Decision-making Support Systems (DMSS) can be defined considered as full technological systems per se. However, from a more systemic view (Ackoff, 1967; Kljajic & Farr, 2008) DMSS can be also defined as sub-systems of organizational management information systems that interactively support the decision-making process (Simon et al., 1997; Forgionne et al., 2005) of individuals and groups in life, public, and private organizations. These systems include Decision Support Systems (DSS) (model-based DSS including analytic, statistical-based and simulation-based types), Executive Information Systems (EIS), Expert Systems (ES), Knowledge Based Systems (KBS), and Creativity Enhancing Systems (CES). Other DMSS, such as Executive Support systems (ESS), Management Support Systems (MSS), Artificially Intelligent Decision Support Systems (IDSS), and Decision Technology Systems (DTS), integrate the functions of DSS, EIS, ES, KBS, or CES, to provide more comprehensive support than the individual separate systems (Turban & Watson, 1994; Forgionne, 1991; Forgionne & Kohli, 2000; Nichols & Goul, 2005). Thus, since the technology’s purpose is to improve decision making (Mora et al., 2005), the articles are expected to link DMSS technology to improvements in the process and outcomes of the decision making process. This link can be established theoretically, mathematically, methodologically or empirically in a systematic and scientific manner.

This special issue on “DMSS Development Methodologies: A Software Systems Engineering Approach”, has been co-edited in general for supporting and advancing the development of Decision-making Support Systems (DMSS) technology issues and on how DMSS technology and related methodologies can deliver value (Buede, 1986) to individual and group-based decision-making processes (Forgionne, 2000), and in particular for advancing the scientific and practical knowledge on the DMSS development and their related technical, organizational and economic issues. DMSS have been developed during the last 40 years from a more art-based approach than engineering one (Gachet & Haettenschwiler, 2006). While several coarse-grain development paradigms such as:
prototyping evolutive (Courbon, 1980; Alavi & Henderson, 1981; Mahmood & Medewitz, 1985), adaptive (Keen, 1980; Alavi & Napier, 1984), or Representation-based method (Carlsson, 1979) have been reported, as well as general requirements engineering methods for related DMSS (for DSS see Meador et al., 1984; for EIS see Watson et al., 1991; for Expert Systems see Turban & Aronson, 1998), few systems and software engineering-based approaches (Saxena, 1991; Sage, 1991; Holsapple & Winston, 1996; Manjarrez & Pickin, 2002; Mora et al., 2010) have been used. Thus, in contrast with other types of IS, where well-structured systems development methodologies have been posed and used more systematically, practitioners and academics are confused on the available DMSS development methodologies. Consequently, organizations develop DMSS in particular modes.

We believe that this DMSS topic has been taken by granted, but evidences show few standardized DMSS development methodologies (Gachet & Haettenschwiler, 2006). Furthermore, DMSS development methodologies are considered as an implementation success factor (Einierman et al., 1995; Turban, 1992; Watson et al., 1991) and its selection and correct application cannot be overlapped. Thus, in this special issue we invite researchers and practitioners to report high quality research papers on advances on DMSS (model-based DMSS such as DSS, EIS, SBDS and ES) development methodologies from a robust Software Systems Engineering approach (Jalote, 1997; Sage, 1981; Kljajic & Farr, 2008). Topics of interest are the following:

- Descriptions and proofs of concept of DMSS development methodologies
- Comparison studies on DMSS development methodologies
- Foundations on the expected characteristics for a DMSS development methodology
- Contribution from Systems and Software Engineering to DMSS developments
- DMSS development tools and methodologies
- Survey studies on DMSS development methodologies used in the practice
- Business Intelligence and DMSS development methodologies
- Data Mining and DMSS development methodologies
- Cognitive aspect of DMSS development methodologies
- Challenges for DMSS development methodologies
- Academic teaching of DMSS development methodologies
- Industrial training of DMSS development methodologies

We edit this special issue with four relevant research papers. Two of them were directly asked to International and recognized Senior academics in the topics of DMSS and KMS (Knowledge Management Systems), and the other two were selected from the open call process from several interesting submitted papers. Invited papers were reviewed for Senior colleagues also for enhancement purposes.

