OASIS, the IFIP Working Group 8.2 research workshop
ICIS 2004 in the Conference Hotel, the Grand Hyatt Washington, in Washington, D.C., United States. The workshop will be held from 9 AM-3:30 PM on Sunday 12 December 2004.

Research in progress.
500-word abstract of your work to oasis@dsi.uminho.pt by 30 September 2004.

Mark Aakhus, Ph. D. Department of Communication
William Voon, Department of Library and Information Science
School of Communication, Information, and Library Studies
Rutgers, The State University of New Jersey

Discourse interns use to make sense of work and professional life in organizations

In this study, we examine the way interns talk about work in an online learning system designed to support reflective learning. This study is part of a more general project focusing on approaches to managing knowledge that support "reflection on practice." This project is concerned with the conceptual tensions in explicitly representing tacit understanding and how effective application design might manage such tensions. We will report an analysis of a large corpus of text (approximately 980 thousand words) produced by 395 students over 7 semesters of an internship program. The first phase of this study involves reconstructing the discourse about work used by students when interacting with each other about the dilemmas they experience in work and professional life. To the degree that such a discourse presents itself, we are interested in explaining how interns, by using this discourse, frame the dilemmas they experience and approaches for handling those dilemmas. To do this we perform discourse analysis using computer aided text analysis tools. The second phase of this study involves examining how interns use the learning system and how that use is consequential for representing tacit understanding. Toward this end, we examine specific design features of the application and their uses. We are interested in whether the design features of the application contribute to the user's ability to construct a genre of reflective interaction. To do this we perform discourse analysis using computer aided text analysis tools.

The overall study is rather ambitious for one presentation so we plan to report our ongoing findings and the implications for theory and design. We hope to show ways in which discourse and text analysis can be used in assessing information systems and knowledge management applications. The analysis should help generate a better understanding of the ways people, novices in particular, understand work. The analysis may also reveal ways to improve intervention into learning and knowledge management processes. We hope to contribute to a better understanding of knowledge management, which is an important contemporary problem for organizations and society. The intention is to see how systems designed to enhance people's ability to reflect on problems in the workplace can thus be used to provide an interaction space where members of an organization freely contribute their thoughts about problems that they encounter in their routine organizational life. Much literature on KM points out the difficulty in getting employees to contribute to knowledge managements systems. A yet unrealized hope of KM research is that instead of relying on organizational coercion to induce knowledge sharing, KM approaches would provide interaction spaces that promote the discourse of work practice/problems. In this way, then, the results of this study may be of practical and theoretical importance.

The Computer Made Me Do It:
Toward 101 Examples and a Theory of Computer Dysfunction

Steven Alter
University of San Francisco
alter@usfca.edu

Alice received a new bank account number after her bankcard was stolen. Subsequently, her husband wrote a check to transfer money to her account from another account. The bank placed a "hold" on that money until the check cleared. Alice went to the bank.

Alice:	"We have made this same transfer many times with no delays."
The teller:	"I'm sorry, but this is a new account."
Alice:	"No, I have been a bank customer for 14 years."
The teller:	"This is a new account."
Alice:	"That's ridiculous. You know this is the same account."
The teller:	"I'm sorry but the computer won't let me release the funds."

In other words, "I'm sorry, I know this is a bit ridiculous, but the computer made me do it." As computerized controls on transaction systems and other systems become more pervasive, various forms of this excuse are becoming more common.

Assume we had 101 brief stories that actually happened and whose last sentence could have been "I know this is a ridiculous, but the computer made me do it:" Assume the stories are organized using a straightforward theory of computer dysfunction that classifies and explains such situations. The combination of theory and examples might extend the systems analysis and design subfield by helping system designers anticipate and minimize these problems as the computerization of work expands in the future. It could also be used by managers and business professionals trying to understand and avoid the various versions of the excuse "the computer made me do it."

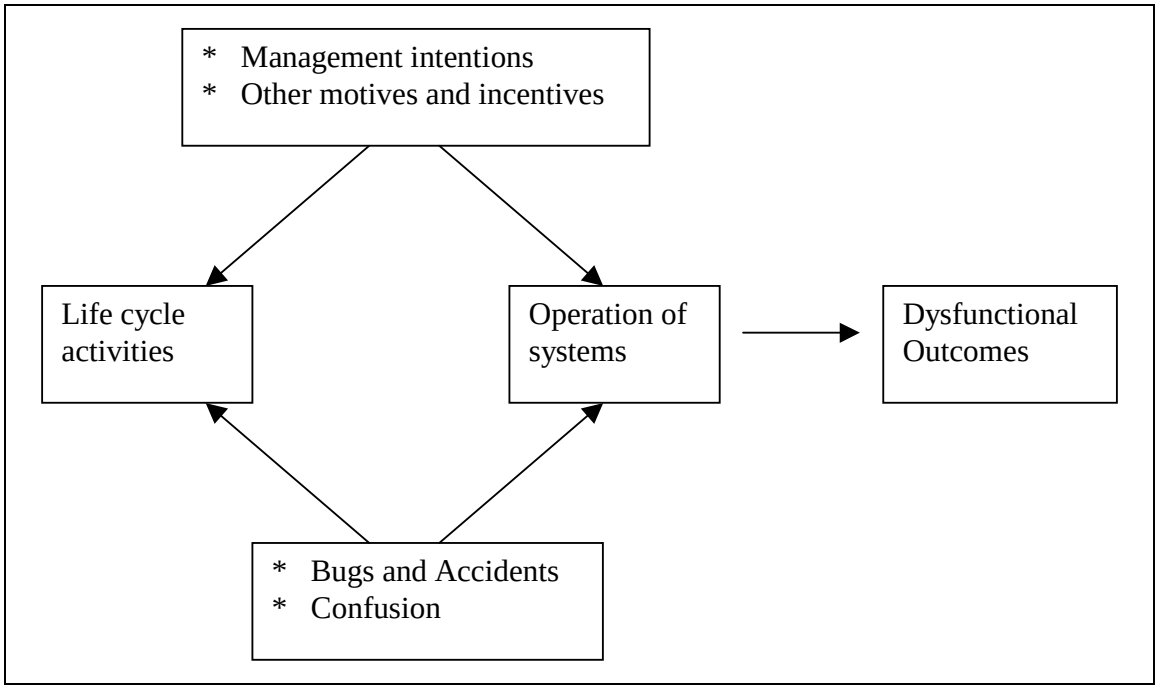
The first stage of this research involved a research assistant's efforts to find examples in the Risks Digest (http://catless.ncl.ac.uk/Risks/) and in books and articles on technology- or computer-related problems. The first 40-50 examples were filtered to eliminate examples that were about computer downtime or other uninteresting factors. The remaining examples were classified using various criteria in an attempt to move toward an explanatory theory.

Typical root causes of these situations included various combinations of:

- Management made specific requests without fully analyzing or understanding the consequences.
- Designers designed systems or specified business rules without fully understanding management's requests.
- Programmers programmed systems or business rules that missed nuances that the designers understood.

- Application packages could not support detailed logic that made sense in particular situations.
- Programmers did not debug software fully.
- The business situation changed, making old software inconsistent with current realities and therefore requiring odd workarounds.
- The users didn't understand aspects of the available software.
- The users didn't understand aspects of their own jobs.

These root causes can be reduced to a model that starts with intentions and design and extends through system in operation and dysfunctional outcomes.



