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Design Science in Information Systems: Hegemony, Bandwagon, or New Wave?

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DESIGN SCIENCE IN INFORMATION SYSTEMS: HEGEMONY, BANDWAGON, OR NEW WAVE?

Les Sciences de la Conception en Systèmes d'Information: Hégémonie, Retard ou Nouvelle Vague?

Panel

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Abstract

Design Science has, in the past few years, become a topic of increasing importance especially in the North American academic IS community. Some observers see a new hegemony in the process of forming. Others dispute that, but suggest that Design Science is merely the latest bandwagon rolling through the IS domain. The panel includes supporters of all these views. It will attempt to position Design Science from a variety of perspectives including the North American and the European view, the latter with a long tradition of Design Based IS scholarship.

Keywords: Design Science, IS Community, Multiple Perspectives and Experiences

Résumé

Les sciences de la conception sont devenues un thème majeur des SI, en particulier pour la communauté Nord américaine. Certains pensent qu'elles incarnent une position hégémonique, d'autres qu'elles sont plutôt un domaine mineur des SI. Ce panel reprendra différentes visions sur le sujet, notamment américaines et européennes.

Introduction: The New Design Science Wave

Recognizing the values and relevance that innovative design brings to research the academic Information Systems (IS) Community in North American has appropriated the theme of Design Science (DS) as a counterpoint to the prevailing orthodoxy into behaviorial research issues. In less than five years, the view promoted by Alan Hevner, Sal March, Jinsoo Park and Sudha Ram in MISQ (Hevner et al. 2004) appears to have become a "Design Science Hegemony" in the IS Community.

This may be contrasted with a somewhat different tradition prevalent in other parts of the world and in particular in Europe where rather more diverse notions of what IS embraces prevail and where the importance of design has long been accepted but expressed in many different forms.

Academic careers in Continental Europe have for many years been built not only on scientific publication, but also on success in attracting funding based on the quality of design *(and the actual use of the designed artefacts in*

practice). In line with that understanding, typical EU research projects require prototyped systems as deliverables and place much less emphasis on the quantity of peer-reviewed publications as valued by key journals and funding organizations in North America. In the European research tradition, design has been pursued as the touchstone of relevant IS research. In the UK, for example, the focus has been on the development of design methodologies ranging from Mumford's ETHICS (Mumford 1995; Mumford 2003), Checkland's Soft Systems Methodology (Checkland 1999), to more engineering-based methodologies derived from software engineering. In some countries – Germany in particular – the academic IS community is to a great extent concerned with practice: that is the engineering-oriented approach of design and bringing into use of IS on behalf of the organizations which help to fund the research.

Nevertheless because of the preponderance, weight, and sheer assurance of the North American view, the understanding of Design Science as postulated in the seminal Hevner et al. (2004) paper has become accepted as the new orthodoxy, while the long-standing European view is being redefined in its context. However, it is possible to find advocates for all views and indeed many favor plurality which has a long tradition and goes back to Simon (1996) and underlies the methodologies espoused for example by Avison and Wood-Harper (1990) and is given a philosophical underpinning by Mingers (2001).

Panel Overview

In this panel, we would like to challenge and debate the recently popular and constantly growing emphasis on Design Science in the Information Systems field as mainly advocated in North American-based publications. We wish to recognize that other traditions in IS research recognized and practiced world wide have not lost importance.

The number of recent Design Science publications (e.g., Gregor and Jones 2007; Hevner 2007; Iivari 2007; Peffers et al. 2008; MISQ Special Issue on Design Science Research, the number of conferences (e.g., DESRIST – www.desrist2008.cis.gsu.edu; WITS - www.citi.uconn.edu/wits2008) and conference tracks (e.g., ICIS 2008 - "Design Theory and Research"; AMCIS 2008 – "Philosophical Underpinnings of IS Development and Design Science Research") leaves no doubt about the impact the movement has had.

But is it a bandwagon as we have seen before in the IS field or is it a genuine and valuable new wave? Is this new approach to Design Science revolutionary, evolutionary, or merely re-labeling of research practices that have been around for years and which have produced outstanding results? March and Smith (1995) identify four possible design outputs: constructs, models, methods, and instantiations, providing a framework for understanding Design Science. Based on that classification, many excellent IS papers, including some theory development papers, could also be claimed as Design Science contributions. Even more research papers could be tagged Design Science, if one follows the view that Design Science papers attempt to provide a "proof" of the proposed design ("Design-science research relies upon the application of rigorous methods in both the construction and evaluation of the design artefact", Hevner et al. 2004, p. 83).

