

Chapter 24

A Framework for Developing Management Intelligent Systems

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ABSTRACT

This paper proposes a framework for developing management intelligent systems (MiS). The proposed framework identifies the main management functions, intelligent systems and decision support systems (DSS) for planning, organizing, leading and controlling, and their corresponding applications as the core components of MiS. It integrates the main management functions with intelligent systems and DSS in a context of decision making by managers in organizations. This paper also examines intelligent systems for management and management decision making. The approach proposed in this paper might facilitate research and development of MiS, management, intelligent systems, and information systems.

1. INTRODUCTION

Management intelligent systems (MiS) is an emerging paradigm that integrates management with intelligent systems (IS) (Sun & Firmin, 2012). The core components of MiS are still unclear. Integrating IS with management is still a big challenge. Many textbooks on information systems cover management activities based on information technology (IT) and information systems (Laudon & Laudon, 2011; Bocij, Greasley, & Hickie, 2008). A large number of papers have contributed to a detailed account of the management activity of managers based on IS. Examples includes intelligent supply chain management (SCM) (Khan, Al-Mushayt, Alam, & Ahmad, 2010), marketing IS (Martínez-López & Casillas, 2009), and intelligent customer relationship management (Baxter, Collings, & Adjali, 2003). There is little literature on the main management functions and decision making (DM) of managers in organizations based on IS. IS should be applied to each of the main management functions in order to aid managers to realize their organizational intelligence, that is, it is important for MiS to look at IS for planning, organizing, leading, and controlling (Sun & Firmin, 2012). This consideration leads to the following

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issues for developing MiS: How are intelligent systems managed? How can management and intelligent systems be integrated? Based on our early work (Sun & Firmin, 2012), this paper will address these issues by presenting a framework for developing MiS through integrating the main management functions with IS taking into account DM of managers. To this end, the rest of this paper is organized as follows: Section 2 provides some background on this research. Section 3 and 4 examine intelligent systems for management and intelligent systems for management decision making respectively. Sections 5 and 6 propose a framework for developing MiS and a strategic model for MiS. Section 7 looks at theoretical, managerial and practical implications of this research. Section 8 discusses the related work and the limitation of this research. The final section ends this paper with some concluding remarks and directions for our future work.

2. BACKGROUND

This section provides a background on information systems, management information systems, and intelligent systems for research of MiS.

Management is what managers do (Robbins, Bergman, Stagg, & Coulter, 2012, p. 12). More specifically, management is the process of managers' coordinating and overseeing the work activities to ensure their completion. The main management functions or activities consist of planning, organizing, leading and controlling (Terry, 1968; Robbins, Bergman, Stagg, & Coulter, 2012). Management functions in organizations have remarkably improved with the development of advanced ICT and information systems over the past decades (Turban & Volonino, 2011) (Laudon & Laudon, 2015).

Information systems as a discipline encompasses the concepts, principles, methodologies and processes for two broad areas of activity within organizations: 1. acquisition, deployment, management, and strategy for ICT resources and services; and 2. packaged system acquisition or system development, operation, and evolution of infrastructure and systems for organizational processes (ACM, 2010). Information systems are vital to problem identification, analysis and DM of managers (ACM, 2010).

Management information systems are information systems for management through providing reports on organizational performance to help management monitor and control business (Sun & Firmin, 2012). Management information systems consist of information systems for customer relationships management (CRM) (Chaffey & White, 2011), business process management, human resource management, financial management, procurement management, SCM (Laudon & Laudon, 2015), marketing management (Casillas & Martínez-López, 2009) and marketing analytics (Turban & Volonino, 2011; Bocij, Greasley, & Hickie, 2008).

Intelligent systems (IS) as an applied field of AI (Russell & Norvig, 2010) encompasses the principles, methodologies, techniques, processes and applications in real world problem solving contexts. Currently, IS is a field that studies intelligent behaviors and their implementations as well as their impacts on human society (Sun & Firmin, 2012). An IS is a system that can imitate, and/or automate intelligent behaviors of human beings, and solve problems that were previously solved by humans through generating representations, and adopting inference procedures and learning strategies (Schalkoff, 2011). An IS embodies a form of computing that is based on an inexact, fuzzy and ambiguous model (similar to human reasoning) (Schalkoff, 2011).

The difference between IS and non-intelligent systems is that the former emphasize the representation, emulation and simulation of intelligent behaviors towards their implementation using computing

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