



Chapter XV

Decision Support Systems and their Application in Construction

Alaa Abdou

United Arab Emirates University (UAEU), United Arab Emirates

Moh'd Radaideh

United Arab Emirates University (UAEU), United Arab Emirates

John Lewis

University of Liverpool, UK

Abstract

Decisions are activities that we face and deal with every day. Decision support systems are used to support and improve decision making. They help people make better and faster decisions than they could make themselves. The construction industry witnessed a growth in the application of knowledge-based expert systems in the eighties and early nineties, followed by the application of fuzzy, artificial neural networks and hybrid (integrated) systems. Potential applications of the Internet in the construction industry have generated many research projects recently. The purpose of this chapter is to understand decision support systems and their basic technologies, and to review their application in the construction industry. The construction industry is rapidly realising the need to integrate information technology and artificial intelligence into its processes in order to remain competitive.

Introduction

Decision support systems (DSSs) are designed, built, and used to assist in and support the decision-making process. They are used by managers in direct support of managerial decision making (Keen & Wagner, 1979). “The evolution of DSS from its conception in the 1970s to the present day has seen numerous extensions of the original notion. The modern-day study of DSSs must include a focus on conventional model-based systems, knowledge-based systems, artificial intelligence, expert systems, executive information systems, group support systems, data visualisation systems, and organisational decision support systems” (Marakas, 1999, p. 8). As we begin the 21st century, major changes can be observed in the way managers use computerised tools to support their decision making. Organisations can easily use the Internet and intranets to deliver high-value performance analysis applications to decision makers around the world. Today’s decision support technologies can also create an interactive interface that allows users to view and process data models with standard Web browsers with great flexibility, efficiency, and ease (Turban & Aronson, 2001).

For the construction industry, one of the most urgent challenges to its fragmented nature is the need to improve business performance and client satisfaction. It is now recognised that the management of project and organisational knowledge is necessary if construction businesses are to remain competitive and effectively respond to the needs of their clients (Kamara, Anumba, & Carrillo, 2000).

This chapter focuses on decision support systems (DSSs) and their application in construction. It starts with an overview of the DSS concept and its fundamental principles. Following that, it presents a series of sub-sections, each of which focuses on a particular theoretical aspect of decision support technologies, starting with DSS basic components and ending with artificial intelligence (AI) and the Internet’s impact on decision support systems. Finally, a number of case studies showing the application of DSSs in the construction industry are presented.

Learning Objectives

1. To understand the definition of decision support systems and their major components and categories.
2. To understand different decision support technologies and their background, components, theories, and limitations.
3. To highlight the relationship between DSSs and organisations and their people.
4. To highlight the impact of the Internet on decision support.
5. To present some examples of the applications of different decision support technologies in the construction industry.
6. To discuss the impact of decision support systems and their future.

21 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/decision-support-systems-their-application/25013

Related Content

Information and Knowledge Management Perspective Contributions for Fashion Studies: Observing Logistics and Supply Chain Management Processes

George Leal Jamiland Cecília Carvalho Jamil (2017). *Handbook of Research on Information Management for Effective Logistics and Supply Chains* (pp. 199-221). www.irma-international.org/chapter/information-and-knowledge-management-perspective-contributions-for-fashion-studies/166808

A Meta-Analytical Review of Antecedents of Organizational Ambidexterity

Ishita Batra, Preethi P. (bf6c5222-6c79-44b2-9918-3869c720c453) and Sanjay Dhir (2021). *International Journal of Knowledge Management* (pp. 1-24). www.irma-international.org/article/a-meta-analytical-review-of-antecedents-of-organizational-ambidexterity/288320

Supporting Knowledge-Based Decision Making in the Medical Context: The GLARE Approach

Luca Anselma, Alessio Bottrighi, Gianpaolo Molino, Stefania Montani, Paolo Terenziani and Mauro Torchio (2013). *Intelligence Methods and Systems Advancements for Knowledge-Based Business* (pp. 24-42). www.irma-international.org/chapter/supporting-knowledge-based-decision-making/67715

KM Technologies and the Organizational LOE: The Unintended Consequence of Constant Organizational Change

Victoria M. Grady and James D. Grady III (2008). *Strategic Knowledge Management in Multinational Organizations* (pp. 104-118). www.irma-international.org/chapter/technologies-organizational-loe/29779

RDF and OWL

Gian Piero Zarri (2008). *Knowledge Management: Concepts, Methodologies, Tools, and Applications* (pp. 1231-1244). www.irma-international.org/chapter/rdf-owl/25175