The next step in the research is to find additional examples, re-examine the model, and elaborate on root causes and how their effects propagate through subsequent life cycle stages.

Ubiquitous Transport Systems: Assessing the Mobile-Stationary Divide

Magnus Andersson, Rikard Lindgren & Ola Henfridsson
Viktoria Institute, Göteborg, Sweden

Extended abstract

Facilitated by rapid developments in mobile and wireless communication technologies and continuing miniaturization of computing devices, the emergence of ubiquitous computing offers new possibilities and opportunities for organizations attempting to improve their productivity and effectiveness (Lyytinen and Yoo 2002). In particular, the promises of ubiquitous computing are attractive to organizations in which coordination of diverse sets of mobile units are central to organizational performance.

As an example of such organizations, road haulage firms typically coordinate a workforce mainly consisting of drivers who are geographically distributed and constantly moving, providing timely pickup and delivery of goods. Plagued by low margins and intensive competition, road haulage firms have therefore directed their information technology investments at implementing new ways to rationalize internal communication, facilitate seamless processes, improve resource control, and support decision making (Andersson et al. 2004). Evident in these investments is the desire of organizational and technological integration of people as well as the systems they use. However, a central problem to realizing the vision of a 'total solution' (Brown and Vessey 2000) to their information needs is the mobile-stationary divide of existing advanced technologies.

The mobile-stationary divide refers to the set of organizational, social, and technical problems associated with integrating stationary office information systems (such as accounting and order entry systems) with mobile applications (such as embedded vehicle sensor networks and telecommunication services). Overcoming the mobile-stationary divide is vital for road

haulage firms seeking to interconnect various technological, social, and organizational elements into an assemblage that enable physical and social mobility of computing and communication services (cf. Lyytinen and Yoo 2002). Indeed, the vision of "ubiquitous transport systems" (UTS), *i.e.*, seamlessly integrated computing environments applicable to the transport industry, involves dwelling with the multitude of applications emerging in the road haulage business. By including previously inaccessible distributed and mobile actors and equipment, such new applications include features for:

- *Resource Coordination:* The positions of individual trucks can be presented on maps, offering the dispatcher a quick overview of the geographic distribution of the resources.
- *Route Calculation:* Route calculation done by the driver in the field or by the dispatcher is intended to minimize the cost of an assignment in terms of time and fuel expenditure.
- *Vehicle Maintenance:* Recording of vehicle performance parameters to facilitate optimal decisions on when to service individual trucks.

In this research-in-progress paper, we present a qualitative study of the mobile-stationary divide in practical efforts to implement instances of UTS in road haulage firms. The study is part of an action research project named "Value-Creating IT for Road Haulage Firms". Our collaborative action research project (Mathiassen 2002) is conducted as a joint effort involving academics at the Viktoria Institute in Göteborg, road haulage industry representatives, a number of road haulage firms, and system vendors. Recognizing the need to concretize and analyze the IT artifact as part of research on the interplay between technology and organization (Monteiro and Hanseth 1995; Orlikowski and Iacono 2001), we conduct a close examination of the technology *per se*. Such a technology review is vital when conducting research on UTS as an emerging form of information systems. The review is based on qualitative interviews with system vendors, product

information, and demonstrations of the systems. Having examined existing technology, we then proceed to the user experiences of the investigated systems. Empirical data was collected in a qualitative interview study involving managers, traffic controllers, and truck drivers from five road haulage firms using these systems.

The paper contributes to the early stage of the ubiquitous computing research tradition in the field of information systems. We discuss the complexity that transport organizations face when trying to integrate mobile and stationary components in enterprise wide ubiquitous infrastructures. Our discussion address, for example, the critical challenge of how to create a supporting infrastructure (involving heterogeneous, geographically distributed computing resources) that spans far beyond the stationary parts of a transport organization. We also elaborate on what social dimensions the construction of such infrastructures will involve.

REFERENCES

Andersson, M., Wridell, Y. and Lindgren, R. (2004). A Qualitative Interview Study Investigating the Role of Transport Information Systems in Road Haulage Firms. In Proceedings of IRIS-27. [Selected for plenary presentation]

Brown, C. and Vessey, I. (2000). ERP Implementation Approaches: Toward a Contingency Framework. In Proceedings of the 20th International Conference on Information Systems, pp. 411–416.

Lyytinen, K., and Yoo, Y. (2002). Research Commentary: The Next Wave of Nomadic Computing. Information Systems Research, 13, 4, pp. 377-388.

Mathiassen, L. (2002) Collaborative Practice Research. Information Technology and People, 15, 4, pp. 321-345.

Monteiro, E., and Hanseth, O. (1995). Social Shaping of Information Infrastructure: On Being Specific About the Technology. In Information Technology and Changes in Organisational Work, W. Orlikowski, G. Walsham, M. R. Jones and J. I. DeGross (eds.), Chapman & Hall, pp. 325-343.

Orlikowski, W.J. and Iacono, C.S. (2001). Research Commentary: Desperately Seeking the "IT" in IT Research - A Call to Theorizing the IT Artifact. Information Systems Research, 12, 2, pp. 121-134.

ITC Support for Deliberative Communications

- A significant gap in IS research?

Zaheeruddin Asif	MIS Department, Fox SBM, Temple University, Philadelphia Zaheeruddin Asif <zasif@temple.edu>
Heinz K. Klein	School of Management, SUNY Binghamton, U.S.A. "Heinz K. Klein" <hkklein@binghamton.edu>

Abstract

It has been said that true democracy is possible not through free speech but through deliberative speech. According to Jürgen Habermas, deliberative communications are those that are carried out in a space relatively free from domination and fear with an objective of sincerely reaching mutual understanding or agreement on issues that need informed consensus. In that sense, deliberative communications about issues concerning common interests of society form the core of deliberative democracy and are, of course, only possible, if freedom of speech and peaceful assembly are established civil rights. However, such communications can take place at any level, including commercial organizations, and small groups that respect the human rights to privacy and security.

The Internet *supports a large variety* of communication patterns through technologies such as e-mail, list servers, instant messaging, discussion forums, and now increasingly through blogs, online magazines, wikis (which allows groups to jointly create and edit Web pages, cf. http://msnbc.msn.com/id/5954306) and sites facilitating government to community interactions. The ability of the Internet to *support deliberative communications* can profoundly influence the conceptualization and functioning of democratic states as well as institutions and organizations. The interest in deliberative potential of the Internet has been increasing at an exponential rate over the past decade and a half. We have seen mushrooming growth in web-based projects claiming to promote deliberative communications. These include some government websites offering spaces for public deliberations.

The principal purpose of this paper is to establish the large gap between the general significance of the topic of deliberative communication for IS research and the lack of attention to this topic in our premier journals. The conclusions will outline the need for an appropriate theory base for developing ITC support for deliberative communications at all levels of society, but in particular at the level of organizations and governmental institutions.

We will first present a survey summarizing the purpose, functionality, orientation, and scope of eight such projects including; Consulting Canadians, Meetup, Minnesota e-Democracy, UK online, OpenDemocracy, e – the people, GRASS, and Blogs. Yet only one of the above projects, namely GRASS, has a theory-based design and can be classified as an academic project. A short survey of top four IS journals will be presented to draw attention towards the paucity of IS research in this area. One of the reasons for

this general lack of theory-based projects may be that the traditional IS research has confined itself to the organizational level. Academic IS research on interaction of ICT and society is almost non-existent despite the availability of a huge amount of grey literature on the subject. This has lead to a significant gap in officially refereed IS research.

