

# Perspectives On Knowledge Management

## A Socio-Technical View

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### ABSTRACT

The current literature on knowledge management (KM) presents KM as a broad field that encompasses many perspectives. This paper reviews these perspectives with the aim of offering a socio-technical view. KM has emerged with strong links to the multidisciplinary field of information systems (IS) where technology has been seen as a relevant enabler of change within organisations. Yet these organisational changes have also been emergent in the practices of people according to the social setting in which they are embedded. The process of knowledge will be reviewed as well as its enhancement through Knowledge Management Systems (KMS) and how this technology needs to be integrated into an existing organisational context for people to use it effectively. The resource-based view and practice-based view are considered to form a socio-technical view in order to analyse the complexity of KM and why people may share or retain their knowledge. A framework is also proposed to present the literature reviewed from a socio-technical perspective. For further studies, this paper aims to facilitate research into how organisations can encourage knowledge processes through the right incentives and effective technology.

### INTRODUCTION

The knowledge society has emerged from a societal transformation whereby highly-skilled specialised workers have surfaced as those who add value (Drucker 1968) to organisations and the economy as a whole. This trend has also been identified as “The Weightless Economy” (Quah 1999) where value increasingly lies in intangible assets such as Intellectual Property Rights, software and leveraging organisational knowledge. Knowledge emerges from data which is contextualised into information which is then processed by individuals and framed around their own perceptions, values and experiences (Grover and Davenport 2001). Knowledge exists as tacit and explicit whereby tacit knowledge is rooted in action and experience making it difficult to codify and explicit knowledge can be explained and communicated easily making it simpler to codify (Nonaka 1994).

With the increasing development and use of Information Technology (IT), organisations have invested in creating repositories for the abundant data and

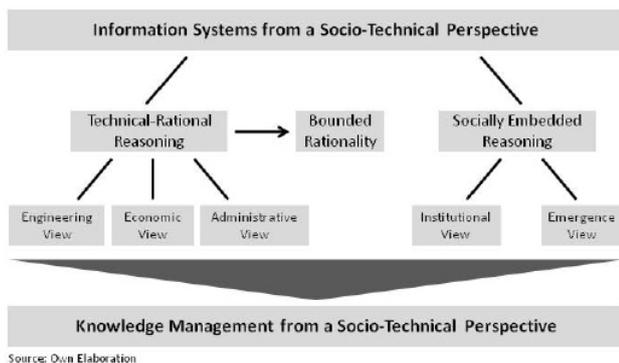
information they produce (Davenport et al 1998) in order to foster knowledge as a competitive advantage. Thus in order to expeditiously adapt to a constantly changing global business environment (Stark 2000) the process of knowledge creation, storage/retrieval, transfer and application needs to be managed (Alavi and Leidner 2001). Organisations have therefore adopted KMS in order to facilitate, conceptualise and integrate knowledge into organisational processes and learning (Alavi and Leidner 1999, Böhmman and Krmar 2002, Goel et al 2009). Hence, the field of KM can be viewed from a socio-technical perspective where the development of KMS facilitates the management of knowledge (Bhatt 2001).

This paper is presented as follows; firstly, the reasonings that help explain information systems from a socio-technical perspective are presented followed by an analysis of these reasonings around the existing literature on KM. A framework is then proposed which presents the resource-based view and practice-based view of KM as part of the socio-technical perspective. Finally, the concluding points of this paper consider the complexity of managing knowledge and therefore explain how a socio-technical perspective encompasses existing literature and facilitates understanding of the topic for further research.

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**INFORMATION SYSTEMS AS A SOCIO-TECHNICAL FIELD**

A multidisciplinary field such as information systems (IS) can be structured around both technical-rational reasoning and socially embedded reasoning to form a socio-technical perspective as illustrated in Figure 1 below. Within the technical-rational, IS can be viewed from three rationalities which are engineering, economic and administrative. However, in practice, the application of these rationalities shows that they are bounded due to the complexity of embedding IS in the existing context of an organisation. The bounded rationality is therefore a pragmatic adaption of the technical-rational reasoning with the aim of providing explanations, when observed behaviour of individuals and organisations seems irrational, regarding rational theories. The socially embedded reasoning addresses how people perceive and accept IT innovations and thus considers broader social contexts that influence IS implementation in organisations. This reasoning can be divided into the institutional and emergence perspectives where different structures can be viewed as institutions that affect IS development (Meyer and Rowan 1991; Swanson and Ramiller 1997) and emergence explains how organisational change is grounded in the ongoing practices of actors within an organisation (Orlikowski 1996).



