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Decision support capabilities of enterprise content management systems: An empirical investigation

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ABSTRACT

Enterprise content management (ECM) systems help organizations cope with the increasing complexity and volume of data and information. Despite the growing popularity of ECM, published literature indicates that organizations primarily use ECM for operational benefits, while the strategic decision making capabilities are rarely considered. Thus, the most significant rewards of ECM implementation may be largely forgone. This study investigates the potential of ECM technology for decision support. A research model is proposed and validated via an empirical investigation. The results show that ECM positively influences problem identification and definition, decision making speed and analysis, decision quality, and decision makers' satisfaction.

1. Introduction

An unprecedented and clandestine predicament has emerged from the congruence of new technology and increasing volume of data. The natural consequence of cheap storage and high-speed connectivity has created the strategic tendency for organizations to amass data for the sake of extracting collective knowledge. Yet, as the information content becomes increasingly complex and dispersed, the ability to utilize this information for quick and effective decision making declines. One strategic approach to realize business value from the cumulative content assets is to employ appropriate decision support (DS) technology. DS technology offers a means to structure, filter, and analyze information in order to reduce uncertainty and increase efficiency in the decision making process [5,6]. Traditionally, DS technology encompassed tools such as decision support systems (DSS) [74], expert systems (ES) [48], executive information systems (EIS) [72,83], and group decision support systems (GDSS) [19]. More recently, newer technologies have emerged that are designed more specifically around the problem context of organizational data and include systems that support knowledge management and generation [3,58,84]. Enterprise content management (ECM) systems belong to this category.

ECM systems are implemented to manage the increasing volume of organizational data and to generate meaningful information from diverse content assets. ECM solutions have proliferated the marketplace in the recent years. According to Gartner [20], the ECM market grew 7.2% in 2012 to a worldwide market size of $4.7 billion. The use of ECM helps organizations to be compliant with government regulations and standards, and enhances organizational reputation and competitiveness in the marketplace [54,73].

The popularity of ECM makes it an important subject matter for information systems (IS) research [11,41,42,67,78,81]. Most published ECM literature, to date, focuses on the operational and tactical benefits of ECM, and only a few studies address the strategic role of ECM in an organizational context [59]. For example, Smith and McKeen [73] assessed the relationship between cost reduction and work process simplification from ECM adoption, and vom Brocke et al. [80] analyzed the impact of ECM on organizational performance based on efficiency and content availability. The paucity of research on the strategic benefits of ECM (for example, decision making support and competitive intelligence) is well documented [1]. Though largely surmised in practice and in academic research, the potential to support and enhance organizational decision support is perhaps the most important strategic benefit that ECM can provide. Therefore, the objective of this study is to gain a better understanding of the decision support capabilities of ECM systems. Specifically we look at the strategic role of ECM in the lifecycle of decision support activities. This research attempts to answer the following questions:

- How does the use of ECM impact decision support?
- What specific decision support activities are supported by the use of ECM?

To this effect, we introduce a conceptual model that combines the sequential decision making framework of Mintzberg et al. [52] with the content stewardship activities of ECM. To assess

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the strategic value of ECM in decision support, we propose several hypotheses and conduct an empirical analysis to test the hypotheses.

The rest of the paper is organized as follows. In the next section we provide a conceptualization of ECM as it applies to this research, and background on related work. In the subsequent section, we describe the conceptual model and formulate our hypotheses. The empirical study and results are presented next, followed by a discussion of the major findings, practical implications, and theoretical contributions. The paper concludes by summarizing the limitations of the study and suggesting directions for future research.

2. Background

2.1. Conceptualization of ECM

Content management (CM) is the identification of content requirements, creation of a structured content for reuse, and the assembling of content to meet the customers' need [64]. The origin of CM can be traced to the development of processes and tools to manage high quality websites with rapidly changing content and functionalities. The increasing need to maintain currency and consistency between content publication and organizational information led to the emergence of integrated solutions that combine CM with traditional document management solutions. In document management systems (DMS), the content components (or units) are the digital files (or documents), whereas CM goes further and involves the management of different types of content components. It allows the creation of new content by combining components from varying sources [12]. CM at the enterprise level is ECM.