The paper will argue for expanding the scope of IS research to investigate the potential of ICT for supporting deliberative communications. At the level of society this research must deal with issues such as the effects of ICTs on politics, public sphere, democratic systems, lifeworlds and social integration. We suggest that Jürgen Habermas theories of communicative rationality and the public sphere are well poised to provide a foundation for such research. Other important theoretical insights to be considered in discussing the potential and limits of IT-mediated deliberative communications have come from Bourdieu, Foucault, Gadamer and Giddens. A variety of IS applications already support public sphere deliberations like blogs, group- and free wiki software. However, similar issues exist at the level of economic organizations in the realms of participatory policy debate, implementation, decision-making checks and balances and responsiveness of the organizational leadership to the needs and concerns of the rank and file. The lessons learned by examining ICT at the societal level should be used to cross-fertilize research on communication applications at inter- and intra-organizational levels such as intra-nets and GDSS.

We end by outlining our plans for future research in these areas and believe that IS strategy implementation will have to be rethought in light of emerging insights on the importance of a public sphere in Western democracies. We also anticipate critical methodological issues. They include operationalization of theoretical constructs such as public sphere and communicative rationality, empirical testing of theoretical propositions as well as the creation and site testing of prototypes of which GRASS provides and interesting first example.

Literature:

To be listed at the presentation.

Knowledge Management at SMEs: Five Unique Peculiarities

Yukika Awazu
Institute for Engaged Business Research
The Engaged Enterprise
555 West Madison Street
Tower 1, Suite # 3705
Chicago, Illinois 60661
USA
Phone: +1 312 207 1577
E-mail: awazu@engagedenterprise.com

Kevin C. Desouza *
Department of Information & Decision Sciences
University of Illinois at Chicago
601 South Morgan Street, M/C 294
Chicago, Illinois 60607
USA
Phone: +1 312 829 8447
E-mail: kdesou1@uic.edu

* Corresponding Author

September 8, 2004

Submitted to: **Organizations and Society in Information Systems (OASIS) 2004 Workshop**

Abstract

In this article we discuss five peculiarities about knowledge management practices at Small-to-Medium sized Enterprises (SMEs). We draw our findings from a nine month investigation of knowledge management practices at 25 SMEs. Managing knowledge is a critical capability for SMEs to master because it helps them leverage their most critical resource. Organizational knowledge is the most salient resource at the disposal of SMEs in terms of availability, access, and depth. Successful SMEs are those who can leverage their knowledge in an effective and efficient manner, so as to make up for deficiencies in traditional resources, like land, labor, and capital. In our research, we discovered that SMEs do not manage knowledge the same way as larger organizations.

Briefly, the five peculiarities of knowledge management at SMEs are the following. The [1] Dominance of Socialization in the SECI Cycle: Nonaka and colleagues developed the knowledge creating cycle comprising of four activities – socialization, externalization, combination, and internalization (SECI). As postulated by Nonaka and colleagues, in any organization, working through the SECI cycle helps in the generation, transfer, and application of knowledge. While we did find instances of the SECI cycle in motion, however we would argue that it was a variant of the SECI model – the SECI model. The process of socialization dominated all other activities of the SECI model. Socialization was the predominant way through which knowledge transfer occurred from owner to employees and between employees. [2] Common Knowledge: In SMEs, we were pleasantly surprised to see the prominence of common knowledge in terms of both depth and breadth. Most SMEs we researched had deep-levels of common knowledge, i.e. each employee had very similar foundation and grounding in organizational matters. Due to training initiatives, each employee is given a deep introduction into the way the SME conducts business. It is because of this that employees can frequently, and often do, fill in for one another. The deep level of knowledge along with the breadth of common knowledge also facilitates ease of communication and sensemaking. Common knowledge forms a shared context for interpretation and communication. [3] Knowledge Loss – Not a Problem: We asked SMEs how they faired with issues of knowledge loss. Surprisingly, many remarked that they never considered it a real problem or issue. At first glance, we thought this can be attributed by the fact that these businesses have only been in existence for a few years and hence did not have much knowledge to lose. On further probing, we discovered that the answer was not that simple. Some of the mature SMEs in our sample had deliberate mechanisms in place to prevent knowledge loss from becoming a problem. [4] Exploitation of External Sources of Knowledge: SMEs have a knack for exploiting foreign sources of knowledge. Since they are resource constrained, and cannot spend efforts to create knowledge, they look outside the organization for knowledge. [5] People Centered Knowledge Management: SMEs knowingly or unknowingly, manage knowledge the right way – the humanistic way. Technology is never made part of the knowledge management equation. The use of technology in an SME is mostly limited to acts of automation (such as the use of cash registers) and at times for informative purposes (storing of employee contact information in databases). Technology is never used as a means to manage knowledge. Knowledge is created, shared, transferred, and applied via people based mechanisms. These include the use of face-to-face meetings, observations, apprenticeship training methods, etc. Knowledge generated is immediately put into practice, rather than being stored in some obscure technology artifact, like a database. Putting knowledge into practice helps in immediate institutionalization of the insight and the improvement of work practices.

In conclusion, viewing SME knowledge management practices as scaled down versions of the practices found in larger organizations is incorrect. SMEs have understandable resource constraints, and hence have to be creative in working around these limitations in order to manage knowledge. Therefore, the goal of this paper is to shed some light on peculiarities in SME knowledge management practices, with the hope of enticing scholars and practitioners to follow-up with more detailed research undertakings.

Keywords: SMEs; Small-to-Medium sized Enterprises; Knowledge; Knowledge Management; Capabilities

Social Capital as a Motivator, Integrator and Facilitator of Knowledge Integration in Inter-Organizational IS Projects

Mamata Bhandar
National University of Singapore
disbm@nus.edu.sg

Shan-Ling Pan
National University of Singapore
dispansl@nus.edu.sg

Bernard C.Y. Tan
National University of Singapore
dishead@nus.edu.sg

Puay Guan Goh
Manager,Operations and Technology
Sembcorp Logistics
pggoh@yahoo.com

ABSTRACT

Inter-Organizational collaborations in various forms like joint ventures, strategic partnerships, short-term contractual engagements, are rife for several reasons including the rapid assimilation of new and specialized knowledge [2, 3] into the organization. One prevalent form of such inter-organizational arrangements are IS projects considering the fact that most IS projects in the present day involve at-least two organizations. The simplest case could involve a client and vendor, and the others may involve a third party consultant, or in some cases multiple software vendors. The knowledge required for the implementation of a IS project is present in different entities (e.g employees, processes, documents) within each of the collaborating organization and hence has to be integrated [7]. This process is conceptualized as 'knowledge integration'. It involves the combination of relevant knowledge across the participating organizations (e.g. process knowledge of the client and software knowledge of the vendor), its application to the context, and the reconfiguration of work practices in the affected organizations (e.g. client accommodating the changes as a result of the IS/IT solution project).

The process is challenging as knowledge is often dispersed, differentiated and embedded [7], more so in inter-organizational IS projects, since organizations are intrinsically different in physical characteristics (operations, business and size), social traits (culture and priorities) and may have conflicting interests. Time and again, the importance of social capital for 'knowledge integration' [4,7] as well as for building inter-organizational relationships [5,6] has been emphasized, leading us to believe its potential influence on knowledge integration in inter-organizational IS projects. Albeit the indication, prior studies shed light on

the exact interaction between social capital and knowledge integration. *This study therefore proposes to investigate the role of social capital on knowledge integration in inter-organizational IS projects* through a multiple case research strategy, building on knowledge integration and social capital literature.

