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# The Role of Organizational Climate in the Use of Knowledge Management Systems to Support Problem Solving

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## ABSTRACT

Organizations invest heavily in knowledge management systems (KMS) to improve integration of knowledge across different contexts, to foster new insights and produce innovation. Yet many initiatives fail. This research investigates how knowledge workers' innovativeness and knowledge reuse are affected by different aspects of perceived support for innovation and the KMS they use to support their everyday work. A model is proposed that describes causal connections between KMS characteristics, perceived usefulness, use, perceived support for innovation, and innovativeness and knowledge reuse as performance outcomes. This research will also help practitioners improve individuals' innovativeness and knowledge reuse by matching KMS functionality and organizational context, and enable researchers to develop more powerful models of creativity, knowledge, and innovation.

## KEYWORDS

Organizational climate, KMS characteristics, KMS use, individuals' innovativeness, individuals' knowledge reuse

## INTRODUCTION

Technical support work "takes the form of advice to users on changes to the product and /or how it is used for maximum benefit" (Das, 2003) (p.416). As technical support costs rise, firms are increasingly interested in developing systems that facilitate the work of support professionals. Expert or rule-based systems are of limited value because the knowledge domain is updated frequently (Davenport and Klahr, 1998). In contrast, KMS focusing on capturing and disseminating emerging knowledge can enhance organizational performance (von Krogh et al., 2000) by increasing employees' exposure to knowledge from different problem contexts (Zack, 1999).

However, KMS deployment is a complex organizational change (Gallivan et al., 2003) requiring both a fit with the organization and a significant change in employees' behavior (Repenning, 2002). Fit is needed between KM practices, such as KMS, and organizational culture, norms, processes, and incentive systems. The complexity of the interaction between the KMS and the organization can lead to the failure of KMS initiatives (Gallivan et al., 2003).

While most firms need to *exploit* rules and procedures, they also need to *explore* new problem-solving methods. March (1991) and others describe tension between these two essential practices which compete for the same resources. The context of technical support is interesting because it is important not only to reuse (exploit) previous solutions (for efficiency) but also to innovate (explore) when previous solutions are absent or only parts of those previous solutions might apply to new problems. It is not clear how these processes are affected by KMS and/or an organization's climate (OC).

This research will examine the role that OC plays in the relationships which link key KMS features and the system's impact on technical support professionals' innovativeness and knowledge reuse. Because innovation is one of the major goals of KM initiatives (Ernst and Young, 2000) and KMS implementation represents a complex innovation process in organizations (Gallivan et al., 2003), the proposed model considers the implications of perceived organizational support for innovation (POSI).

## THEORETICAL MODEL

Even in successful KMS initiatives, there is significant variation in individuals' adoption level (Gray, 2002). Individual behavior is key – constant updating is needed (Zack, 1999) and knowledge must be retrieved and applied if the system is to impact the performance of technical support. Individual adoption of a KMS links the features of the system, the organizational context, and the system's impact on performance. The following discussion proposes a theoretical model of two key factors influencing the level of individual adoption of KMS in the context of technical support: (1) the characteristics of the KMS, and (2) the organizational environment.

### Knowledge Management Systems

The literature recognizes two main types of KMS: (1) *document (knowledge) repositories*, and (2) *communication support systems* (email or online discussions). Due to their prominence in technical support, this work focuses on knowledge repositories. These KMS can be characterized in terms of two dimensions: (1) content, and (2) technical characteristics.

#### *KMS Content*

Almeida, et al. (2003) argue “[although a firm’s] research efforts play an important role in innovation, firms must turn to external sources of knowledge to maintain their innovative processes.” (p.375). Therefore external knowledge directly related to business objectives affects KMS quality and is necessary to support a firm’s KM efforts. However, KMS must be constantly updated with users’ knowledge to prevent it from becoming stale and useless (Zack, 1999). If users are permitted to enter new knowledge, a wide range of ideas can emerge. These new insights are not always of consistent quality, perhaps because of a wide variation in expertise of the people entering them. Therefore, when examining the content of a KMS, credibility of the source and argument quality need to be assessed (Sussman and Siegal, 2003).

#### *KMS Characteristics*

Recently, Markus et al. (2002) described a theory for KMS design intended to support emerging knowledge processes (EKPs), proposing several dimensions that designers should keep in mind when building these systems. The theory represents a key contribution since it provides research-inspired advice that can be applied to KMS design. In their work, Markus and colleagues argue that four dimensions describe a high quality KMS: (1) easy for naïve users; (2) supports offline action; (3) allows the integration of local knowledge into the KMS; and (4) supports implicit guidance through dialectical development processes.

The work of technical support analysts does not represent EKPs. However, Markus et al. inquire: “...can these [principles] also be employed in the case of other knowledge work processes (e.g., semi-structured decision making)?” (p.208). As Das (2003) argues, technical support represents nonroutine work where response time is critical. Therefore, we can argue that technical support represents semi-structured decision-making and principles derived by Markus and colleagues can serve as a base for the empirical model described later. The desirable characteristics of a KMS as used in this research are described in Table 1.

