly the factors and conditions that affect the acquisition process has been largely ignored in the literature. Here we argue that incorporating an understanding of issues relating to KM software acquisition into KM frameworks could have real business benefits such as substantial savings in terms of cost, time, and improved administrative procedures, and could lessen the risk and uncertainty associated with KM software. The paper first examines KM definitions, KM processes and frameworks. Then, it briefly reviews evaluation criteria for acquiring KM software. A conceptual framework is introduced to describe the nature of the KM software acquisition process. Lastly, that framework is illustrated using two case studies to highlight its usefulness. This framework can also be used as a tool to explore the appropriateness of a particular software solution to an organisation by analysing the solution against the factors and conditions depicted in the framework. Empirical examination of the factors identified in our framework could also lead to a better understanding of the critical success factors of KM initiatives.

Keywords: Knowledge Management, technology, software acquisition, conceptual framework.

Introduction

This paper aims to extend our understanding of the Knowledge Management (KM) software acquisition process within organisations. KM is widely acknowledged as a strategic issue for organisations (Bollinger and Smith 2001; Linstone and Mitroff 1994). A large-scale survey conducted by KPMG in 2003 found that around 80 percent of organisations considered knowledge as a strategic asset (KPMG 2003). If knowledge and KM are indeed strategic issues for organisations, then the KM software acquisition process could also be seen as critical to ensure the fit between a specific KM software and the broader organisational context of a KM initiative. Whilst the implementation of KM software has received a significant degree of academic attention, the role played by acquisition has been largely ignored.

Yet practitioner evidence suggests firms contemplating acquiring their first KM software product or perhaps adding to existing KM provision may be subject to considerable uncertainty and ambiguity. In recent times, many KM software products have been introduced into the market (KMWorld Magazine 2006), and this is further complicated by the fact that, whilst some of these tools have been designed specifically as KM software, others have been re-packaged, re-labelled and re-marketed as KM software (Malhotra 2005). Since many of these products differ in terms of their features and capabilities, choosing the right

KM software product that fits the characteristics, systems, operational conditions and business objectives of a given organisation can be difficult. This is further exacerbated by the 'one-size-fits-all' viewpoint prevalent in many software vendors. As Soh, Kien and Tay (2000) and Markus and Tanis (2000) state, deciding which system to choose and understanding how the new system will influence the organisation is often problematic[3]. There is a risk that previous investments in KM may have been inappropriate or misaligned with the strategic needs of the firm.

Though the literature on KM covers a range of concerns in knowledge management, such as the use of specific KM tools to support various KM processes, issues of KM implementation, post-implementation and related organisational issues, the KM software acquisition process has received very little attention (Peachey and Hall 2005). Again, whilst much attention has been paid to the acquisition of complex systems such as ERP, CAD/CAM (Computer-Aided Design/Manufacturing), or CRM (Customer Relationship Management), there have been no efforts to examine the KM software acquisition process. This issue is, however, important because as the stage preceding the implementation process, it presents the opportunity to examine the dimensions and implications of buying and implementing KM software prior to the commitment of formidable resources. Last but not least, due to a record of poor implementation success (Malhotra 2005), understanding the acquisition process may help to highlight the critical factors and conditions necessary to ensure adequate organisational fit between the software and the broader KM context within the organisation.

The paper is organised as follows. We first define KM and KM processes, and examine a range of KM frameworks. Next, we briefly review evaluation criteria for acquiring KM software. Following is a conceptual framework depicting the KM software acquisition within organisations. This framework is then illustrated in two case studies. Finally, the concluding section presents some implications for research and practice.