In first invited paper titled “Social Media in DMSS System Development and Management”, Professor Daniel E. O’Leary, a recognized internal and Senior expert in intelligent DMSS and KMS, in the University of Southern California, USA, addresses the role of modern social media technologies (e.g., wikis, blogs, tagging, etc.) in the development of software systems in general. Whilst Decision-making Support Systems (DMSS) have particular characteristics, also they are software systems and all development issues related with them can affect the development of DMSS. From this view, Professor O’Leary, surveys available public systems development repository, given the actual scarcity of data, to investigate how such social media technologies have been and can be used to improve the development and management of DMSS, through communication and collaboration between their stakeholders. Given the novelty of this topic, this paper explores such problem and provides several extensions for advancing the scientific and
practical knowledge on such DMSS development situations. Text analytics techniques are finally suggested to analyze the content of social media tools used in the DMSS development process, for supporting the automated recovery and discovering of collected project data history.

In the second invited paper titled “DSS-CMM: A Capability Maturity Model for DSS Development Processes”, Professor Omar F. El-Gayar, also a recognized international Senior expert in DMSS, in Dakota State University, USA, jointly with Amit V. Deokar and Jie Tao, both also in Dakota State University, USA, reports for first time in journals a highly original and relevant paper in the DMSS area. Authors have elaborated a Capability Maturity Model of process for DMSS development, inspired in the strong utilization of them in the Software Engineering discipline. As authors report, while such relevant holistic frameworks have been supported and encouraged to be used in Software Engineering, in the IT area, and in particular for developing DMSS, they have been largely ignored. Thus, a relevant knowledge gap exists in relevant DMSS literature in the last 40 years. Authors value the DMSS development approaches posed and used by DMSS pioneers, and subsequent proposals, but also assert in the need to count with a more comprehensive DMSS development process framework, in order to provide a better guidance for DMSS development and process improvements. Thus, authors elaborate and report a Decision Support System Capability Maturity Model (DSS-CMM). Authors illustrate its initial utilization evaluating two exemplary DMSS development methodologies reported in 1978 and 1991, and one more recently reported in 2010. We consider that this paper will be a landmark and seminal paper given the first utilization of CMM-alike frameworks in the DMSS area, and it will be call for a better integration of past DMSS development approaches with modern Software Systems Engineering approach.

In the third paper titled “Using Systems Engineering for the Development of Decision Making Support Systems (DMSS): An Analysis of System Development Methodologies (SDM)”, PhD student Sara Vallance, jointly with her Professors Alex Duffy, Robert Whitfield, and Kepa Mendibil, as well as with her colleague Abigail Hird (a PhD student), all of them in the University of Strathclyde, UK, and with John McCabe and Neville Turner in the DePuy Orthopaedics Company, UK, review a Systems Approach literature for identifying a set of business, technical and organizational considerations that DMSS development methodologies are expected to address to reduce the usual risks involved in these kind of projects. Business requirements, culture, technology, complexity management, uncertainty management, and human factors are the identified issues. Four methodologies for developing DMSS (from a Simulation and Systems Engineering view) are analyzed. Authors conclude with the critical finding on none DMSS development methodology from the studied four fulfills the six considerations posed in this study. This paper contribute with a call for Simulation and Systems Engineering area, to improve current DMSS development methodologies, and conjointly used with the relevant findings of the paper two, such six considerations can be more methodologically addressed.

In the last paper titled “IDSSE-M: A Software System Engineering Methodology for Developing Intelligent Decision-making Support Systems”, the guest editors Manuel Mora, in the Universidad Autónoma de Aguascalientes, Mexico, Fen Wang, in Central Washington University, USA, Professor Ovsei Gelman, in the CCADET, in the Universidad Nacional Autónoma de México, Mexico, and Emeritus Professor Miroljub Kljajic, in University of Maribor, Slovenia, report an initial empirical evaluation of IDSSE-M, a free-access methodology for designing and building Intelligent Decision Support Systems. IDSSE-M extends and adapts Turban and Aronson’s DSS Building Paradigm (open access), and Saxena’s Decision Support Engineering Methodology (proprietary). Empirical results obtained during the utilization of IDSSE-M for MSc IT students in the IT MSc Program in the Autonomous University of Aguascalientes, Mexico, during
1998-2010 period (methodology used but data collected are from 2006-2008 period) suggest that IDSSE-M can provide to DMSS developers at least a moderate level of usefulness, compatibility, and results demonstrability, which finally leads to a positive, good and beneficial attitude of using such methodology. Under the premise and fact of a high scarcity of well-defined free access DMSS development methodologies (e.g., reported in DMSS texts or technical reports), this paper contributes making available it with their empirical related evaluation data.

Hence, we are academically satisfied to have achieved this special issue by the international collaboration of international researchers and anonymous reviewers. We also thank you to Professor Pascale Zarate (Editor-in-Chief of IJDSST) by the trust on us as guest editors and the topic, and to IGI editorial staff for all support provided to the realization of this special issue.

Manuel Mora
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IJDSST

REFERENCES


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