<b>Dimension</b>	<b>Definition</b>
<i>Support for online action</i>	The perception that the KMS provides advice on what steps to take to resolve the work problem.
<i>Support for offline action</i>	The perception that the KMS provides help in showing which entries are the most useful to resolve the work problem.
<i>Support for local knowledge sharing</i>	The perception that the KMS allows to input solutions to the system.
<i>Implicit guidance</i>	The perception that the KMS helps in <i>understanding</i> work problems.

**Table 1 Characteristics of KMS (adapted from Markus et al., 2002)**

#### *KMS adoption model*

Because KMS represents technology individuals use to support their work, existing theories of adoption can be used to describe the process of individual acceptance of this novel technology. According to TRA (Fishbein and Ajzen, 1975) and TAM (Davis, 1989), individuals' acceptance of technology is “based on their beliefs about the consequences of the adoption

and their evaluation of these consequences (p.49)” (Sussman and Siegal, 2003). The better the KMS (content and characteristics) the more likely individuals will perceive the system as useful. Moreover, based on TAM, perceived usefulness is expected to affect adoption behavior. Hence, if a KMS is perceived as useful it is more likely to be used (i.e., adopted). This leads to the following propositions:

*P<sub>1</sub>: Perceived quality of content of a KMS positively affects the perceived usefulness of a KMS.*

*P<sub>2</sub>: The presence of integrated support for knowledge sharing and knowledge use is positively associated with perceived usefulness of a KMS.*

*P<sub>3</sub>: Perceived usefulness of a KMS positively affects use of a KMS.*

As developers embark on the process of creating a KMS, one assumption is that the better the system, the better the outcomes (DeLone and McLean, 2003). If a KMS of good quality (content and characteristics) is implemented to support innovativeness and knowledge reuse, an individual who uses the system should perform better in terms of innovativeness and knowledge reuse than an individual who does not. The discussion presented in this paragraph is summarized in the following propositions:

*P<sub>4A</sub>: The use of a KMS positively affects individuals' innovativeness.*

*P<sub>4B</sub>: The use of a KMS positively affects individuals' knowledge reuse.*

It would be somewhat tempting to believe that KMS have only positive impact on KM in an organization, and indeed organizations are encouraged to develop better technology to support them (e.g., Offsey, 1997). However recently, there have been reports indicating that KMS initiatives often fail (Gallivan et al., 2003), suggesting that other organizational factors (see the next section) moderate the relationship between a KMS and individuals' innovativeness and knowledge reuse.

### **Organizational Environment for KM**

Individuals rely on their work environment to support their everyday tasks. This environment needs to be supportive of innovation if the organization is to benefit from KM (Fahey and Prusak, 1998). Organizational climate (OC) is a set of measurable properties specific to an organization and perceived by individuals who work in this environment (Siegel and Kaemmerer, 1978). Prior studies have found that organizations must pay particular attention to the climate they provide to support innovation because of its strong effects on individual behavior (e.g., Amabile et al., 1996).

Organizational and psychological processes are influenced by climate. These processes affect the overall productivity and well-being of an organization (Isaksen and Lauer, 2002). Different individuals can perceive these processes differently and it is the perception that affects their eventual behavior (Moore and Benbasat, 1991). Therefore, the focus of this study is on individuals' perception of organizational support for innovation (POSI) that influences their motivation and behavior (Siegel and Kaemmerer, 1978).

In Amabile's view (1996, Amabile, 1998), management has to take action to foster innovation by allocating resources that would support creativity and implementation of innovative ideas. In this theory there are specific conditions that can inhibit and encourage creativity at both the individual and organizational levels. The model of creativity uses three interlocking circles to represent each of the three components of creativity, namely, domain-relevant skills (expertise), creativity-relevant processes (originality), and intrinsic task motivation (Amabile, 1998). When these three essential components of business creativity coincide, the highest individual creativity is achieved, leading to the highest level of innovation for the organization.

Amabile et al. (1996) reasoned that while all three components of business creativity can be managed, originality and expertise are more difficult to influence than motivation. Intrinsic motivation, on the other hand, can be increased considerably by even subtle changes in an organization's environment. Amabile found that organizations that foster business creativity have the following characteristics: considerable freedom in deciding what to do and how to do it, good project management, sufficient resources, encouragement, an atmosphere of cooperation and collaboration, ample recognition, sufficient time for creative thinking, a sense of challenge, and internally generated pressure to accomplish important goals.