Literature review

Defining Knowledge Management

A working definition of Knowledge Management (KM) is needed (Tiwana 2000). Still, one of the first things to say about KM is that definitions abound. For example, some studies look more at how employees create and share knowledge, making the subject more akin to organisational behaviour or human resource management (See for example Inkpen and Dinur 1998; Yahya and Goh 2002). Others such as Spender (1996a) emphasise the pluralistic epistemology of knowledge based on the extent to which knowledge is individually or socially located. Alternatively, studies by Davenport and Prusak (1998), Holsapple and Joshi's (1999), Alavi and Leider (2001) and Gold, Malhotra and Segars (2001) discuss a wide range of dimensions such as technology (IS/IT) as well as organisational issues (i.e. structure, culture, benefits, change management). Although it is difficult to find a commonly agreed working definition of KM, it is easier to find agreement on the broad parameters of KM. Such parameters include (i) KM is a new business concept and should be employed using a systematic approach rather than ad-hoc or disjointed initiatives; (ii) KM includes the processes of creating, storing, disseminating/sharing/transferring, and applying organisational knowledge; and (iii) KM aims to create business value by enhancing innovation, creativity

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[3] According to a KPMG survey of the top 500 organisations in the UK, France, Germany and Holland, 20% of respondents felt that *"the use of different KM technologies best suited to specific needs"* was a crucial factor in ensuring the success of KM implementation (KPMG, 2003).

and responsiveness. In this paper, we subscribe to Malhotra's definition (2000: 11): *"Knowledge management caters to the critical issues of organisational adaptation, survival, and competence in face of increasingly discontinuous environmental change. Essentially, it embodies organisational processes that seek synergistic combination of data and information-processing capacity of information technologies, and the creative and innovative capacity of human beings"*. Accordingly, we believe that a good working definition of KM should incorporate aspects of organisational culture and behaviour (i.e. knowledge sharing practices, nurturing creativity), the external environment (i.e. being able to adapt to a fast changing business environment), processes, IT/IS infrastructure, all of which must aim to enhance the organisation's competitive advantage over its rivals.

KM processes

Zdrahal et al. (2002) define the following components of technology architecture of particular relevance from a KM perspective: (a) Knowledge gathering (b) Knowledge transformation and processing (c) Knowledge sharing and use (d) Knowledge lifecycle maintenance (See Figure 1). Frappaolo and Capshaw (1999) and Zdrahal et al. (2002) argue that this kind of categorisation is useful as it facilitates an understanding of how KM technologies enable KM processes rather than as isolated technological endeavours. The diagram below adapts the European KM framework developed by Zdrahal et at. (2002) to incorporate propositions from Davenport and Prusak (1998), Wiig (1999), Tiwana (2000) and Becerra et al. (2004) to provide an overview of different viewpoints of KM processes. Looking at this diagram, organisations could identify the technological categories needed to support various knowledge processes.

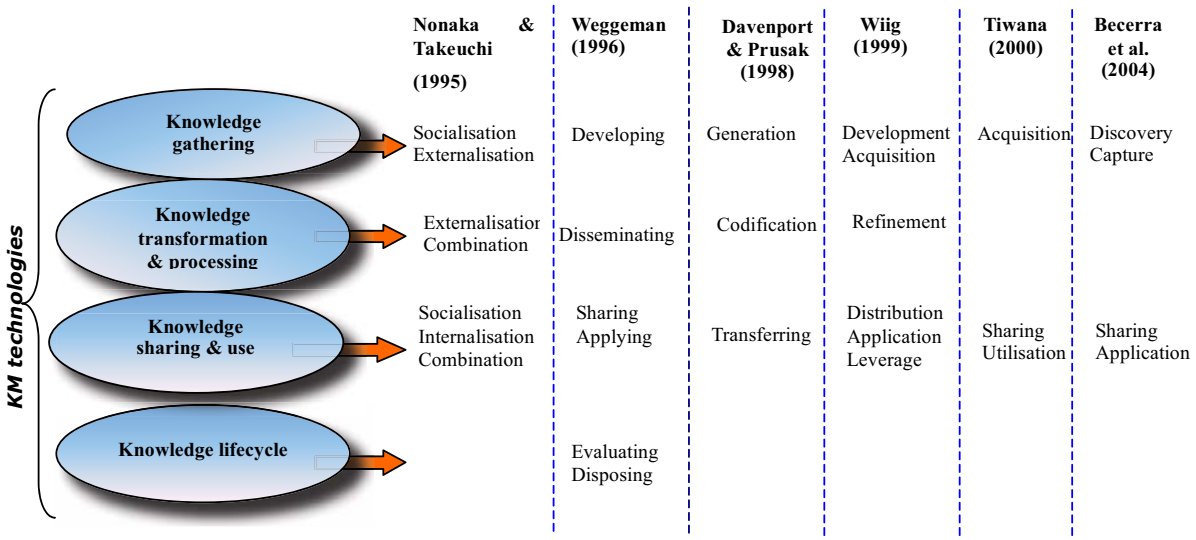

Figure 1: A comparative view of identified KM processes (Adapted from Zdrahal et at., 2002)