As part of the multiple case research strategy, a case-study was conducted on a collaborative supply chain project that was embarked upon by three organizations who were logistics partners for seven years, through an IT supply chain integrator. The extreme diverse profiles of the participating organizations and the potential social capital among them owing to their long-term association made an interesting case for this study. The study adopted the OMA (opportunity, motivation and ability) schema of social capital proposed by Adler and Kwon [1], to investigate knowledge integration in the collaborative project. Preliminary findings of the OMA analysis reveal at least three roles of social capital: Motivator, Integrator and Facilitator of the process of inter-organizational knowledge integration, over the lifecycle of the project. In doing so, the study also refines the original OMA schema by identifying a new set of enablers of OMA that vary over the life cycle of an inter-organizational project. The OMA analysis will be replicated in distinct case settings.

REFERENCES

[1] P.S. Adler and S.W. Kwon, Social Capital: Prospects for a New Concept, Academy of Management Review 27, No. 1(2002)17-40.

[2] M. Alavi and A. Tiwana, Knowledge Integration in Virtual Teams: The Potential Role of KMS, Journal of the American Society for Information Science and Technology 53, No.12 (2002)1029-1037.

[3] R. Grant, Prospering in dynamically-competitive environments: Organizational capacity as Knowledge Integration, Organization Science 7, No.4 (1996) 375-387.

[4] J.C. Huang, S. Newell, and S.L. Pan, The Process of Global Knowledge Integration: A Case Study of a Multinational Investment Bank's Y2K program, European Journal of Information Systems 10, No.3 (2001)161-174.

[5] P. Kale, H. Singh, and H. Perlmutter, Learning and protection of proprietary assets in Strategic Alliances: Building Relational Capital, Strategic Management Journal 21,No.3 (2000)217-237.

[6] J.P. Liebeskind, L.O. Amalya, Z. Lynne, M. Brewer, Social Networks, Learning and Flexibility: Sourcing Scientific Knowledge among New Biotechnology Organizations, Organization Science 7, No. 4, (1996) 428-443.

[7] S-L. Pan, S. Newell, J.C. Huang, and A.W.K. Cheung, Knowledge Integration as a Key Problem in an ERP Implementation, Twenty-second International Conference on Information Systems, New Orleans-USA (2001) 321-328.

Submitted to:
Organizations and Society in Information Systems (OASIS) 2004 Workshop

Summary Title:
Changing Society with Information and Communication Technologies: An Investigation of Technological Determinism

Category:
Research in Progress

Author:
Pratyush Bharati
Assistant Professor
Management Science and Information Systems
College of Management
University of Massachusetts, Boston
Boston, MA 02125-3393
Phone: 617 287 7695
Fax: 617 287 7877
E-mail: Pratyush.Bharati@umb.edu

Changing Society with Information and Communication Technologies: An Investigation of Technological Determinism

Introduction

The popular and academic literature has claimed the arrival of a digital world. A world in which there is universal access to the technologies of and information from the Internet. This transformation of the world, as a result of information and communication technologies (ICTs), is not limited to ICT but involves a transformation of the society as a whole. Prognostications abound about the societal transformation that the Internet will usher. These and other benefits of IT create the conditions for "friction-free capitalism" (Gates, 1995), "the death of distance" (Cairncross, 1997; Dyson *et al*, 1996; Toffler, 1980), "weightless world" (Coyle, 1997), or "digital economy" (Shaw, 1999; Tapscott, 1998), amongst others.

Accounts of this nature are called nomological accounts of technological determinism (Bimber, 1994). This research explores and investigates the 'information technology driven societal change' accounts, and pertinent history of technology, especially ICTs, for these accounts. The research also investigates the global diffusion of information and communication technologies, especially country-level patterns of diffusion, to contrast with technologically deterministic utopia. The existence of the digital divide implies that these technologies are not even able to diffuse themselves to create the conditions for social change. Thus the existence of the digital divide will be an important refutation of technological determinism. Although, concerns have been expressed about technological determinism by researchers in IS, there are no research articles on this topic. Therefore, it is important to investigate technological determinism in the context of ICTs.

Brief Literature Review

The visions of a new world whether digital, weightless or friction free because of ICTs are propounded by influential people, academics, or otherwise. As academic information systems researchers we have a responsibility to provide a profound and critical analysis of the technologies and systems we study and not be charmed by the popular rhetoric. Nevertheless, academics have been influenced by a world vision not always grounded in facts and history. Recently a management of technology researcher has also argued "… researchers in our field run the risk [of] being too easily enamored by the novel. Even when one is but an observer at the leading edge, wonder can sometimes overpower skepticism…" (Barley, 1998, pg. 237). Researchers in the IS field have also argued for a more balanced view (Baskerville and Myers, 2002; Hirschheim and Klein, 2003; Markus and Robey, 1988; Orlikowski and Iacono, 2000; Orlikowski, 1992; Sarker and Lee, 2002).

Recently, IS researchers have criticized the popular portrayals of the "digital economy" as inappropriate and misleading (Orlikowski and Iacono, 2000) and have stressed that history helps in comprehending the "depth and breadth of contemporary meaning" (Hirschheim and Klein, 2003). This research also takes the view that we as information systems educators and researchers should critique this illusion about technology in general and information and communications technology (ICT) in particular. We need to

propound a more historically and factually grounded view of ICTs, their impact on organizations and vice versa.

Methodology

The historical accounts are being selected because the views are nomological accounts of technological determinism. Nomological accounts of technological determinism claim that social change is a direct result of technology. Technological determinism is not new and people have held these views even in the nineteenth century. The study will be investigating these accounts. The research is also analyzing country level data for investigating the digital divide. It explores this issue by analyzing the data about the Internet and other information and communication technologies (ICTs). The cluster analysis categorizes and compares several different grouping of countries for various ICTs.

Research in Progress

As I progress with this research, I am looking for constructive feedback from the IFIP 8.2 group on the following:

Are there any new studies that should be incorporated?
What other historical accounts should be considered?
What other quantitative or qualitative methodologies could be applicable?
What other related research questions should be studied?

References

Barley, S. R. (1998), "What can we Learn from the History of Technology," Journal of Engineering and Technology Management, (15), pp. 237-255.

Baskerville, R. L. and Myers, M. D. (2002), "Information Systems as a Reference Discipline," MIS Quarterly, (26:1), March, pp. 1-14.

Bimber, B. (1994) "Three Faces of Technologican Determinism," in Does Technology Drive History, Edited by M. R. Smith and L. Marx, The MIT Press, Cambridge, MA.

Cairncross, F. (1997), The Death of Distance: How the Communications Revolution Will Change Our Lives, Harvard Business School Press, Boston.

Coyle, D. (1997), Weightless World: Strategies for Managing the Digital Economy, Capstone Publishing, Oxford.

Dyson, E., G. Gilder, G. Keyworth, and A. Toffler, (1996), "Cyberspace and the American Dream," The Information Society, (12:3), pp. 295-308.

Gates, B. (1995), The Road Ahead, Viking, New York.

Hirschheim, R. and Klein, H. K. (2003), "Crisis in the IS Field? A Critical Reflection on the State of the Discipline," Journal of the Association for Information Systems, (4:5), October, pp. 237-293.