To summarize, organizations supportive of innovation will tend to promote freedom, challenge, encouragement, collaboration, recognition, and provide sufficient time to arrive at solutions. Innovativeness and knowledge reuse are both essential for an organization to be competitive, and a firm needs to maintain an appropriate balance between the two (March, 1991). If a firm creates a supportive climate, employees will be encouraged to experiment and take risks, increasing their innovativeness. On the other hand, in an organizational climate that does not support innovativeness, old-fashioned, “proven” procedures are safe, and therefore knowledge reuse will be more frequent than innovativeness, and vice versa. A key issue is the tension described by March (1991), emphasizing that innovativeness and knowledge reuse compete for the same scarce resources.

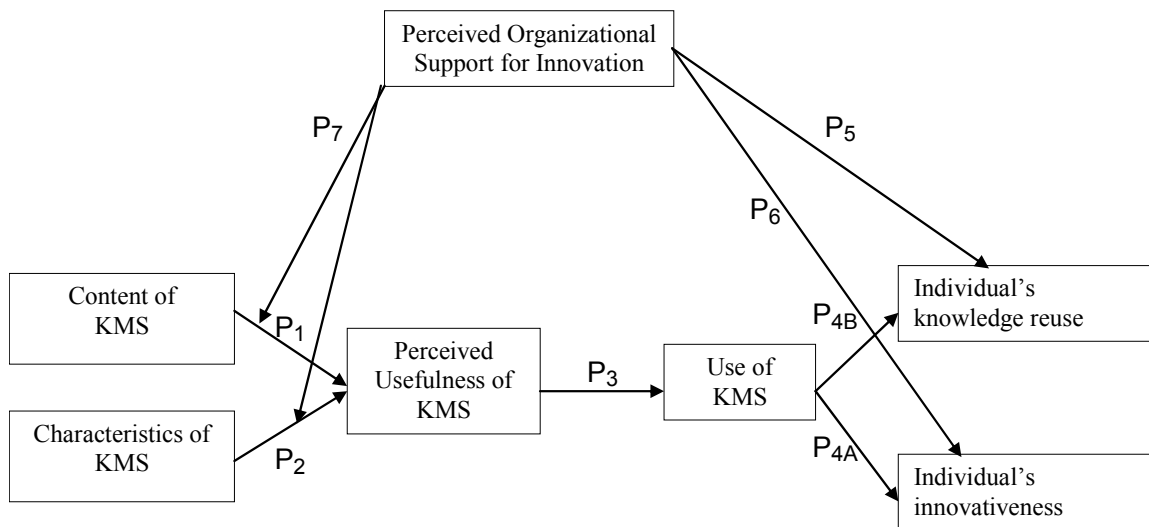
*P<sub>5</sub>: High POSI positively affects individuals’ innovativeness.*

*P<sub>6</sub>: Low POSI positively affects individuals’ knowledge reuse.*

KMS do not represent systems that should be developed in isolation, but rather these systems need to be augmented for greater organizational support (Soo et al., 2002). If two organizations, one with high POSI and other with low POSI, implement a high quality KMS, the employees in the organizations with high POSI would perceive this system as a useful tool supporting their everyday work. However, the employees in the organization with low POSI (e.g. no support for collaboration and no visible benefits from sharing knowledge) would perceive such a KMS as an additional threat. Employees may perceive that the system is going to eventually replace them if they supply their knowledge to the system (Davenport and Klahr, 1998) and therefore their performance will be negatively affected.

*P<sub>7</sub>: POSI moderates the relationship between the quality and perceived usefulness of KMS*

The proposed theoretical model (Figure 1), and six propositions, emphasize at the individual level of analysis the role that an organization must play in supporting innovation in general and asserts that the higher the level of POSI the better the expected individuals’ innovativeness and knowledge reuse when using a KMS.



**Figure 1 Proposed Theoretical Model**

## PROPOSED METHODOLOGY AND ANALYSIS

A survey instrument will be used to collect data. The unit of analysis is an individual working as a help-desk analyst and using a KMS to support his/her work. To better understand the theoretical model shown on Figure 1, two empirical models will be tested: (1) Model I focuses on the perceived usefulness of KMS and its antecedents. Two characteristics of POSI, namely innovation and pressure, are considered as moderating variables; and (2) Model II focuses on user's innovativeness and knowledge reuse. These two dependent variables are studied with respect to perceived usefulness of KMS, use of KMS and two characteristics of POSI, namely innovation and pressure.

## SUMMARY AND CONCLUSION

Companies are recognizing the importance of KM. Simply having the ability to collect and process knowledge will not necessarily improve KM in a firm (McDermott, 1999). Rather, the success of KM lies in the integration of individuals and IT (Sharp, 2003). Also, "it is important for support knowledge managers to emphasize that technologies and the knowledge bases they contain are meant to augment human knowledge, not to replace it (p.206)" (Davenport and Klahr, 1998). This research will help practitioners improve individuals' innovativeness and knowledge reuse by matching KMS functionality and organizational context, which in turn will enable researchers to develop more powerful models of KMS adoption and use.

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