KM frameworks

A KM solution lies at the centre of a triangular relationship shaped by business practice, organisational behaviour and culture and technology (Frappaolo and Capshaw 1999). This implies that any investment in KM technologies must examine whether and how such a selection would impact the organisational culture, environment, job descriptions, process design, production plans and so on. However, how do we know that the selected KM technologies would fit the actual areas of expertise and competence that a business possesses? What makes us believe that such technologies would be of added-value to the organisation? Zack (1999) argues that the two gaps – *strategic gap* and *knowledge gap* –

must be aligned and must feed into each other to ensure organisational fit for KM technologies. The gap between what the organisation is doing and what it should be doing represents its strategic gap whilst a knowledge gap is the gap represented by what an organisation should know and what it does know to gain competitive advantages. Once the gaps are identified, the organisation would know 'what knowledge to manage'.

Jashapara (2005) gives some interesting insights in his integrated, interdisciplinary KM framework. For instance, he agrees that change management is critical to aligning the KM technology with the business. This also ties in with the work of Malhotra and Galletta (2004) who list it as a leading factor for acquiring software. He then emphasises that a combination of the Resource-Based View (RBV) (Wernerfelt 1984; Barney 1991) and the Knowledge-Based-View[4] (KBV) (Spender 1996b; Grant 1996; Zack 1999) of the organisation is a key to KM success. In particular, adopting the KBV 'can yield insights beyond the production-function and the RBV by creating the new view of the firm as a dynamic, evolving, quasi-autonomous system of knowledge production and application' (Spender 1996b: 59). In other words, viewing the firm as a knowledge system focuses the attention not on the allegedly given resources that the firm must use but on the 'services' (Penrose 1959: 25) rendered by a firm's resources. This means that ideally the acquisition process must consider not only hardware and software as organisational resources in a RBV sense, but also the technological capability to add value to the organisation's knowledge resources. It is essential to consider both views as this helps keep the acquisition on track in terms of strategic management. Balancing these two perspectives to refine the selection criteria would be challenging for organisations. In the same vein, Maier and Remus (2001) present a conceptual process-oriented KM framework, which extends our understanding by featuring the Market-Oriented View (MOV) of an organisation. Taking this view is useful as it provides additional dimensions related to customers and market rivals. Such a view is also considered in Weill and Broadbent's model (1998) when they examine technical opportunities, competitive threats and regulatory controls having impacts on the KM technology. We therefore believe that properly incorporating this kind of view into the KM software acquisition process would make a contribution to our understanding of the process.

Evaluating KM software

In general, the software acquisition process must present some criteria on the basis of which the candidate software package can be chosen. For example, there are many guidelines and models to assist software selection (See for example Curry and Bonner 1983; Martin and McClure 1983; Lynch 1985; Klein and Beck 1987; Anderson 1990; Montazemi et al. 1996; Burgués et al. 2002) as well as criteria for acquiring many specific types of software such as ERP, CRM, CAD/CAM, accounting, all of which form a good reference source for KM software (See for example Baki and Çakar 2005; Bernroider and Koch 2001; Verville and Hallingten 2002; Verville et al. 2005; Adhikari et al. 2004; Basili and Boehm 2001; Regner et al. 2004). The criteria that help to evaluate candidate software largely deal with technical issues (i.e. cross-module integration, compatibility, human-computer interface, customisation, reliability), organisational issues (i.e. change management, business processes, user behaviours and practice, degree of internalisation and size), and vendors (i.e. vision,

[4] The RBV has limitations since it may have too much of an internal focus on the firm (Bontis 1999). Other researchers have taken this view further by emphasising knowledge and learning as the critical resource, and thus developing the KBV as an extension. The KBV's ultimate aim is to enable the firm to effectively apply existing knowledge to create new knowledge and to take action that forms the basis for achieving competitive advantage from knowledge-based assets.

market position, maturity, user-centre approach, upgrade and maintenance policy). We now turn our attention to issues specific to KM software.