Markus, M. L. and Robey, D. (1988), "Information Technology and Organizational Change: Causal Structure in Theory and Research," Management Science (34), pp. 583-598.

Orlikowski, W. J. (1992), "The Duality of Technology: Rethinking the Concept of Technology in Organizations," Organization Science (3), pp. 398-427.

Orlikowski, W. J. and Iacono, C. S. (2000), "The Truth Is Not Out There: An Enacted View of the "Digital Economy," in Brynjolfsson, E. and Kahin, B. (Eds.) Understanding the Digital Economy: Data, Tools, and Research, MIT Press, Cambridge.

Sarker, S. and Lee, A. S. (2002), "Using a Positivist Case Research Methodology to Test Three Competing Theories-in-Use of Business Process Redesign," Journal of the Association for Information Systems, (2:7), January.

Shaw, M. J. (1999), "Electronic Commerce: State of the Art," Conference on E-Commerce in the Global Marketplace, University of Illinois, Urbana-Champaign, April 15.

Tapscott, D. (Ed.) (1998), Blueprint for the Digital Economy: Wealth Creation in the Era of E-Business, McGraw Hill, New York.

Toffler, A., (1980), The Third Wave, Morrow, New York.

IT architectures and Enterprise Systems integration in SMEs

Marc Bidan, University of Nantes

email: marc.bidan@iut-nantes.univ-nantes.fr

Frantz Rowe, University of Nantes *(corresponding author)*

email : Frantz.Rowe@sc-eco.univ-nantes.fr

Duane Truex, Florida International University

email: Duane.truex@fiu.edu

IT architectures and Enterprise Systems Integration in SMEs

ABSTRACT:

This paper is based on an empirical study of the IT architectural integration or federation efforts within 143 small to medium enterprises (SMEs) in France in 2002. In the main the literature bases its findings from studies conducted in large enterprises, yet in Europe SMEs account for more than 60% of economic activity and have needs and organizational structures that are distinct from the larger enterprises. Thus lessons from these firms should be taken into account in the discourse on enterprise architectural integration or federation. This research identifies three archetypes for integration in French SMEs, of which only two, hybrid integration, partial integration, make serious efforts at whole sale enterprise systems integration standards. Based on this analysis another key finding is that in the diffusion process of an ERP system, is in the way success is intrinsically linked to the role of IT architecture.

Keywords:
Integration, IT architecture, SME (Small to Medium Enterprise), ERP, EAI, Database

IT architectures and Enterprise Systems Integration in SMEs

Introduction

This paper is intended to explore the issue of the standardization of IT architectures specifically as it relates to small and medium enterprises. Much of the current literature examines IT architectures through the lens of the large enterprise in many countries it is the small to medium enterprise (SME) that is the major engine of economic growth. SMEs are recognized to have less IT competences and be more prone to imitation strategies and to developing IT strategies based on standards (Raymond, 1985 ; Blili et Raymond, 1993). In France for example, the setting from which this study of 143 firms is drawn, SMEs represent half of gross national product. Given that these enterprises are economic drivers and that the competitive, economic and legal environments they face are different than their larger organizational brethren, it would be useful to know: first, if they have formalized IT architectures are there commonalities in those architectures that suggest a degree or typology of standardization. Second, if there are commonalities suggesting some kinds of standards, do they transcend the merely technical? That is, do they integrate dynamic, emergent business requirements with technical integration? In the process of addressing these issues we will examine IT architectures at a macro level. We do this by contrasting three core architectural characteristics in their relationship to the standardization of organizational work practices. The three main architectural characteristics are: uniqueness of the logical database; existence of a norm for applications, and modularity of infrastructure components. We do this using the surrogate of an ERP system to represent both the norm for application and concrete modular system interaction. In light of this typology we will discuss the issue of enforcing reference data models and meta-standards.

IT architecture and IS management

The choice and design of an IT architecture that has been a recurrent theme for IS management and academics since the very beginning of the IS discipline (Brancheau 1986[Farrell, 1985 #2)]. The notion of stable, scalable, interoperable architectures and infrastructures has consistently

appeared in the Society for Information Management (SIM) annual survey of IT management concerns and continues to appear in the IT literature on Databases, e-commerce, strategic IS Planning and software engineering. (Brousseau 1994; Colomb et al. 1995; Gomaa 1995; Hamilton 1999; Niederman et al. 1991; Sambamurthy et al. 2000; Segars 1998; Sowa 1992)

But what is difficult for a single organization's IS Department may be possible for outside vendor firms for whom building an integrated IT architecture is not a one-off project and for whom the development costs and learning curve can be distributed across many clients. In fact, it is not atypical for vendor firms to market and brand themselves based on just such competencies consultants (Attewell, 1994). That is to market themselves as providing industry-standard, future-oriented technologies such that IT investments won't be lost.

We are considering how IT architectures orchestrate the coexistence of different infrastructural technologies and applications with institutional norms and the processes using organizational data. (Ross, 2003). To do this we must ask: how might we organize the communication such that many different standardized and non standardized components coexist instead of trying standardize every component of the information system? Is there a typology of standards and organizational structures to aid in this communication? Open systems theory suggests that organization adapt to their environments and must do so without standardizing all their activities. This is especially needed when firms face strong technological uncertainty. Because organizations are far too complex to integrate under the banner of a single standard technology we wonder if it is possible to find meta-standards allowing the integration of the management information system .

What do mean by 'integrating' systems?

When searching the term integration one finds references to the integration within the individual components of infrastructures, of applications, of processes or data and less often of crossing the boundaries of all those elements in the firm. Some point to database integration as an indication of progress. For some researchers database integration is considered to be a "natural progression in the development of database systems" (Cheney and Kasper, 1993, p.28). MIS integration has

also made some progress on the application side with ERP. But often ERP systems allow for integration across limited domains in a firm, in some cases exacerbating the islands of automation dilemma when the functional coverage is narrowly defined. This is seen in firms implementing an ERP in one setting, such as production or marketing without considering the broader organizational considerations. In these settings the ERP, rather than providing greater organizational systems integration, simply creates stovepipes of localized integration. Overall integration is stymied, and the benefits or 'standard' solutions backfire. Yet researchers and vendors continue to pursue the holy grail of the integrated IS and promise that standardized solution will yield positive results. But what is the reality of such IT architectures? Will standardized one size fits all types of solutions yield their promised benefits? Organization s are themselves rarely 'standard' and 'one size'. For, as Markus reminds us, "Even with today's "standard" packages and technologies, companies have unique internal systems environments" (Markus, 2001, p.175). This suggests that in any infrastructural acquisition and implementation decision the organizations must take the lead and to define its reference data and process models and set up a policy of standards in each of these domains.

The paper proceeds as follows: in section two we review prior research on IT architectures and the integration of Information Systems. Section three explains the research methodology. Section four presents results and a taxonomy of architectural standards in the sample of French SMEs. Section five discusses the findings and draws conclusions for future research.