ECM is the management of all types of content assets used in an organization [27,53]. Smith and McKeen [73] define ECM as "the strategies, tools, processes and skills an organization needs to manage all its information assets (regardless of type) over their lifecycle." The Association of Information and Image Management (AIIM) defines ECM as "the strategies, methods and tools used to capture, manage, store, preserve, and deliver content and documents related to organizational processes." ECM can be viewed as an evolutionary phase of information management that involves the management of well-structured data (for example, transaction data) and less-structured data (for example, e-mails and blogs) through the complete content lifecycle [12,53]. Rockley [64] states that one of the main goals of ECM implementation is to have transparent content sharing by making different and disparate applications (for example, web content management, and records management) interoperable. ECM systems enhance organizational processes by providing several functions such as capturing, creating, indexing, searching and accessing, organizing, and maintaining all organizational content regardless of the data format [63,73]. It facilitates cross-departmental collaboration from the transparent sharing of knowledge and content [35]. Examples of widely used ECM solutions are Microsoft SharePoint, Drupal, Oracle Universal Content, OpenText ECM Suite, and Perceptivesoft ImageNow.

ECM offers various operational, tactical and strategic benefits. The operational benefits include saving cost and reducing workload by streamlining tasks [59], version control, traceability, reducing duplication [54], and improving search and retrieval [68]. Identified tactical benefits include improving internal and external collaboration [59], enhancing content quality and maintaining consistency [65], standardizing workflows [54], producing organizational metadata attached to content objects [53], and provisioning for regulatory requirements [54]. The described strategic value of ECM includes increasing decision making capabilities [40,73], facilitating creativity [79] and enhancing the professional representation of the enterprise in the eyes of its stakeholders [59].

2.2. Related work

In the current study we focus on the strategic role of ECM for decision support in an organizational context. In general, enterprise systems such as enterprise resource planning (ERP), customer relationship management (CRM), supply chain management (SCM) and ECM offer substantial decision support benefits through the use of decision aids that enable the examination of significant volumes of enterprise data [26, 59]. Although ECM is closely related to other types of enterprise systems such as SCM and CRM, a majority of the scholarly publications specifically on ECM are conceptual or technical in nature. There is limited research on whether the use of ECM improves decision making or advances decision support.

Alalwan and Weistroffer [1] conducted a review of ECM literature, classifying each reviewed article along four dimensions, namely tools, process, people, and strategy. Their comprehensive review indicates that scholarly publications on ECM primarily focus on the tools and process dimensions of ECM. For example, Aziz et al. [7] address the technological issues of multimedia data management for the publishing industry, Chiu et al. [16] discuss privacy and access control for a financial ECM solution, and Befa et al. [9] extend ECM system deployment for semantic interoperability utilizing ontologies.

Implementation challenges, user perceptions, and customization issues are other topics discussed in the ECM literature. Nordheim and Päivärinta [54] highlight the challenges that emerge during the process of implementing an ECM system. Based on an elaborate case study from the oil industry, they characterize four motors of development and change: teleological, evolutionary, life cycle, and dialectical motors. vom Brocke and Simons [80], and vom Brocke et al. [81] propose a five-phase framework for ECM adoption. The framework systematizes business process analysis, content analysis, ECM analysis, ECM-blueprint adaptation, and business process redesign. Bianco and Michelino [11] use the organizational and technological context to evaluate the impact of CM systems on publishing firms. Their results suggest that socio-technical context favors the adoption of content management technology.

Only a few published studies address the strategic dimension of ECM. Smith and McKeen [73] investigate how knowledge engineers within the organization use ECM to manage information. They maintain that an effective ECM strategy should address four content stewardship activities: *capture*, *organize*, *process*, and *maintain*. Their findings suggest short-term benefits (such as cost reduction and work flow simplification) as the main drivers for ECM adoption. Päivärinta and Munkvold [59] compare the concept of ECM to information resource management (IRM), electronic document management (EDM), and knowledge management (KM). They argue that ECM represents an integrative perspective on information management that combines IRM, EDM, and the repository model of KM. By focusing on the explicit, codified dimension of organizational knowledge, Munkvold et al. [53] highlight the tactical role of ECM in an organizational context. They propose investment in ECM as a strategic and holistic approach to manage voluminous and heterogeneous content sources.

While some previous studies have discussed the strategic capabilities of ECM, to the best of our knowledge no published research has assessed the impact of ECM on decision support in an organizational context. Specifically, we know of no research that has been conducted to determine the extent to which ECM use enables decision makers to recognize problems, explore possible solutions, and improve decision making speed. To address this research gap we develop a conceptual model that combines the sequential decision making framework of Mintzberg et al. [52] with the content stewardship activities of ECM identified by Smith and McKeen [73]. We use this conceptual model as the basis to formulate our hypotheses, and our research model to analyze the effect of ECM use on problem definition, speed of problem identification and decision making, decision quality, and decision

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