THOMSON REUTERS

| Home | About Scientific | Press Room | Contact Us |

scienceWATCH.com
TRACKING TRENDS & PERFORMANCE IN BASIC RESEARCH

Interviews   Analyses   Data & Rankings

2008 : August 2008 : Alan R. Hevner, Salvatore March, Jinsoo Park & Sudha Ram

EMERGING RESEARCH FRONTS - 2008

August 2008

📄 PDF

Alan R. Hevner, Salvatore March, Jinsoo Park & Sudha Ram talk with *ScienceWatch.com* and answer a few questions about this month's Emerging Research Front Paper in the field of Economics & Business.

Article: Design science in Information Systems research
Authors: Hevner, AR;March, ST;Park, J;Ram, S
Journal: MIS QUART, 28 (1): 75-105 MAR 2004
Addresses: Univ S Florida, Coll Business Adm, Tampa, FL 33620 USA.
Univ S Florida, Coll Business Adm, Tampa, FL 33620 USA.
Vanderbilt Univ, Owen Grad Sch Management, Nashville, TN 37203 USA.
Korea Univ, Coll Business Adm, Seoul 136701, South Korea.
Univ Arizona, Eller Coll Business & Publ Adm, Tucson, AZ 85721 USA.

In October 2005, this paper was featured as a Fast Breaking paper with comments provided by Alan Hevner. Three years later, we now have the opportunity to reflect on the previous comments and evaluate the paper's further impacts. All co-authors of the paper have contributed to the commentary below.

SW: **Why do you think your paper is highly cited?**

The broad impact of the 2004 MISQ paper continues to be strong as researchers in the Information Systems field recognize the value design science brings to a research project. Design science offers an effective means of addressing the relevancy gap that has plagued academic research, particularly in the management and information systems disciplines.

Natural science research methods are appropriate for the study of existing and emergent phenomena; however, they are insufficient for the study of "wicked organizational problems," the type of problems that require creative, novel, and innovate solutions. Such problems are more effectively addressed using the type of paradigm shift offered by design science.

Researchers in application domains as disparate as health care, E-commerce, biology, transportation, and the arts identify the key role of designed artifacts in improving domain-specific systems and processes. The models and guidelines of our paper support researchers in bringing a rigorous design science research process into projects that heretofore had not clearly described how new ideas become embedded in purposeful artifacts and then how those artifacts are field-tested in real-world environments.

As another far-reaching consequence of the article, the design science guidelines described in this paper have provided a structured path for

doctoral students interested in using this methodology in their research; structuring, and legitimizing of their research.

SW: **Does it describe a new discovery, methodology, or synthesis of knowledge?**

As previously described, our goal in the paper is to position design science research in the IS field as an equal, complementary partner to the more prevalent behavioral science research paradigm. The key contribution is a new way of thinking about what makes IS research relevant to its various audiences of managers, practitioners, and peer researchers in related fields. Design must be informed by appropriate theories that explain or predict human behavior; however, these may be insufficient to enable the development and adaptation of effective organizational artifacts.

Scientific theories may explain existing or emergent organizational phenomena related to extant organizational forms and artifacts but they cannot account for the qualitative novelty achieved by human intention, creativity, and innovation in the design and appropriation of such artifacts. That is, science, the process of understanding "what is," may be insufficient for design, the process of understanding "what can be."

SW: **How would you summarize the significance of your paper in layman's terms?**

Upon further reflection, we would add that the paper has significance due to the natural desire of researchers to improve things. For some, it is not enough to study and understand why nature is as it is, but we also want to know how we can improve the way it is. Design science research attempts to focus creativity into the design and construction of artifacts that have utility in application environments.

Design as a research paradigm focuses on the construction and evaluation of novel artifacts that enable the solution of important problems for which extant theory and design knowledge are inadequate. It utilizes theory and design knowledge but is fundamentally a creative activity in which knowledge is acquired through the building and use of novel problem-solving artifacts. That knowledge must be tested through the evaluation of the produced artifact.

Rigorous testing results in a demonstration that the design can be utilized to solve real problems. Designs have no special dispensation from the laws of nature. Hence, natural science research methods are utilized to gain an understanding of why a design works and to specify contingencies upon it. The resultant theories provide principles that can then become part of the "best practice." However, because organizations and the environments in which they operate are social constructions, such "design theories" are perishable. That is, they are subject to change as the social reality changes.

There may, in fact, be no immutable "laws of organizational design" to be discovered and codified. The significance of this observation for academic researchers is that they must constantly challenge the assumptions that have characterized research in the management disciplines and they must recognize that creativity, innovation, and qualitative novelty are a significant part of the phenomena they study.