Prior research

IT architectures, integration and standards

Ross reminds us that the concept of an 'IT architecture' itself lacks a universally accepted definition. (Ross, 2003, p.31). For our purposes we will introduce three concepts to help refine the concept of an architecture. The first term 'urbanization' explicitly refers to the territories where management information resides and flows between databases, applications, sub-systems, and describes the modalities of this flow. And secondly, to us the notion of an 'architecture' describes the logic and support technologies of an 'urbanization' of information technology

components. The terms are different and the difference is important. The architecture is the logic of a plan. It is the rationale behind urbanization or the realizing and detailing of the plan. The architecture is that which makes the urbanization possible. For example, the architecture of Paris mandated the general notion of a city centre with avenues radiating out from the center to a point six kilometers out where a ring road would be constructed. The building and placement of the roads, parks, statuary, bridges and public places represents the urbanization of the architecture. The urbanization is the detailing and realization of the plan. The plan can, of course, be detailed or realized in different ways. We next apply this distinction in the context of Ross's recent work.

To Ross (2003, p.37), there is a three stage evolution as companies develop IT architectures covering data, infrastructure and applications (Cf. table 1). This architectural evolution both (1) operationalizes the *de-facto* relationship between IS integration and IS urbanization by underlining the essential role of the architecture in the firm's performance and (2) shows the integration and appropriation process of information technologies as a pre-cursor to the integration of MIS applications. This means then that the IT architecture provides operational support to the MIS and integration is the linking up of components of the IT architecture.

	Application Silo Architecture stage	**Standardized Technology Architecture stage**	**Rationalized Data Architecture stage**	**Modular Architecture stage**
IT capability	It applications serve isolated business needs	Firm-wide technology standards	It focused on wiring core process	Modules enable business model extensions
Key management innovation	Technology enabled change management	Standardization and exception management refresh	Recognizing essence of business	Practices faciliting reusability
Business case for IT	ROI of applications	Reduced IT costs, interoperability	Improved business performance; Integration	Speed to market; Strategic agility
Locus of control	Local control	Senior management support of CIO	Senior management, IT and process leadership	Senior management, IT, process and local leadership
Key governance issues	Estimate, measure, communicate value	Establish (local/regional/global) standard setting, exception & funding processes	Determining core processes and finding priorities	Define boundaries for business experiments

Table1. Characteristics of the architecture stages (Ross, 2003, p.41)

The objective of linking the components is to give the MIS integration both technological and organizational dimensions. That is more than a technological interconnection between data and applications, but also a sharing of processes and methods across organizational boundaries. This privileges the role of the IT architecture in the IS integration process. It is more than its infrastructure and applications dimensions because viewing IT architecture only as a kind of collection of technology standards does not explicitly consider business requirements (Ross, 2003, p.32). Rather one needs to place technology standards in the context of the business and its larger set of institutional requirements. So, Ross does not deal with the specific support technologies for integration.

In contrast to this position, in 2000 and 2001 Markus described current enterprise integration practices that suggests a extended notion of the relationship of the IT architecture to the goal of integration. But she also informs us that the global systems integration while growing is still

found wanting and that "…today's painfully and expensively integrated internal systems may not satisfy tomorrow's needs for external business integration." (Markus, 2001, p.179).

Dismissing application-interface integration as insignificant Markus illustrates how intra-organizational integration follows three possible paths (Cf. Table 2). Categories of systems integration are (1) data warehousing (Data extracts technology), (2) enterprise systems (ERP technology) and (3) re-architected systems (EAI/Middleware technologies). Each of these categories has "pros and cons" depending on organizational and competitive environmental factors and explaining four (data, application, process and inter-organizational) integration levels (McKeen and Smith, 2002, p.451).

Broad categories of systems integration	**Databases**	**Architecture**	**Major integration tools**	**Major integration practices**	**Major integration impact**	**Major de facto standard**	**Major integration level**
Data warehousing	Several DBs with extraction to a data warehouse for processing and analysis	Three structure	Data warehouse	Extraction and pertinent processing of data	Structuring of data and updating of processing	Data extracts process	Data
Enterprise systems	Several DBs but only one logical DB	Modular	ERP	Re-engineering of processes	Real time, unique reference and cross-functionality	**1. Single Logical Database** 2. Modular architecture	**Process**
Re-architected systems (EAI)	Several DBs but only one logical DB	Modular and tree structure	Middleware, EAI platform *(many to many)*	Interconnection of application's DBs	Perpetuation of existing systems	Middleware	Application
Interface	Several DBs	Hybrid	Interface (One to One)	Interconnection of few applications and/or DBs	Partial Integration	Application Connectors	Application

Table 2. Three (Plus One) broad categories of systems integration (Markus, 2000)

These solutions can each be complimentary, as shown by the conjunction of ERP and Data warehouse or substitutable as illustrated by still-maturing EAI technologies. The need for data warehousing *in addition* to ERP stems from the need to integrate data from other sources. This when two companies merge, one have to abandon its investment before integrating their systems in order to develop *EAI to EAI hookups*. Broad categories and the interface one are differentiate by their architectures, databases and tools, practices and impacts. We can in fact underline that "It is just that data warehousing and enterprise systems are more mature than the re-architected solutions is" (Markus, 2000). We will focus on this broad categories of systems integration – pure and hybrid – and their implementation to describe IT architecture in French SMEs.

Categorizing integration

Referring to table two we see that, on the one hand, data warehousing achieves data integration without changes in source systems or business process, but on the other hand it cannot compensate for poorly designed data structures in source systems. Nor does it support process integration. Conversely, ERP systems achieve excellent internal data and process integration, when all legacy systems are replaced, but it often requires extensive organizational change. This requires substantial organizational involvement in system justification and implementation. Moreover ERP systems do not even provide integrated reporting and analysis environments combining both internal and external data. Lastly, Enterprise Applications Integration (EAI), achieves internal data integration and can support process integration without replacement of legacy systems. Like ERP it also supports use of "best-of-breed" applications from multiple vendors. However, EAI requires modification of source systems. Thus process integration using EAI requires organizational change and organizational involvement. While it leaves the organization with vestiges of its original and familiar systems, SMEs are still suspicious about the maturity of this technology.

These "pros and cons" explain how there tend to be many mixed partial implementations wherein firms may often combine bit of each of these technologies. Even among those firms deploying ERP systems very few firms adopt all process modules, thus not opting to be totally married to the integration and standardization options provided by the ERP (Themistocleous *et al*, 2001;

Elamrani *et al*, 2003). Markus acknowledges these combination phenomena and observes that mixing modes of integration may be the only viable option for some firms.

Markus and Ross each evokes the urbanization of an IS as the *organization of relationships between applications* but with different emphases distinguishing what *may be termed 'federated' versus 'integration' models*. The federated model implies a loose alliance of system components, where the integration model implies a much tighter marriage, alignment and interdependence of system elements. This urbanization presented by Ross and by Markus can be presented cartographically, with several levels corresponding to the different uses of each sector. The degrees of application integration define the open zones for sharing of information denoting a high level of integration. The closed exclusion zones denote a high level of federation. The federation of systems describes a kind of architecture wherein the emphasis is upon coexistence versus tight integration. It describes a loose interaction of system elements such that there is just enough cooperation to deal with the task at hand. It is a kind of partial integration poised somewhere between global integration and the absence of integration allowing (Bidan and Rowe, 2004). There are examples in system domains. "Federated database systems [that] represent a compromise between no integration (e.g., the user is forced to interface with each autonomous systems) and total integration (e.g., where the autonomy of individual system is sacrificed so that user can access data through a global interface but cannot directly access anyone data base systems as local user)" (Cheney and Kasper, 1993, p.28). From the experience of the federated database we may then infer that a federated architecture is appropriate for integrating sets of autonomous and heterogeneous database systems into a system that allows partial and controlled sharing of data without affecting existing applications. (Seth and Larson, 1990).