**Figure 1: Information Systems from a Socio-Technical Perspective**

By applying the above IS reasoning to KM, the following literature review aims to view KM from a socio-technical perspective by considering the resource-based view and practice-based view as part of this socio-technical perspective.

**SOCIO-TECHNICAL ASPECTS OF KNOWLEDGE MANAGEMENT**

**The process of leveraging knowledge**

The literature on KM offers many steps to explain the process of leveraging knowledge. Overall the main steps can be seen as knowledge creation, codification, storage, retrieval and application (Alavi and Leidner 2001, Grover and Davenport 2001). Rehäuser and Krcmar (1996) suggest a similar process but propose KM as a lifecycle that requires harnessing, adjusting and delivering the information resources depending on its usage. In contrast to scholars such as Brown and Duguid (1991) and Alavi and Leidner (1999), Rehäuser and Krcmar (1996) consider information equivalent to explicit knowledge. They conclude that KM can enhance the management of explicit knowledge but only create tacit knowledge to a very limited extent.

**Knowledge Management Systems**

In a descriptive study of 50 organisations with emerging or operating KMS, Alavi and Leidner (1999) describe emerging issues and practices of KMS. Their analysis from a technical perspective results in specifying the characteristics, concerns and capabilities needed to implement KMS. They suggest that KMS involve not only a solid technological base, but also require effective alignment of cultural and managerial elements to successfully manage and leverage knowledge as a source of competitive advantage. Therefore KM can be seen from a socio-technical perspective since from a technical-rational view, KMS is engineered to leverage the knowledge process but requires alignment with organisational culture in order to integrate these systems into the daily routine of the organisation. Thus, the implementation of KMS is bounded by the complexity of the social settings in which it emerges (Alavi et al. 2006). From a technical-rational view, KMS aim to facilitate the capturing and sharing of knowledge (Alavi and Leidner 1999). On the contrary, Brown and Duguid (1991) emphasise that the existence of such systems does not guarantee effective integration and circulation of knowledge. However, Alavi and Leidner (1999) do state that at the time, the concept was relatively new and thus did not provide enough ground for research into the potential benefits of KMS.

Bhatt (2001) also emphasises a socio-technical perspective on KM because its effectiveness is dependent on the coordination of social relations and technology. This is because IT can be used as an enabler to turn data into information yet it is only through people that this stored information can be retrieved

and interpreted as knowledge (Bhatt 2001). This again shows KMS as a bounded rationality as its implementation relies on a change in organisational culture that embeds the use of such systems into daily organisational routines. Therefore in terms of the socially embedded reasoning, KMS development has to be emergent as knowledge is an invisible resource created in the human mind (Davenport et al 1998) and only the right organisational culture can encourage people to use KMS to share their knowledge. This is because people contribute when they are structurally embedded in a network (Wasko and Faraj 2005). Davenport et al (1998) also take a socio-technical perspective as their study shows that successful KM projects are dependent on the alignment of technical and organisational infrastructure.

An example of the need to align KM projects with information systems has been prevalent in the case of consultancy companies where the role of technology varies according to whether firms choose a codification or personalisation strategy (Hansen et al 1999). Companies that chose a codification strategy to manage their knowledge invest heavily in IT in order to store codified knowledge (Grover and Davenport 2001) to reuse it to offer fast solutions. On the contrary, personalisation firms invested moderately in IT with the intention of facilitating the exchange of tacit knowledge in order to provide creative and unique expertise (Hansen et al 1999). Both the codification and personalisation strategies are embedded in organisational culture as they are consistent with their respective economic models as well as their IT and human resources (Hansen et al 1999).

