Chapter 1.13
The Evaluation of Decision-Making Support Systems' Functionality

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INTRODUCTION

Contemporary decision-making support systems (DMSSs) are large systems that vary in nature, combining functionality from two or more classically defined support systems, often blurring the lines of their definitions. For example, in practical implementations, it is rare to find a decision support system (DSS) without executive information system (EIS) capabilities or an expert system (ES) without a recommender system capability. *Decision-making support system* has become an umbrella term spanning a broad range of systems and functional support capabilities (Alter, 2004). Various information systems have been proposed to support the decision-making process. Among others, there are DSSs, ESs, and management support systems (MSSs). Studies have been conducted to evaluate the decision effectiveness of each proposed system (Brown, 2005; Jean-Charles & Frédéric, 2003; Kanungo, Sharma, & Jain, 2001; Rajiv & Sarv, 2004). Case studies, field studies, and laboratory experiments have been the evaluation vehicles of choice (Fjermestad & Hiltz, 2001; James, Ramakrishnan, & Kustim, 2002; Kaplan, 2000).

While for the most part each study has examined the decision effectiveness of an individual system, it has done so by examining the system as a whole using outcome- or user-related measures to quantify success and effectiveness (Etezadi-Amoli & Farhoomand, 1996; Holsapple & Sena, 2005; Jain, Ramamurthy, & Sundaram, 2006). When a study has included two or more systems, individual system effects typically have not been isolated. For example, Nemati, Steiger, Lyer, and Herschel (2002) presented an integrated system with both DSS and AI (artificial intelligence)

functionality, but they did not explicitly test for the independent effects of the DSS and AI capabilities on the decision-making outcome and process. This article extends the previous work by examining the separate impacts of different DMSSs on decision effectiveness.

BACKGROUND

DMSSs are information systems that directly support the decision-making process for complex, high-level problems in an interactive manner (Alter, 2004; Mora, Forgionne, & Gupta, 2002). The specific DMSS can be a traditional DSS, EIS, ES, knowledge-based system (KBS), or a system that combines the functionalities of DSS, EIS, KBS/ES.

An architecture that incorporates the functionality of the various proposed systems is shown in Figure 1 (adapted from Forgionne, 2003).

In the typical DSS, the decision maker utilizes computer and information technology to (a) structure the problem by attaching the parameters to a model and (b) use the model to simulate (experiment with) alternatives and events and/or find the best solution to the problem (Borenstein, 1998; Raghunathan, 1999). Results are reported as parameter conditions (status reports), experimental outcome and parameter forecasts, and/or recommended actions. Feedback from user processing guides the decision maker to a problem solution, and created information is stored as an additional input for further processing. A DSS, then, would not include the knowledge base on the input side

Figure 1. General DMSS