Session Structure

The panel chairs will briefly introduce the topic and the panelists, and guide them through two rounds of controversial statements by the panelists. After each round, they will also moderate the audience discussion for question and answers.

In the **first round**, panelists will briefly outline their rather different experiences with Design Science projects and elaborate on their experience with having pursued Design Science activities as cornerstones of their academic activities / portfolio.

Alan Hevner presents a North American view of Design Science that emphasizes the need for both a "relevance cycle" and a "rigor cycle" in the research. As co-author of one of the seminal IS Design Science papers (Hevner et al. 2004), he stands for the rather recent, but already quite dominating, view of Design Science in the IS field. He states why he believes a "rethinking" of Design Science in the IS Community was and is needed to elevate design research to an equal footing with other research paradigms in IS research projects.

Eric Clemons finds the idea that Design Science has achieved hegemony in IS research seems at best vaguely amusing, like arguing that dynamic programming had hegemony in operations research or that Parisian cooking had achieved hegemony in food; there is more to optimization than dynamic programming and more to operations research than optimization, and there is more to fine cuisine than Paris, or even than all of France. Survey data demonstrate that in entire IS disciplines (and in his in particular), Design Science is neither cited nor considered salient by authors or referees.

Guenter Mueller argues that in universities and science there is room for everything. However, a topic to be included must have at least three characteristics: contribution – it must add to the knowledge base of man-kind; vision – it must serve some purpose lifting it beyond existing practice, impact – it must provide actual solutions to perceived or real problems. Most IS designs rely on existing technology, they may be practically valid, but often lack the visionary element that allows for real progress and that begs the question of where Design Science can lead us.

Albert Angehrn builds on his extensive experience of designing systems for companies, research project sponsors, and his own "product line" - globally used simulation software for management education. He would hope to never have considered designing anything that does not aim at "relevance" - real world problems or - even better - real world demand. Having been successful on a top business school with his approach, he sees publications mainly as ex-post bi-product which should never take precedence over the actual design needs.

In the **second round** panelists abstract from their own experience and discuss the different Design Science opportunities in different academic systems and the pros and cons of different understandings of "Doing Design (Science)".

Alan Hevner shares his experiences and views on several key questions concerning Design Science research in IS. As a Senior Editor of MISQ, he discusses criteria for publishing design research in the top international journals. Based on his recent assignment at the National Science Foundation, he addresses how design research attracts external funding in the U.S. Finally, from a North American perspective, he will reflect on how design research can become more valued in the academic IS Community, for example in P&T decisions.

Eric Clemons points out that even if one were to accept that Design Science is dominant at the moment, that still says very little about how one would do or judge research. Research needs Relevance (why should anyone care about the work?), Rigor (why should anyone trust the work?), and Passion (why did the authors care enough to do the work?). Following an apparently dominant paradigm produces irrelevant work, usually with pseudo-rigor, and demonstrably lacking in passion or conviction. Instead, regardless of the label, one should do what one believes in and accept what is rigorous and relevant.

Guenter Mueller notes that IS Design is successful when it applies a range of methods, is guided by vision and has a positive impact on society. The Design Science approach with its dependence on the IT artefact, approved methods and models lacks the vision to recognize potential winners. Reliance on single methodologies such as those provided by Design Science would not have given us the world wide web or the explosion in new applications. Examples include the rise of Google, open source systems like Linux, SAP and many others. Of course Design Science has taken its place amongst the many approaches, but the methodological focus can only be the "means to the end".

Albert Angehrn finds the idea of designing systems, in cooperation with partners who very often come from practice - to be much more rewarding than aiming at a publication which - at its best - can serve one's own promotion and tenure ambitions or a school's research reputation. He also notices that such activities get a lot of recognition not only in and from practice, but also form academic audience in case he and "his design colleagues" mix and mingle with purely academic events. While he admits that it is tough to combine such design and development focus with regular publication requirements, he is amused that nowadays writing about activities similar to his is counted as Design Science and finds increased entry into scientific journals.

