

Integrating Knowledge Management with the Systems Analysis Process

Doron Tauber

Bar-Ilan University, Israel

David G. Schwartz

Bar-Ilan University, Israel

INTRODUCTION

Information systems research has clearly recognized that knowledge management systems (KMSs) have different characteristics and requirements than those of a classic management information system (MIS). Beginning with the relationship drawn between data, information, and knowledge (Alavi & Leidner, 1999, 2001; Bhatt, 2001; Ulrich, 2001; Spiegler, 2000, 2003; Tuomi, 2000), through to the essential nature of unstructured and semi-structured information vs. structured information (Wu, Ling, Lee, & Dobbie, 2001; Lai, Carlsen, Christiansson, & Svidt, 2003; Fensel et al., 2002; Chou & Chow, 2000), there are many elements and areas in which the two diverge.

However although the definition, description, and implementation of a KMS has been recognized as sufficiently distinct from an MIS (Alavi & Leidner, 2001; Hahn & Subramani, 2000; Plass & Salisbury, 2002; Malhotra, 2002), there is no single clear approach to develop a systems analysis and development process that is tailored specifically for a KMS (Alavi & Leidner, 2001; Hahn & Subramani, 2000; Plass & Salisbury, 2002). While the first generation of KMS has been developed as add-on or parallel systems living alongside pre-existing structured management information systems, the next generation of systems development needs to deal with *fusion* systems. A fusion system (Gray et al., 1997) is a system that integrates structured and unstructured knowledge in real time, allowing for full situational assessment based on both information and knowledge resources.

MIS has a long and illustrious history of research and development focusing on creating and refining the systems analysis process. KMS has no such legacy other than what it has inherited directly from MIS. The purpose of this article is to articulate the unique systems analysis and development issues presented by KMS in organizations, explain why tight integration between MIS and KMS development processes is desirable, and illustrate how such integration can be achieved through a modified Knowledge Integrated Systems Analysis (KISA) process for knowledge management.

The KISA process evolved from a series of action research cycles conducted over an information system development project within the Information Systems Development Department and the Chief Information Office of the Israeli Navy. Beginning with a classic IS development approach, each development cycle added new modifications to the process, until a fully integrated process was reached and then applied, without modification, to new integrated KMS-MIS development. The result is a process that is tailored to the needs of fusion systems. The result is an integrated (knowledge and process) system to support the Navy mission lifecycle.

BACKGROUND

According to Demarco (1978):

Analysis is the study of a problem, prior to taking some action. In the specific domain of computer systems development, analysis refers to the study of some business area or application, usually leading to the specification of a new system. (p. 4)

Whitten, Bentley, and Dittman (2001) state that the systems analyst will study “the problems and needs of an organization to determine how people, data, processes, communications, and information technology can best accomplish improvement for the business” (p. 14). No matter what methodology of system analysis is chosen—structured, information modeling or object-oriented methodology—this statement by Demarco made over 25 years ago is still correct. Although methodology changes, still the systems analyst as specified by Yourdon (1989) is the key member of any systems development project and, in fact, this role has not changed. Sircar, Nerur, and Mahapatra (2001) showed that a controversy exists in the literature about the magnitude and nature of the differences between object-oriented (OO) and structured systems development methods. Some authors, as cited by these researchers, believe that the OO approach is merely

an evolution from the structured systems development approaches. Others cited by these researchers claim that OO requires an entirely new approach and mindset; still the researchers' emphasize that the primary task of system analysis within the systems development process is to capture the essence of a real-world system through models. This fundamental task has been incorporated into both the structured and the OO development approaches.

Knowledge in an organization can be characterized as unstructured or semi-structured, whereas information and data are fully structured and can be managed by common information management methods. Estimates show that unstructured and semi-structured information account for about 80% of the information volume within organizations (Corp, 2001; Lindvall, Rus, & Sinha, 2003; Ferrucci & Lally, 2004). Therefore, a structured MIS that aids organizational processes will only be addressing 20% of the information management needs. KM flourishes in this gap. Within this gap, most KM projects place an emphasis on knowledge "stock," which tends to dominate an organization's thinking about knowledge (Fahey & Prusak, 1998). According to Schwartz and Te'eni (2000) and Fisher (1999), the problem is "getting the right knowledge to the right person at the right time," or in other words, "delivery of the knowledge to the point of action where it can be applied to the issue at hand" (Schwartz, Divitini, & Brasethvic, 2000).

However, the "right knowledge" is not necessarily the sole property of the knowledge management domain, nor is it to be wholly found in the management information systems domain. The right knowledge is often a fusion of what resides within an MIS with what resides within a KMS. To produce a full knowledge-based situational assessment, *fusion* between the different systems is required. We need to look beyond placing knowledge management systems *alongside* our management information systems and strive to have them tightly integrated or *intertwined*.