### Organisational Culture

Considering the socially embedded reasoning, organisational culture can be seen as an institution that has its own values and rules that enhances the development of KMS according to its own context (Becerra-Fernandez and Sabherwal 2001). Studies show that certain organisational settings increase the effectiveness of KM. In their paper, Chen and Huang (2007) present their research on how organisational climate and structure enhance the effectiveness of KM. Viewed as an institution, organisational culture that fosters social interactions has values that are less formalised alongside a decentralised structure where a cooperative climate encourages people to communicate and share knowledge (Chen and Huang 2007). Davenport et al (1998) also consider organisational culture as an institution where its values and rules are based on flexible structures that have an orientation towards nurturing KM projects. Thus knowledge can be considered an important organisational resource that requires leveraging through information systems that are integrated

with organisational culture and social settings (Alavi and Leidner 2001).

### RESOURCE-BASED AND PRACTICE-BASED VIEWS OF KNOWLEDGE MANAGEMENT

This paper emphasises the socio-technical perspective of KM. The framework proposed in Figure 2 below categorises the remaining reviewed literature into the resource-based and practice-based view of KM where both views form a socio-technical perspective of KM. This section discusses the use of these prevalent views within the IS literature and their applicability in the field of KM.

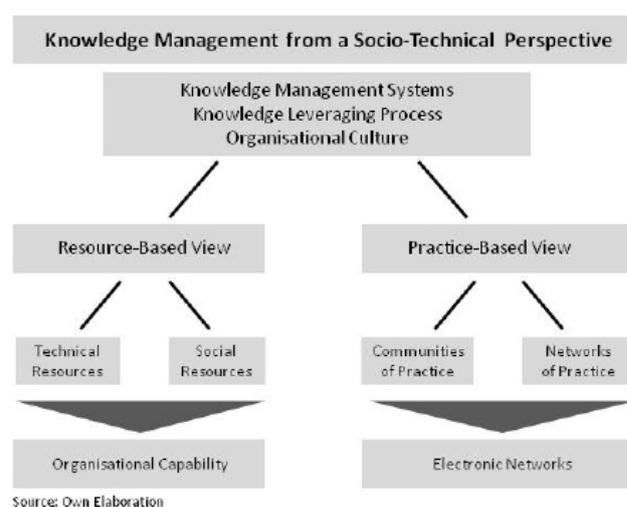


Figure 2: Knowledge Management from a Socio-Technical Perspective

#### Resource-Based view

The resource-based view stems from the technical-rational reasoning in focusing on how resources and their combination within a firm can lead to a competitive advantage (Mahoney et al 1992). The entire literature on KM considers knowledge a valuable resource that requires fostering since it represents intellectual assets (Grover and Davenport 2001), operational routines and creative processes (Grant 1996). The view postulates knowledge and the ability of its effective treatment as a long-term resource to create a competitive advantage (Grover and Davenport 2001, Alavi and Leidner 2001, Rehäuser and Krcmar 1996). According to the resource-based view, many authors such as Grant (1996), Alavi and Leidner (2001) and Brown and Duguid (1998) assume that knowledge-based resources are rare and difficult to imitate making them valuable intangible assets that can enhance sustained competitive advantage. This

assumption draws upon a combination of the economic and the administrative rationalities within technical-rational reasoning. In terms of economic rationality, evaluation of the value of intangible resources such as knowledge is required to assess productivity and financial gains from KMS. Administratively, knowledge-based resources need to be organised and aligned for effective management supported by a relevant IT infrastructure. KMS as a repository for knowledge to store and retrieve it are generally enabled through IT, adding an engineering aspect to the resource-based view of KM.