More recently, there have been some efforts focusing on the evaluation and selection of a particular KM software package. For example, Kim, Chaudhury and Rao (2002) suggest adopting Activity Theory as a foundation to develop the evaluation criteria for a particular KM software product. This theory provides a framework to view the activities of knowledge integration and application from the perspective of individual actors with specific objectives participating within a community. In particular, KM can be viewed as an activity in which each actor as a constituent of a community performs one's task by using tools or technologies. Patel and Hlupic (2002) offer a rare comprehensive study of commercial KM tools acquisition. However, although Patel and Hlupic mention KM strategy, organisational culture and business processes, they ignore the strategic and environmental factors reviewed above that are vital to the adoption of KM software. In other words, Patel and Hlupic take an overly micro level view which ignores important external factors that influence the acquisition process overall. In particular, they also ignore the literature dealing with the acquisition of complex software such as ERP, CRM or CAD/CAM for these can provide useful criteria for KM acquisition. Also missing is explicit consideration of KM software vendors and producers' viewpoints. Taking up Zack's (1999) approach, in addition to strategic and knowledge gaps, there probably exist a gap between the 'structures' (Orlikowski 1992 and 2000; DeSanctis and Poole 1994) – *a way of doing things* – embedded within a KM software product and within the implementing organisation. Bridging this gap would be beneficial for both developers/vendors and KM adopters.

After surveying many KM technology solutions available in the market, Frappaolo and Capshaw (1999) summarise that a typical KM software package should be: (i) *context sensitive*, i.e. the software should tailor knowledge requirements to the organisational context; (ii) *user sensitive*, i.e. the software should be able to extract the knowledge most useful to a specific knowledge-seeker; (iii) *flexible*, i.e. the software should produce knowledge in any form, structure and media required by the organisation/user; (iv) *suggestive*, i.e. the software should deduce from users' requirements and present relevant and useful suggestions; (v) *heuristic*, i.e. the software should be capable of constantly 'learning' from the users' behaviours.

The conceptual framework

From the above review of the relevant literature, we can conclude that the KM software acquisition process must address the following key principles:

- An awareness of change management: Those who select KM software must consider whether the selected KM software vendors put end-users (purchasing organisations) at the centre of their software design development. *Will the software require a lot of business process changes?*
- An awareness of organisational culture and behaviour: It is important to know if organisational culture and practices are thoroughly considered during software design development. Different cultures may lead to different user behaviours and practices in adopting the software. For example, KM practices in Asia in general, or Japan in particular, may not be the same as their Western counterparts. As such, technology facilitating knowledge sharing and capturing must learn the cultural differences in order to be really useful for an organisational context (see for example Nonaka and Takeuchi

1995). *Will the projected technologies be in line with the organisational culture and practices?*

- A comprehensive Knowledge-Based View (KBV): In accordance with this view, organisations should look for the *'speed and efficiency'* (Kogut and Zander 1996: 503) of the technological solution in enabling the knowledge process. Alternatively, the technology must also enable *'differential access to externally generated knowledge'*. (DeCarolis and Deeds 1999: 954).
- A comprehensive Resource-Based View (RBV): This view is drawn from both Jashapara (2005) and Maier and Remus (2001). Here, the organisation must ask if it has the necessary resources – financial, human, technical, quality – to make the KM software work within the organisational context.
- A comprehensive Market-Oriented View (MOV): This principle, drawn from Maier and Remus (2001), concerns the external market, competitive threats, customers, technical opportunities and regulatory controls. The KM acquisition criteria must address any external factors that could impact the chosen KM software.