SW: **How did you become involved in this research and were any particular problems encountered along the way?**

The four authors and most of our doctoral students have followed the design science methodology implicitly, so this paper was a natural outcome of our experiences over the past three decades. With science and engineering backgrounds, design seemed a natural mode of conducting research intended to affect practice. Design is fundamental to the management disciplines. Managers are engaged in the design and implementation of business systems aimed at improving organizational performance.
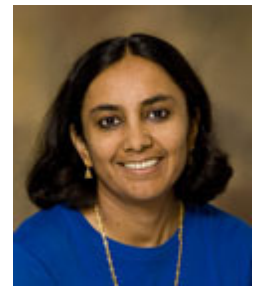
A manager's professional responsibility is to transform existing situations into preferred ones, to shape social organizations and economic processes, and to create value. Yet research in the management disciplines has been based primarily on the natural science paradigm. This has been attributed to the

Coauthor
Salvatore March

Coauthor
Jinsoo Park

Coauthor
Sudha Ram

absorption of management schools into the general culture of the university where the natural science paradigm is the norm for academic research. Overcoming this bias toward the natural science paradigm has been and continues to be a challenge.

SW: Where do you see your research leading in the future?

The broadening recognition of design science research in the IS field has led to a number of important new activities and research directions:

- A new, multi-disciplinary research conference, Design Science Research in Information Systems & Technology (DESRIST), has been established and three offerings of the conference have been held from 2006 to 2008.

- A special issue of *MISQ* on Design Science Research will appear in 2008.

- Most IS doctoral programs in major universities now provide a research seminar dedicated to design science research methods and projects.

- Leading international scholars in IS are actively extending the research ideas found in the 2004 *MISQ* paper.

- Examples are:

- S Gregor and D Jones, "The Anatomy of a Design Theory," *Journal of the AIS* 8[5], 312-35, May 2007.

- Iivari J, "A Paradigmatic Analysis of Information Systems as a Design Science," *Scandinavian Journal of Information Systems* 19[2], 2007.

- Peffers K, *et al.*, "A Design Science Research Methodology for Information Systems Research," *Journal of Management Information Systems* 24[3], 45-77, Winter 2008.

"The broad impact of the 2004 MISQ paper continues to be strong as researchers in the Information Systems field recognize the value design science brings to a research project."

Leading research journals and conferences in the IS field are openly soliciting top-quality design science research contributions and are expanding their boards to include more senior editors and associate editors who have used and understand the design science approach. This will ultimately pave the way for more design science research papers to be published and thus benefit the whole field by enhancing the relevance of IS research.

We are excited by the ongoing discussions and increased interest in design science research projects in the IS field. Information systems and organizational routines are among the key components of organizational design as they are extensions of human cognitive capabilities. These are the tools of knowledge working to enable new organizational forms and provide management and decision-making support.

For example, incentive structures related to job performance such as achieving sales, product quality, or customer satisfaction goals require information gathering and analysis capabilities. Management of outsourcing and inter-organizational partnerships requires secure information sharing. Identification of problems and opportunities requires the gathering and analysis of business intelligence.

More and more frequently, business decisions are made based on a computer-based analysis and subsequent recommendations. Similarly, organizational routines are intended to provide guidance to human action within prescribed organizational contexts. Yet, even these artifacts are appropriated and adapted by humans in ways and for purposes which the designers may not have envisioned. With the renewed interest in design science research in the information systems and organizational science disciplines, future research will focus on the co-design of information processing capabilities and organizational structures.

SW: Do you foresee any social or political implications of your research?

With a goal of improving societal and organizational environments, it is clear that design science research does include many social and political implications. Iivari (2007) discusses in some detail the ethical responsibilities of a design scientist for the consequences of the research process and results (the designed artifacts). He encourages the questioning of the values of a design science research project.

Whose interests are served by the improvements introduced into an environment by these design artifacts? Are other groups disadvantaged by these new artifacts? The values underlying design science

research must be made as transparent as possible, in order to evaluate the social and political impacts of the research.

Governments and societies are social constructions, artifacts designed to achieve human goals, purposes, and intentions, influenced by and operating within the context of emergent and intentional human behavior. As information technology artifacts enable new organizational forms in business they enable new forms in government and in society as a whole.

Designers must be concerned about the unintended effects of artifacts they have developed. Information technology artifacts such as the Internet, electronic social networks, communication media, electronic commerce, and large-scale electronic collaboration systems have had significant positive and negative impacts on government and society. They have made government more accessible and have also greatly improved the availability of information. Yet they raise serious privacy and security concerns. These are issues that researchers working in the field of design science must address.

Alan R. Hevner
University of South Florida
Tampa, FL, USA

Salvatore March
Vanderbilt University
Nashville, TN, USA

Jinsoo Park
Seoul National University
Seoul, KOREA

Sudha Ram
University of Arizona
Tucson, AZ, USA

Keywords: design science, design science methodology, design theories, information systems, development adaptation effective organizational artifacts, emergent organizational phenomena, natural science research methods, natural science paradigms, laws organizational design, information technology artifacts.

PDF

back to top

2008 : August 2008 : Alan R. Hevner, Salvatore March, Jinsoo Park & Sudha Ram