Now lets us apply this taxonomy to an information system with several data processing applications. From a technical standpoint it is characterized, by its interconnections between applications, its database(s) and the interface between users and applications.

Considering the different types of architectures, we see that the federated system offers very limited standardization in all three architectural domains. In such a system we find , several and

possibly inconsistent types of man-machine interfaces, difficult not seamless connections between applications and several different logical databases.

Integrated information systems offer different types of standardization based on its architectural type : an IS based on an ERP system would offer a consistent type of user-machine interface, real time interconnection with a single logical database. It provides a standard for each architectural domain; Data Warehouse offers standardization in data mining, access and reporting and traceability and updating. It provides a standard in terms of user interface and query language; an EAI offers a meta-standardization based on database conversion protocols ; in other words it provides standardized organization of communication between modified application programs, the new database and those of the remaining legacy systems.

Research Method

Perhaps because of the topics complexity, with few exceptions (notably Tractinsky and Jarvenpaa, 1995), the empirically based literature on the design and IT architecture is mostly based on case studies (Irani, 2003). While we have contributed to that literature as well, (self citations removed during review), we felt it necessary develop an exploratory quantitative survey to better examine the diffusion of IT architectural standards. The study targeted the midsize market segment using the ERP vendor's market criteria designating firms having between 30 and 3000 employees as 'midsized'. We began knowing the purchase decision criterion considered to be of paramount importance for this market segment is "the fit with current business processes" (Van Everdingen et al., 2000). Often termed Small to Medium Enterprises (SMEs) these 'midsized' firms are a large and important sector throughout Europe. In Europe, 1.1 million firms employ between 10 and 249 employees and contribute 40% of the total European economic turnover[1]. In France, SMEs of between 10 and 499 employees represent more than half of the private employment and contribute 40 % of the turnover as well. These firms, like their larger brethren, are courted by a host of ERP vendors and system integrators.[2]

[1] « Les entreprises en Europe », 4ème rapport Eurostat, 1996

[2] The list includes SAP (business one), MBS Navision (axapta), Adonix (x3), Intentia (movex), Oracle, Sage, etc. and integrators Cap Gémini, E&Y, and Sopra among others. Some firms market sole to SMEs (Bidan, 2001; De Dreuzy et Akoka, 1996). And SMEs tend to demand quicker results at lower cost than larger firms (concerning *IDE* see Raymond et Bergeron, 1996).

Data collection

Survey data was gathered during spring 2002. One author had developed a firm contact list of over 600 French firms during his supervision of student internship placements. Starting with this database, he selected the 223 firms he knew to be concerned about their information system organisation. He asked them if they would agree to answer to a short and explicit questionnaire *about the integration of its MIS and - if they had any - about their ERP and related impacts.*

The survey instrument was pre-tested with 13 integration practitioners, project managers and CIOs who helped clarify terminology and cut the length of the questionnaire. In fact, 23 SMEs had some terminological questions requiring clarification before replying. Those questions dealt with the meaning of the terms “satisfactory integration” (Singletary, 2003) and with the nature and classification of integration tools (Markus, 2000). In particular several SME’s did not clearly understand the data warehouse concept. So, when it was determined that none of our survey set deployed data warehousing (and only “single database”), this item was removed.

We yielded 143 useable surveys. This remarkable 64% response rate can be explain by the fact that during our pre contact inviting firms to participate, all 223 firms had made a promise to return the questionnaire against complete results of the research. We also followed up with telephone questions when surveys were incomplete such as the modules deployed. But even with our telephone follow-ups 61 firms never completed the instrument. Out of the 156 questionnaires finally received in July 2002 we had to eliminate another 13 considered inconsistent or illegible. We believe that our ‘high touch’ process of data collection explains the high response rate and the high quality of the data obtained. By comparison and earlier attempt to survey SMEs using ‘cold call’ mailed instruments SMEs in Paris netted a paltry a 15 % response rate.

The survey had two main parts. The first part addressed the degree of IT architectural integration by including questions asking the degree of system integration. Part two was divided in 4 sections covering, ERP deployment, BPR and organizational change, system and firm flexibility, and finally impact on work organization. Part two was completed only by companies which had had an ERP deployed for at least six months and at least two modules from the same ERP vendor.

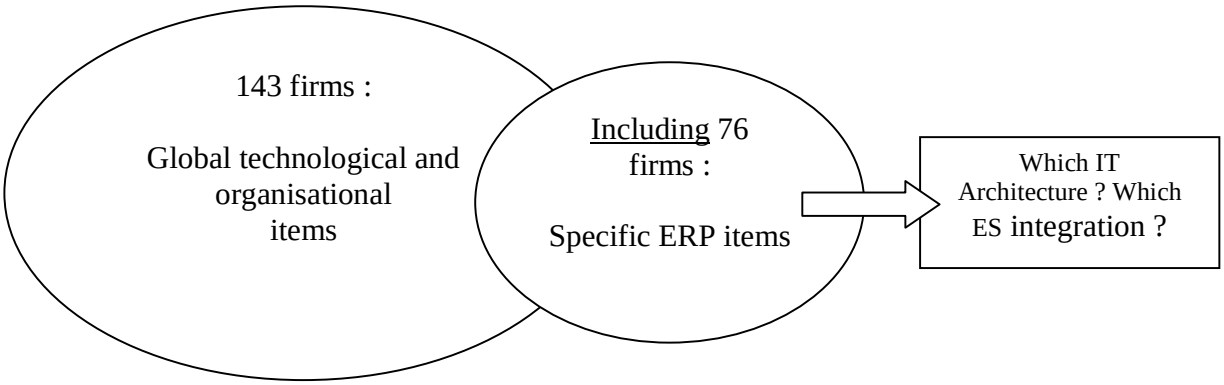


Figure 1. data collection methodology

Measures

The survey instrument opened with 16 items covering contextual and demographic issues before turning to issues dealing with the type of IS integration and ERP implementation. These items were drawn from the literature as follows

A. Contextual/demographic Items
What is the number of employees in your firm?
What is the main activity in your firm ?
What is your main organizational type ?
What is the age of your organization?
What is your position/status in your organization?

B. technological Items
How many ERP packages have you implemented in your firm?
How many ERP modules have you implemented in your organization?
Have you implemented any " support function" type module?
Have you implemented any " core function" type module?
How many legacy system do you have in your organization?
Do you have any support application program in your organization?
Do you have any core application program in your organization?
Do you have a common database for MIS?
Do you have a unique referential for working together in the firm ?
Do you use an EAI platform or middleware for MIS?
For *you* is your MIS satisfactory integrated ?

Table3. Items

Statistical tool and tests

Our analysis began with elementary descriptive statistics. We used the software SPAD.N version 3.21, developed by Lebart, Morineau & Warwick (1984) for the power of its descriptive tools classifying statistical individuals by characteristic modality and for the relevance of its aggregated criteria of the Value Test (VT). The tool identifies and systematically sorts, among the variables included in a model, those (discrete or continuous) significantly related to a specific variable.

The test compares various proportions using, on the one hand, Chi-Square for discrete variables and, on the other hand, a statistic related to Student t for continuous variables. The computed statistics are converted into a probability level, allowing for a simultaneous sorting of both types of variables. In other words, in ordre to assess the differences between percentages or average means, SPAD.3.21 performs differents statistical tests (hypergeometrical law for proportions and corrected Student T for average means) that the software expresses in number of ecarts types of a Normal law. The value test, VT, equals this number of ecarts-types (for VT >2, this ecart type is significant at the 5 % error threshold.