Based on these key principles, the KM software acquisition process can be conceptualised as follows (see **figure 2**). Firstly, the organisation would analyse its business strategy and the extent to which business objectives have been met. Such an analysis would then prompt some clues to analysing any strategic gaps in the organisation. In order to close this strategic gap, an organisation may wish to enhance its capability for business innovation, creativity and responsiveness. This will then prompt the analysis of any knowledge gaps leading to a better understanding of 'what knowledge should be managed'. Here, an organisation may find it useful to develop its own definition of KM as well as to identify all KM processes within the organisation. Defining KM and identifying KM processes are important in order to help identify the boundary for KM software acquisition criteria. Alternatively, knowing 'what knowledge to manage' and the range of KM processes will help (i) specify the KM processes that are necessary to create knowledge-added values; (ii) choose the relevant technological categories in general and the required software in particular that can enable such KM processes and (iii) make the selection procedures more systematic and well-organised (i.e. the organisation can map the projected technologies against each identified process; see **figure 1**). Secondly, factors such as 'change management' and 'organisational culture' would need to be addressed within the selection criteria. Lastly, the selection process can be seen as a closed-loop (i.e. the criteria, as briefly reviewed above, are generated, assessed and refined as one moves through the loop) that is located within three layers, namely the Market-Oriented View (MOV), the Resource-Based View (RBV) and the Knowledge-Based View (KBV).

This conceptual framework offers two noteworthy advantages. On the one hand, it considers many relevant criteria for both general and KM software acquisition, and factors such as change management and organisational culture. One the other hand, the framework is arguably the first of its kind to link an analysis of strategic gaps and knowledge gaps to the KM software selection process in order to ensure alignment between the acquisition process and the business strategy. The selection process is grounded in KM processes, and therefore helps to link KM technologies with specific KM processes (i.e. the organisation can now have an overview of what technological category can enable what KM processes). Last but not least, the framework brings together MOV, RBV and KBV perspectives. This combined view is of utmost significance on the following grounds. First, because KM has to be linked to business strategy and ultimately to the creation of economic value and competitive advantage (see for example Zack 1999), considering the RBV is useful to demonstrate the

link with corporate business strategy, and especially, according to Maier and Remus (2001), to reflect the internal capabilities of the organisation. Next, though the acquisition occurs within the organisation, factors regarding the acquisition can not exclude the external environment, and hence, the MOV is needed to examine lots of variables of competitive advantages (i.e. competitors, market trends). Finally, the KBV reflects that knowledge that contributes to value creating activities can successfully be linked to the business process, and thus knowledge can be offered to an employee in a much more targeted way (Ibid). Examples of the use of our framework will be illustrated in the following two case studies. Both case organisations acquired the same type of KM software: *a Knowledge Portal*.

