Guest Editorial Preface

Special Issue on Ontological Analysis in Conceptual Modeling, Part 1

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The call for "native" theories in information systems has been strong over the discipline's history (Straub 2012). One answer to this call has been the ontological theory (drawing on the ontology of Mario Bunge) Wand and Weber introduced to the field in three seminal papers (1990, 1993, 1995). This work established three views on information systems as representations of human perceptions of a domain of interest: the representation model, the state-tracking model, and the good decomposition model.

This stream of work has generated a great deal of interest, and it has produced many papers using Wand and Weber's models to evaluate important phenomena in information systems (Siau and Rossi, 2011). Notably, researchers have used ontological analysis to suggest how grammars for conceptual modeling and database design might be modified to be ontologically sound and they have evaluated the effects of these modifications on how well models are understood.

As it has been more than 25 years since the early work in this area, this is an opportune time to assess the contribution ontological analysis has made to the information systems field over the past quarter century and to look forward to new areas of application. Submissions were invited from a variety of perspectives, including (but not limited to) the following:

- Theoretical contributions of ontological analysis
- Practical contributions of ontological analysis
- New areas of application of ontological analysis
- Comparative studies of different ontological foundations
- Design science research based on ontological analysis
- Open questions in the use of ontological analysis

Another objective of this special issue theme is to collect a number of works related to ontology in one or two special issues to celebrate the distinguished careers of Yair Wand and Ron Weber, and to recognize their pivotal roles in developing theories in the field of information systems.

Because of the overwhelming response to the special issue call and the high quality of submissions, two JDM issues will be dedicated to the topic of Ontological Analysis in Conceptual Modeling. In this first issue, four papers were collected.

The first paper, a research commentary titled "Thirty Years Later: Some Reflections on Ontological Analysis in Conceptual Modeling", is written by Yair Wand and Ron Weber (Wand and Weber, 2017). Wand and Weber discuss the motivation and goals of developing their work some thirty years ago to provide a theoretical basis for evaluating conceptual modeling grammars and scripts. They then provide some brief history about the early research that discussed how ontological theories might be used to study conceptual-modeling grammars and scripts. An overview of the progress that

has been made using various elements of this early research is described. The article also outlines some of the major critiques that have been made of conceptual modeling work that uses ontological foundations. Finally, the authors suggest some areas that they believe hold substantial promise in using ontology to better understand and predict conceptual-modeling phenomena.

The second paper is a research paper titled "Conceptual Modeling Meets Domain Ontology Development: A Reconciliation" is authored by Veda Storey (Storey, 2017). Domain ontologies and conceptual models similarly capture and represent concepts from the real world for inclusion in an information system. This paper examines the challenges of conceptual modeling and domain ontology development when mapping to high-level ontologies. The paper also attempts to reconcile apparent differences and position some of the inherent challenges in these closely-coupled areas of research, while providing insights into recognizing and resolving modeling difficulties.

The third paper is a research paper titled "A Framework for Managing Complexity in Information Systems" is authored by Mala Kaul, Veda Storey and Carson Woo (Kaul, Storey, Woo 2017). The paper examines a particularly difficult, but important, challenge in the design and development of contemporary information systems -- complexity. Although complexity has been richly discussed from various perspectives in the literature, there is limited guidance on how to address complexity in information systems design. This research analyzes different approaches to handling complexity and finds that there exists a plurality of ways in which to address complexity that are dependent upon the given situation. This analysis results in the derivation of a framework for addressing complexity in information systems. The framework presented in the paper explicitly recognizes implications and limitations of decomposition, inner-outer environments, abstractions, and decentralization, and the role of ontology. The framework enables information researchers to identify and adapt applicable strategies for managing complexity in any domain.

The final research paper in this first issue is written by Jun Liu and Sudha Ram, titled "Improving the Domain Independence of Data Provenance Ontologies: A Demonstration Using Conceptual Graphs and the W7 Model" (Liu and Ram, 2017). Provenance is becoming increasingly important as more and more people are using data that they themselves did not generate. In the last decade, significant efforts have been directed toward developing generic, shared data provenance ontologies that support the interoperability of provenance across systems. An issue impeding the use of such provenance ontologies is that a generic provenance ontology, no matter how complete it is, is insufficient for capturing the diverse, complex provenance requirements in different domains. In this paper, the authors propose a novel approach to adapting and extending the W7 model, a well-known generic ontology of data provenance. The authors utilize various knowledge expansion mechanisms provided by the Conceptual Graph formalism to develop domain ontologies of provenance in a disciplined yet flexible way.

Together, these papers provide an excellent opportunity to reflect on Wand and Weber's (1990, 1993, 1995) proposal for an ontological foundations of information systems. The papers provide unique insights into the history of these ideas, how they can be applied successfully to address important contemporary problems, and limitations that need to be addressed in the future. We are excited to offer such high quality papers in this issue and we look forward to the next set of high quality papers in the second part of the special issue later in the year.

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Andrew Burton-Jones is a Professor of Business Information Systems at the UQ Business School, University of Queensland. He has a Bachelor of Commerce (Honours) and Masters of Information Systems from the University of Queensland and a PhD from Georgia State University. He is currently a Senior Editor of MIS Quarterly and has served on the Editorial Boards of MIS Quarterly, Information Systems Research, Journal of the Association for Information Systems, Journal of Database Management, and other journals. He has also served as Program Co-Chair for AMCIS and PACIS and Doctoral Consortium Co-Chair for the ER Conference. He conducts research on systems analysis and design and the effective use of information systems. Prior to his academic career, he was a senior consultant in a big-4 accounting/consulting firm.

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Jeffrey Parsons is University Research Professor and Professor of Information Systems in the Faculty of Business Administration at Memorial University of Newfoundland. His research interests include conceptual modeling, ontology, crowdsourcing, information quality, and recommender systems. His research has been published in leading journals in information systems, computer science, management, and science. Jeff is a Senior Editor for MIS Quarterly, a former Senior Editor for the Journal of the Association for Information System, and a member of the editorial board of the Journal of Database Management. In addition, he has served as Program Co-chair for a number of conferences, including the ER conference - the leading conference on conceptual modeling.

Keng Siau is Chair of the Department of Business and Information Technology (BIT) at the Missouri University of Science and Technology. Professor Siau received his PhD in Business Administration from the University of British Columbia in 1996. Prior to joining Missouri University of Science and Technology in June 2012, he was Edwin J. Faulkner Chair Professor and Full Professor of Management at the University of Nebraska-Lincoln (UNL). Professor Siau served as the Vice President of Education for the Association for Information Systems and served as the AIS representative on the Board of Partnership for Advancing Computing Education (PACE) from July 2011-June 2014. Professor Siau has more than 250 academic publications. According to Google Scholar, he has more than 9100 citation counts and his h-index and i10-index are 47 and 116 respectively. His current research interests are Economic and Social Impact of Artificial Intelligence, Business Analytics and Data Science, Design Science, and Human Computer Interaction and User Experience.