Supporting Decisional Episodes

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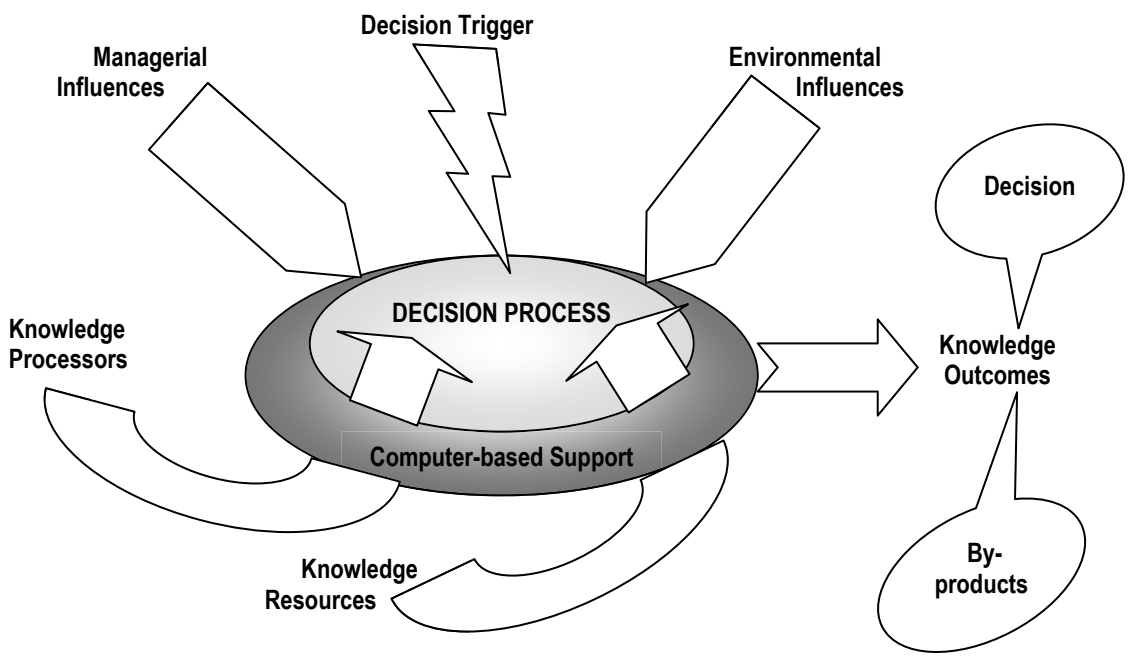
INTRODUCTION

This article develops the notion of decisional episodes as a basis for understanding ways in which decisions can be supported. Grounded in and aligned with knowledge management (KM) theory, the resultant perspective on decision support can guide researchers in the generation of research ideas and designs. It can also contribute to practitioners by suggesting architectures and functionalities to consider in the course of developing decision support systems, and by suggesting key issues to resolve in the course of deploying and evaluating a portfolio of decision support systems.

Broadly speaking, knowledge management is concerned with efforts to ensure that the right knowledge is available to the right processors at the right time in the right representations for the right cost in order to foster right relationships, decisions, and actions with respect to an entity's mission. These efforts unfold in various contexts such as designing, communicating, researching, and decision making. Our focus here is on the latter.

As illustrated in Figure 1, a decisional episode is defined in terms of the following parameters: a decision trigger; a set of knowledge resources relevant to producing a decision; a set of knowledge processors that can operate on these resources; a process that characterizes the coordination of resources and of processors as they operate on these knowledge resources; managerial influences that facilitate, guide, and constrain this process; and environmental influences that impact the episode. Each of these parameters is a candidate for computer-based decision support. KM theory suggests that such support can lead to improvement in the performance of decisional episodes in the sense of decision making that is more productive, more agile, more innovative, and/or more reputable.

Figure 1. A decisional episode



The article commences with a review of salient aspects of knowledge management theory, concentrating on the knowledge management ontology that characterizes the nature of KM episodes. One major class of such episodes is comprised of those that are undertaken in order to produce a decision. We examine the nature and parameters of decisional episodes. Delineation of these parameters gives a structure for our subsequent systematic consideration of how decision support systems can contribute to decision making.

BACKGROUND

It has long been recognized that decision making is a knowledge-intensive activity (Bonczek, Holsapple, & Whinston, 1981; Holsapple, 1995; Holsapple & Whinston 1996). There are other important kinds of knowledge-intensive tasks such as transaction making (as supported by data processing systems), record making and reporting (as supported by management information systems), design making (as supported by computer-assisted design systems), communication making (as supported by computer-mediated communication systems), relationship making (as supported by collaboration systems), and invention (as supported by creativity support systems). Thus, the study of decision making and decision support systems is part of the larger field that has come to be known as knowledge management.

It follows that, by understanding the nature of knowledge management, researchers and practitioners have a strong foundation for making advances in both the theory and application of decision support systems (Jones, 2006). KM is a key reference discipline for the decision support system field, and will increasingly be recognized as such for the other kinds of task support noted above. Generally, KM is concerned with ensuring that knowledge processors (human and computer based) have the proper knowledge for accomplishing their tasks, and that this knowledge is properly presented at the proper times at a satisfactory cost, and is subject to the maintenance of prevailing security and privacy standards. In the context of decision-making tasks, this means that we aim to adopt suitable methods and technologies for ensuring that all participants in making a decision are furnished in a timely and cost-effective manner with knowledge that meets their respective needs, presented in ways aligned with their particular tastes (e.g., conducive to immediate processing), with enforcement of security and privacy conditions.

A decision support system (DSS) is a computer-based technology that is instrumental in meeting this aim. A DSS is a knowledge processor that functions as a participant in decision-making episodes. Like other decisional participants, a DSS is equipped with a knowledge store and possess various knowledge processing skills. The content of its knowledge store can change over time, and its knowledge processing skills can be exercised as needed to accomplish the role that a DSS plays in a decisional episode, subject to security and privacy constraints. A DSS can accept knowledge or requests presented to it by other participants (and perhaps entities not participating in the decision making) provided the knowledge is suitably presented. A DSS can also present knowledge or requests to other participants (and perhaps entities not participating in the decision making). Because it can store and process some kinds of knowledge faster and in larger volumes than human participants, a DSS is important for achieving timely and cost-effective knowledge availability in decisional episodes.

As a foundation for further developing the concept of supporting decisional episodes, a review of salient facets of the knowledge management ontology is in order (Holsapple & Joshi, 2000, 2001, 2002a, 2004). An ontology is an explicit but simplified specification of a phenomenon to be represented (Gruber, 1995). Because it explicates components that define a phenomenon, an ontology helps us systematically understand and model the phenomenon. Collaboratively engineered by an international panel of KM researchers and practitioners (Holsapple & Joshi, 2002b), the KM ontology provides basic theory and terminology that we subsequently adapt to characterizing support of decisional episodes. After reviewing this ontology, we briefly cover a few aspects of the knowledge chain model (derived from the KM ontology) that are also relevant to support decisional episodes.

The Knowledge Management Ontology

The knowledge management ontology defines KM as "an entity's systematic and deliberate efforts to expand, cultivate, and apply available knowledge in ways that add value to the entity, in the sense of positive results in accomplishing its objectives or fulfilling its purpose" (Holsapple & Joshi, 2004). From a decision-support