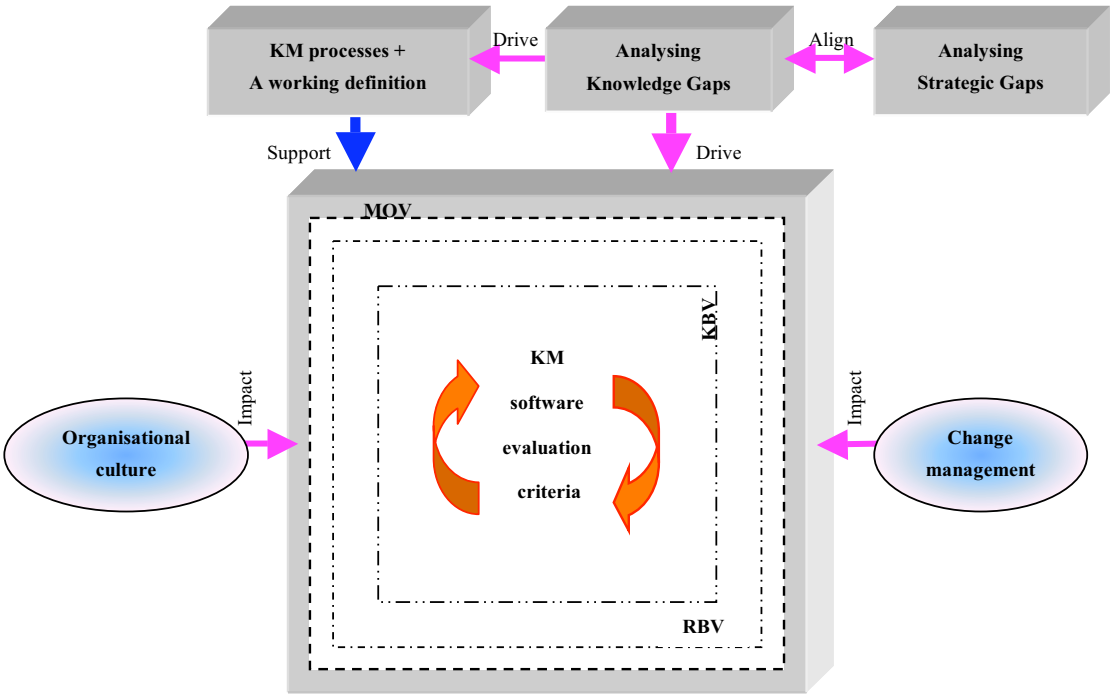

Figure 2: KM software acquisition in organisations: A conceptual framework

Case A: A biological science department of a university in Southwest London, UK

The science department in question consisted of some 400 students and 38 staff. These end-users found the need to access and extract the knowledge about their work and study from one central point. A Knowledge Portal was then selected to serve that purpose. We worked with the IT Director of the university and a research fellow of the university to explore the usefulness of our framework in the context of this department. We found that the IT department (representing the purchasing team) did analyse the knowledge gap in the department and university but not the strategic gap. When asked if they took into account the university's as well as the department's strategic visions, the IT department admitted that though they considered these issues at the beginning, they did not really align the strategic objectives stated clearly in the university's agenda with the identified knowledge gap. Interestingly, the department analysed the knowledge gap and considered the issues raised by the KBV at the very late stage of the acquisition process. Regarding the latter, the IT Director acknowledged that this was by far the most important task in the acquisition process since the department needed to know how the new technology could actually help close identified knowledge gaps. The research fellow, who was involved in the acquisition process, illustrated

that his team raised many questions over how the candidate packages could be able to address their research productivity (i.e. searching, brainstorming). The issue of change management was also seen as problematic by both the IT Director and the senior research fellow. For instance, the way people contributed and extracted knowledge from the software was not standardised and thus, can lead people in some units or laboratories to either ignore certain properties of the portal, work around them, or invent new ones that may go beyond or even contradict designers' expectations and inscriptions. The IT Director further commented, *'Generally, IT specialists like us all are aware of change management. However, in this context, change management is not only about changing certain organisational practices but also about knowledge-related activities…We are concerned that a lack of attention to handling changes of these practices may eventually result in underutilisation of the technology*'. To sum up, the IT director concluded: *'...From the university's perspective, we strongly agree that defining our own KM definition, and in particular understanding what KM processes do exist in our department would help to know what kind of KM technology would properly enable a particular KM process. Regretfully, we underestimated these practices and hope to [address these] in the near future when we purchase a Collaboration tool to support knowledge sharing activities…Initially, we just …looked into some evaluation criteria such as technical functions (i.e. integration with current systems, ease of use, consistency, reliability) and interface…but finally realised that acquiring KM software is in fact different from acquiring other kinds of software …given the fact that the technology ties itself with many non-technical and yet important factors such as knowledge sharing practices'.*