The need to utilize new or revised systems analysis methods is founded upon few basic phenomena. First, over time, systems analysis methods have evolved in response to the growing complexity of software systems (Booch, 1994). The two main methods of systems analysis—the Structured (Demarco, 1978; Gane & Sarson, 1979; Yourdon 1989) and Object Oriented (Rumbaugh, Blaha, Premerlani, Eddy, & Lorensen, 1991; Jacobson, Christerson, Jonsson, & Overgaard, 1992; Booch, 1994)—are mainly focused on the structured information as part of the business process. Considering the increase in complexity caused by KM mainly from a technical point of view—the dominant unstructured or semi-structured nature—new or revised methods of system analysis methods are indicated.

Second, as suggested by Jayaratna and Sommerville (1998), current methods and techniques for classic systems analysis lack the ability to close the gap between the ordered world of formality and the complex real world. Adding the lack of structure found in KM to this equation only widens this gap. Since the real world has become more complex, it is the formal methods and techniques that are to be changed.

Third, KM is intended to be viewed as a natural extension of the IS function, and studies show that IS remains responsible for most KM implementation and management (King, Marks, & McCoy, 2002). However, approaching the new field of KMS with the old tools of systems analysis is a recipe for failure. This confusion leads to facts mentioned by researchers, that there is no single clear approach to the development of KMS (Alavi & Leidner, 1999), and that KMSs are developed in ad-hoc and trial-and-error modes (Plass & Salisbury, 2002; Nissen, 2001). The classic system analysis process tends to ignore organizational knowledge and KM process, focusing instead on the organizational processes that involve data and information.

NIMSAD (Normative Information Model-based Systems Analysis and Design) is a systemic framework created by Jayaratna (1994). It is used to understand and evaluate methodologies. Using this framework to examine the structured analysis methodology shows clearly that the classic systems methodology focuses on the flows and structures of formal data and data-related activities, while any aspect beyond this remains outside the area of the practitioner concern (Jayaratna, 1994).

KISA: KNOWLEDGE INTEGRATED SYSTEMS ANALYSIS

One strategy to accomplish this tight coupling between KMS and MIS is to specifically integrate knowledge items (or knowledge artifacts) into the information system. The approach illustrated here is based on the popular UML (Unified Modeling Language) methodology for systems analysis and design. The modified system analysis phases include building the KMS as part of the system analysis process, and adding the knowledge items into the UML charts. The final product of this approach is a unified system that contains two cooperative but independent subsystems, which allow the users to accomplish their processes and use knowledge artifacts at the right time, in the right way. UML is a unification of three methods (Jacobson, Booch, & Rumbaugh, 1999); the unified process is use-case driven, which is a piece of functionality in the system that gives a user (or another system) a result of value. All the use cases together make up the use-case

6 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

www.igi-global.com/chapter/integrating-knowledge-management-systems-analysis/16959

Related Content

Keeping the Flame Alive: Sustaining a Successful Knowledge Management Program

Eliot Richard Peter Duchessi (2008). *Knowledge Management: Concepts, Methodologies, Tools, and Applications* (pp. 112-122).

www.irma-international.org/chapter/keeping-flame-alive/25080

The RFM Model Analysis for VIP Customer: A Case Study of Golf Clothing Brand

Tung-Hsiang Chou and Shu-Chen Chang (2022). *International Journal of Knowledge Management* (pp. 1-18).

www.irma-international.org/article/the-rfm-model-analysis-for-vip-customer/290025

Knowledge Management Practices in Brazilian Software Organizations: The Case of SERPRO

Tatiana de Almeida Furquim and Sueli Angelica do Amaral (2011). *Knowledge Management in Emerging Economies: Social, Organizational and Cultural Implementation* (pp. 213-226).

www.irma-international.org/chapter/knowledge-management-practices-brazilian-software/46850

Representation of Action is a Primary Requirement in Ontologies for Interoperating Information Systems

Robert M. Colomb (2013). *Ontology-Based Applications for Enterprise Systems and Knowledge Management* (pp. 68-76).

www.irma-international.org/chapter/representation-action-primary-requirement-ontologies/68889

Analysis of Vertical Federated Technology for Effective Financing of Small and Medium-Sized Enterprises Based on Three-Party Evolutionary Game

Huijun Tang (2025). *International Journal of Knowledge Management* (pp. 1-24).

www.irma-international.org/article/analysis-of-vertical-federated-technology-for-effective-financing-of-small-and-medium-sized-enterprises-based-on-three-party-evolutionary-game/370317