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Panelists' Bios

Frank Land (chair and moderator) is Emeritus Professor in the Information Systems and Innovation Group, Department of Management, London School of Economics. After a career in the computer industry dating back to 1953 with LEO Computers he joined the London School of Economics in 1967 on a grant to establish teaching and research in the then new topic of Systems Analysis for Information Systems. In 1986, he became Professor of Information Management at the London Business School. He has been a Visiting Professor at the Wharton School, Sidney University, Cairo University, Bond University, Bath University and Leeds Metropolitan University. He is a Senior Editor of JAIS. He has received the AIS LEO Award, and AIS Fellowship and an Hon. Doctor of Science from the University of East London.

Claudia Loebbecke (chair and moderator) holds the chair for Business Administration, Media and Technology Management at the University of Cologne. 2005-2006, she was President of the Association for Information Systems, 2001 - 2007 she was AIS Council member. With a PhD in Business from the University of Cologne and an MBA from Indiana University, Bloomington, she previously held the KRAK Chair of Electronic Commerce at Copenhagen Business School. She also worked and researched at McKinsey & Co., Erasmus University, INSEAD, HKUST, UNSW, University of Paris Dauphine, Bentley College, and the LSE. She has over 100 peer-reviewed publications and has consulted for a variety of multi-national companies and public institutions.

Albert A. Angehrn is Swiss, grew up in Italy, and spends most of his time in France. He holds a doctoral degree in mathematics, has been on the faculty of INSEAD, France, since 1989 and is currently professor of Information Technology and Entrepreneurship. He also directs CALT, INSEAD's Centre for Advanced Learning Technologies. One of his passions is the design of games and simulations, as he strongly believes in Learning-by-Doing. His current focus is on games providing rich learning experiences by allowing users to interact with realistically behaving virtual characters operating within realistic contexts and situations. His research has been published in several international academic journals. His projects have been awarded large research funds from the European Community, and bring him regularly in touch with interesting organizations such as IKEA or Ferrari, a number of banks and car manufacturers, and several innovative start-ups.

Eric K. Clemons is Professor of Operations and Information Management at The Wharton School of the University of Pennsylvania. He has been a pioneer in the systematic study of the transformational impacts of information on the strategy and practice of business. His interests include strategic uses of information systems, transformation of distribution channels and channel conflict, online social networks and other uses of online content to influence consumer behavior, and the risks and benefits of outsourcing and strategic alliances. He has an S.B. from MIT and M.S. and Ph.D. degrees from Cornell University. He has over 30 years experience at the Wharton School and at Cornell University, the Harvard Business School, Hong Kong University of Science and Technology, and the Indian School of Business.

Alan R. Hevner is an Eminent Scholar and Professor in the Information Systems and Decision Sciences Department in the College of Business at the University of South Florida. He holds the Citigroup/Hidden River Chair of Distributed Technology. His areas of research interest include information systems development, software engineering, distributed database systems, healthcare information systems, and telemedicine. He has published numerous research papers on these topics and has consulted for a number of Fortune 500 companies. He received a Ph.D. in Computer Science from Purdue University. He has held faculty positions at the University of Maryland and the University of Minnesota. Dr. Hevner is a member of ACM, IEEE, AIS, and INFORMS. He recently completed a two-year assignment at the National Science Foundation as a program manager in the Computer and Information Science and Engineering (CISE) Directorate.

Guenter Mueller was founding director of the Institute of Computer Science and Social Studies in 1990, and holds the chair in telematics at the University of Freiburg, Germany. Previously, he was a director of IBM Europe and in 1985 he was founding manager of IBM's European Networking Research Centre in Heidelberg, Germany, to work on OSI and Internet. He has served on several parliamentary enquiry commissions and also on scientific advisory councils in Germany and Japan,. In 1995, he was a guest scientist at Harvard University and in 1998 at ICSI in Berkeley. He has acted as a consultant to SAP in Germany, NTT and Hitachi, Japan on work in security and human interface technology. Since 2000 he has led the focus program security of the German Research Foundation (DFN). His main research interests are security and privacy and compliance, as well as electronic commerce and risk management and compliance.