However, much of the literature on KM considers the technical-rational aspects of the resource-based view as bounded due to the subjective nature of knowledge (Grover and Davenport 2001) and its inherent complexity of existing invisibly in the mind (Davenport 1998). Consequently, there is no clear measure of the productivity or quality of knowledge work (Davenport 2004). This particularly refers to tacit knowledge as it is not documented or is difficult to codify (Nonaka 1994, Brown and Duguid 1998) and put into KMS. As a result, knowledge as an intangible resource is bounded in reasoning since there is no standardised way of measuring its financial value. Due to this uncertainty of giving knowledge capital a value, current accounting systems are unable to incorporate intangible assets in their balance sheet (Grover and Davenport 2001). The increasing value placed on knowledge by organisations suggests that it is in the interest of individuals to sometimes retain their knowledge. This creates further measurement difficulties as knowledge may exist, but may not have been leveraged as a resource if people are unwilling to share their experiences. Knowledge exchanges can come in many forms such as money, respect, promotion or other knowledge (Grover and Davenport 2001). Based upon the idea of these exchanges and tangible and intangible resources, Grover and Davenport (2001) describe organisations as a marketplace for dynamic knowledge exchanges. Organisational buyers search for knowledge either to solve an issue or to realise knowledge into a valuable product. Sellers with tacit knowledge link the organisational marketplace to the traditional theory of efficiency of markets which offers concrete problems of the knowledge market, as information asymmetry, and how they could be resolved by, for example, IS (Cordella 2006). The market perspective assumes that a greater liquidity of the flow of knowledge enhances a firm's efficiency. From this viewpoint, KM can be described as "the problem of creating an effective and efficient knowledge marketplace in the organisation" (Grover and Davenport 2001, pp. 15) and thereby trying to cope with the measurement issues of knowledge.

Other than measurement uncertainty, another aspect

that makes the resource-based view of knowledge bounded is that although knowledge is an intangible resource, what makes it valuable to an organisation is how it leveraged alongside effective management practices that allow an organisational capability to emerge (Chuang 2004). An empirical study by Chuang (2004) examines the link between KM capability and competitive advantage in 540 manufacturing firms. The paper can be viewed from a socio-technical perspective as it differentiates knowledge-based assets as either technical KM resources or social KM resources. The results of the study showed that there is a strong positive correlation between social KM resources and competitive advantage where organisational culture had a significant influence. However, the findings for technical KM resources were inconsistent (Chuang 2004). This may be attributed to the fact that methodologically, only a relatively homogenous sample of large manufacturing firms were chosen for the study as opposed to knowledge-based firms that have implemented systems that enable knowledge processes such as software or automotive companies.

Chuang (2004) does identify that despite investing heavily in IT, not all firms are able to combine this asset with other resources to form organisational capabilities. This shows that within the technical-rational reasoning, the engineering rationality is bounded as technical resources need to be combined with social resources to facilitate the emergence of potential organisational capabilities as shown in Figure 2.

### Practice-Based view

The practice-based view of organisational knowledge focuses on the role of human action within organisations, given the assumption that tacit knowledge is basis of all knowledge (Orlikowski 2002). This means that tacit knowledge is only constituted through action and therefore inseparable from explicit knowledge (Brown and Duguid 1998, Orlikowski 2002).

Brown and Duguid (1998) as well as Orlikowski (2002) share a similar practice-based perspective on KM. In terms of types of knowledge, Brown and Duguid (1998) present the distinction between tacit and explicit knowledge stating that tacit knowledge, which is "know-how", is the ability to put the explicit knowledge, "know-what", into practice. Orlikowski (2002) takes this view into consideration and puts forward a perspective on knowing in practice stating that knowing is what people put into action. Therefore tacit knowledge is a form of knowing and is inseparable from action since it is generated through this particular action (Orlikowski 2002). In contrast to Orlikowski, Brown and Duguid (1998)

focus more on the idea of knowledge, in particular, tacit knowledge, being held collectively in communities of practice. These are groups of people that come together informally due to a common work purpose and form a social network of cultivating and sharing knowledge (Wenger 1998) where members are bound together by a sense of joint enterprise and a developed understanding of the community (Wenger 2000). Yet know-how can 'stick' if it is too embedded in the actions of a community and can therefore be difficult to move across communities (Brown and Duguid 1998). Thus cross-community knowledge transfer needs to be fostered so that communities remain effective and open to new ideas (Wenger 2000). This boundary spanning can take place through activities such as translating, knowledge brokering and boundary objects (Brown and Duguid 1998).