Case B: A software services firm in Singapore

This newly-established firm, located in Singapore, employed some 40 staff. The firms developed software packages for insurance and logistics sectors in Southeast Asian region. As a software maker, the firm soon realised the importance of storing as well as capturing experiences and lessons learned from all previous projects and meetings. The firm believed that such an investment would enhance its competitive advantages over many rivals in the region. This awareness prompted the need to acquire a Knowledge Portal. In this company, we interviewed the Head of Information and Knowledge Department (IKD) and a business analyst to understand how our KM framework could be applied in their context. At a glance, there were some common factors between our framework and the firm's actual practices. To start with, the IKD's Head admitted that his firm seriously considered the alignment between strategic gap and knowledge gap. He explained that such an alignment was their first priority to ensure a return on any technological investment. This firm addressed the RBV by investigating how the candidate package could match its current ERP system, and particularly CMMI (Capability Maturity Model Integration). They argued that a 'fit' with their existing systems was also critical to align strategic and knowledge gaps. Reflecting on KBV, the IKD's Head commented: *'...We simply think the values of the technology lie in its capability to … save staff's access and problem solving time and that is what we actually count…'*. The firm agreed that such views should be incorporated in the final selection and that considering RBV alone may be sufficient for its purposes. Moreover, the IKD's Head was somewhat sceptical about considering the MOV in the selection of the software, as according to him aligning the strategic gap with the knowledge gap could help address the issues posed by MOV. Yet, IKD's Head, and particularly the business analyst felt interested in finding out how MOV could be linked to factors such as their competitors and regulatory controls. As they commented, *'It is interesting to raise the MOV as it points towards issues such as our firm's external environment market. We are now thinking if this view could facilitate us to*

gain more insights into how the candidate technology can put us well ahead of our big rivals'. What was particularly interesting was the unequivocal emphasis on organisational culture, *'...For a long time, even before acquiring the portal, we have seen the cultural factor as something vital…more than any kind of software we have been using'*. This is quite understandable since his firm employed staff from different countries (i.e. India, Japan, Britain, US, China, Indonesia, etc.) and they often had different ways of sharing and contributing their knowledge to the firm's knowledge portal. For example, according to the business analyst, the firm had a number of Communities of Practice (CoPs), each of which had its own specific themes and ways to exchange and generate ideas. A thorough understanding of the current CoPs as well as aligning them to the portal was seen as essential to ensuring the effectiveness and the 'flow' of knowledge intensive tasks. The firm also questioned the context (i.e. national and industry differences) in which the software was designed and developed; they argued that such contextual differences may result in some assumptions that are inappropriate for their own organisational context. Hence: *'...Evaluating the designed features as well as the context embedded by the software vendor to know which package really matches our cultural practices is very challenging and yet interesting…We spent about 40 percent of the total time and effort for the whole process to examine this factor..',* acknowledged the IKD's Head.

Based on our KM software acquisition framework and the two brief cases described above, we suggest a number of activities that can enhance the KM software acquisition process in organisations:

- Analysing the organisation's strategic gap
- Analysing and understanding the organisation's knowledge gap based on the understanding of the organisation's strategic gap
- Defining KM and KM processes with the aim of addressing the knowledge gap
- Knowing what (candidate) KM technologies to enable the identified KM processes within the organisation
- Conducting an evaluation of candidate KM technologies. This evaluation should embrace the MOV, RBV and KBV perspectives. Organisations may define which view is applicable to their particular context and condition.
- Paying particular attention to change management (with an emphasis on knowledge-related activities) and organisational culture (with an emphasis on organisation's existing CoPs or knowledge sharing culture)

Conclusion & suggestion for future research

In summary, the growing interest in KM has prompted academics to explore many facets of the subject. One aspect that has not attracted a lot of attention is that of the KM software acquisition process. This paper explored how KM technology can fit into a broader KM context within the organisation, and the factors and conditions that can impact the software acquisition process. Such an understanding could facilitate the KM software acquisition process within the organisation and also help reduce the risk and uncertainty associated with the process. In particular, the framework may be used as a tool to explore the appropriateness of a particular KM technology to an organisation by analysing that solution against the factors and conditions depicted in the framework.

The two cases described here show that the conceptual framework may be applicable in real business situations. What was particularly interesting was the way practitioners viewed and conducted the KM software acquisition process, and this has provided us with some valuable reflections on our framework. Business practitioners revealed much interest in

understanding cultural issues, and in particular the contextual differences (i.e. the context assumed by software developers and by the implementing organisation). In our future research, we propose to examine the relationship between the chosen KM software and each of those factors and conditions depicted in the conceptual framework to see how the relationship may contribute to the success of the adoption. Empirical examination of the factors identified in our conceptual framework could also lead to a better understanding of the critical success factors of KM initiatives. We would also like to conduct more detailed case studies in a variety of business sectors to further explore the usefulness of our KM software acquisition framework.

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