Orlikowski (2002) agrees that boundary spanning could prevent knowledge from getting 'stuck' in particular communities. However, stickiness applies less to know-how because it is embedded in practice and cannot get 'stuck' since it is constituted in actions (Orlikowski 2002). Consequently, know-how is not a discrete object that can be moved from one community to another. It can be shared to enable others to learn how to embed the know-how into their practice and "develop the ability to enact" (Orlikowski 2002 pg. 271). In terms of development and implementation of KMS, the socially embedded reasoning proposes that IS changes within an organisation are grounded in the ongoing practices of people and emerge from the way in which people use these practices in their everyday routine (Orlikowski 2000).

Like Orlikowski (2002), Levina and Vaast (2005) extend the practice-based view of KM by presenting a case study on two professional services firms where boundary spanning has emerged as an organisational competence through being embedded in the practice of organisational members. Organisational culture as an institution also enhances boundary spanning as it encourages individuals to share their knowledge. This collaboration has increasingly been fostered through IT artefacts which have been viewed as boundary objects that can be emergently implemented and integrated as boundary objects-in-use in order to prevent possible resistance (Levina and Vaast 2005).

The development of such IT infrastructures has mediated greater communication which has led to the expansion of networks of practice which, in contrast to communities of practice, consist of weaker ties where geographically distributed people that engage in a shared practice with a common willingness to collaborate (Brown and Duguid 2001). Thus,

knowledge-based resources can be acquired across organisations. This has particularly been the case with an increasing move towards open innovation whereby competing firms support knowledge exchange amongst individuals (Chesbrough 2003).

With the availability of IT, electronic networks have emerged as structures that "make it possible to share information quickly, globally, and with large numbers of individuals" (Wasko and Faraj 2005 pp.36). Within the technical-rational reasoning, the engineering rationality supports how electronic networks of practice have developed. However, this rationality is bounded since communicating tacit knowledge requires complex interactions that are difficult to sustain through IT (Nonaka 1994). This highlights the socio-technical aspects of KM as, in reality, organisations struggle to turn electronic networks into active discussion forums (Orlikowski 1996) due to the lack of personal relationship and the issue of free-riding (Wasko and Faraj 2005). The challenge remains to cope with social complexity of networks of practice based on their different actors with different needs and goals. In relation to the organisational culture, actors need to be embedded into the networks, to be incentivised to share their knowledge.

## CONCLUSION

By taking all the reviewed literature into account, it can be concluded that KM can, to a large extent, be viewed from a socio-technical perspective. In terms of developing and implementing KMS, technology can be seen as an enabler for change but the effective usage of these systems and the main cause of change lies deeper within an organisation and relies on the willingness to share knowledge that emerges amongst members within and across organisations. Therefore the success of an organisation depends on its ability to design itself as a social learning system (Wenger 2000) through social networks that are supported by the alignment of a strong and embedded IT infrastructure and a flexible organisational culture. KM and more specifically KMS, are still evolving concepts (Davenport et al 1998) making them hard to measure in terms of success. Additionally, knowledge is an intangible resource embedded in practice resulting in further difficulties of measuring its financial value. Overall, managing knowledge is a challenge itself as the inherent subjectivity of knowledge and its nature of existing invisibly in the minds of individuals results in the extent to which knowledge can be managed being uncertain.

Although the literature proposes many different views on KM, a socio-technical perspective considers the technical-rational aspects in creating KMS as well

as explaining how these developments are bounded in complexity and how they are emergent in a socially embedded context. The proposed framework of this paper emphasises the socio-technical characteristics of knowledge as a process, with its systems and the importance of organisational culture. The framework categorises the literature by either viewing knowledge as a resource or as embedded within the practices of communities and networks.

For further research, the socio-technical aspects of KM can be considered in order to assess the extent to which an organisation is successful in managing knowledge, in particular, with the use of technology. A socio-technical view will facilitate identifying why KM systems may or may not be effective by considering the complexity of transferring tacit knowledge, the need for incentives for individuals to leverage the knowledge process, an organisational culture that enhances learning and technology that supports electronic networks.

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