RESULTS

Partitioning the sample

We begin this section by examining the relevance of an n-wise partitioning of the sample into 2, 3 and 5 categories. We do this by analyzing before and after comparisons of the ratio of interclass inertia to total inertia. We only present the ratios, as selected by the software, retaining the partitioning offering both the greatest statistical stability – the least change in the ratio before and after consolidation – and the most relevant empirically. For the partition into two categories achieved stability after two iterations, when the change in the inter-class inertia was almost null (0%). In the case of the 3, 5 and 7 categories, the consolidation stopped after three iterations. Table 4 gives the main characteristics of the different partitioning and shows the changes in the inertia ratio before and after each iteration. The 3 category partition, while the second best, has been selected for its richer empirical relevance.

Best partition combinations in n categories by the change of relative inertia (n = 2 by10)	Number of firms in each category (N=143)	Inter class inertia / total inertia ratio. Before the consolidation of the partition	Inter class inertia / total inertia ratio. After the consolidation of the partition	Change in inertia ratio (After/Before)
2	C1 = 61 / C2 = 82	0.2648	0.2648	1
3	**61/29/53**	**0.3485**	**0.3513**	**1.0080344**
5	61/29/10/11/32	0.4595	0.4668	1.0158868
7	33/7/21/29/10/11/ 32	0.5226	0.5324	1.0187524

Table 4. partitioning

Because its inertia ratio reaches stability quickest the optimum partitioning, in the statistical sense, is the one proposing *only* two standards in terms of MIS IT architectures (respectively for 61 and 82 firms). As described earlier, this partitioning shows clearly that IT architecture first differs by the federated *versus* the integrated archetypal distinction. It then is partitioned by (value test of 13,52/14,65) ERP or not ERP (explaining uniqueness of DB) all with a size effect at around one hundred employees.

The federation type displays the following characteristics:

- No ERP (VT = 13.52)
- Not a unique logical database (VT = 13.52)
- More than 8 specific applications (VT = 4.49)

While the integration type displays the following characteristics:

- One ERP (VT of 14.65) ;
- Unique logical database (VT of 4.28)
- Having between 4 and 8 modules deployed (VT of 6,21).

The federation category (representing 61 firms or roughly 43% of the population) is more homogeneous. The "integration" category can be fragmented, which is proposed by the partitioning in 3, then 5 categories. The partitioning in 7 categories fragments simultaneously the two archetypes of the very first partitioning. The partitioning in three categories is satisfying in terms of change of inertia ratio and more interesting than the mere distinction between the two archetypes. We will therefore focus on this taxonomy in the following.

A taxonomy in three meta standard MIS IT archetypes

The hierarchical tree was thus segmented in three categories or classes. We will describe them using only variables for which VT >2 (i.e. less than 5% threshold error) and can therefore be considered or statistically significant. Variables always appear by decreasing order of characterization of a category.

First category: Federation

We call this category " Federation " and not federated, because our cases show that there is not a clear urbanization policy in this category. However, there is a trend toward a vision of the MIS that calls for some understanding of its urbanization, Its is becoming quite rare that firms use applications in completely closed silos, even in this category. However the logic of the Federation IT architecture is not that of integration, as we shall see. In this and following tables "SA" refers to Specific Applications (autonomous) as they are alternatively called in the literature.

Category 1	**42.66%**	**Federation**

	Value Test	Category/Attribute	Attribute/Category	Total sample
No ERP	13.52	100	100	42.66
Support SA	8.54	78.26	88.52	48.25
Core SA	8.22	76.06	88.52	49.65
> 8 SA	4.49	80	39.34	20.98
No unique DB	4.28	49.19	100	86.71
< 100 employees	2.55	53.33	65.57	52.45

Table 5: Federation

In column 1, the Value tests indicate that the Federation type is strongly characterized by the lack of ERP systems, and therefore have a large number of autonomous specific applications, (SA) both for operation and support functions. This category tends to lack a unique logical database and is made up of rather smaller firms of fewer than 100 employees The architecture looks like a set of heterogeneous applications with few interfaces, and is a non-modular hierarchical architecture of a tree type.

The second and third columns in the Table allow for a closer description of the category by the variables. As an example we will describe the line " No unique database ". No unique database is a modality of the corresponding discrete variable. We see that 100 % the firms of this category display that modality. Overall it is also the case of 86.71 % of the total sample. Conversely, 49.19 % of the firms of the total sample with no unique logical database fall in the Federation category. These firms have specific applications without ERP modules in both core activities and support activities.

The environment of these rather smaller firms does not seem very aggressive. Many of the cases we have studied in this category could be termed "defenders" (Miles, Snow, 1978). The standard IT architecture we found in this firm typically resembles the following Figure 2:

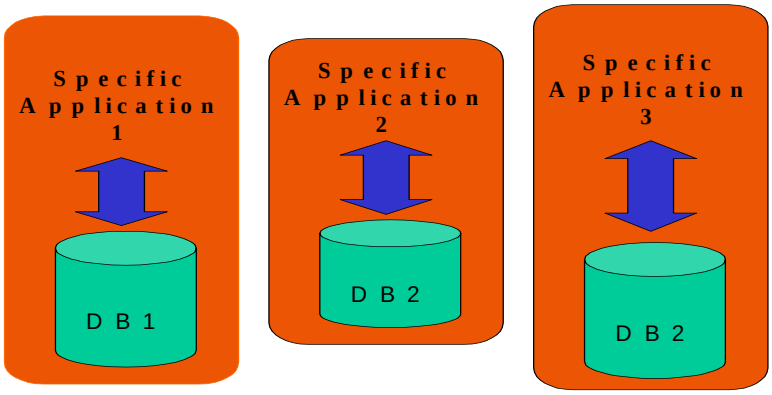


Figure 2. federated IT architecture

Category 2: Partial Integration

Category 2	**20.98%**	**Partial integration**

	Value Test	Category/Attribute	Attribute/Category	Total sample
1 to 3 modules	8.56	92	76.67	17.48
A unique ERP	6.49	41.10	100	51.05
1 to 3 SA	6.45	52	86.67	34.97
Support module	4.83	36.99	90	51.05
< 100 employees	4.67	36	90	52.45
No support SA	4.27	35.14	86.67	51.75
No EAI	4.06	35.21	83.33	49.65
Core module	3.17	32.39	76.67	49.65
No core SA	3.09	31.94	76.67	50.35
< 5 years old	2.94	30.38	80	55.24
CEO responding	2.82	38.46	50	27.27

Table 6: Partial Integration

This partial integration category of firms is characterized by the limited coverage (in terms of modules) of the ERP since 77% of the firms in this category have from 1 to 3 modules deployed. However, 100 % of the firms of this class have a unique ERP, 90 % for at least one module for its support activities and 77% for its core activities. With no EAI platform in 83%, one to 3 specific applications and no significant indication regarding the uniqueness of the logical database, we can only consider that it is an IT architecture best characterized by partial integration.

These firms are of rather modest size, since 90 % of this class have fewer than 100 employees, and young, since 80 % of them are less than 5 years old. Their CEO is heavily involved as he or she is leading the project and responding to the questionnaire.

We can represent the standard type of MIS IT architecture of this category in the following Figure :

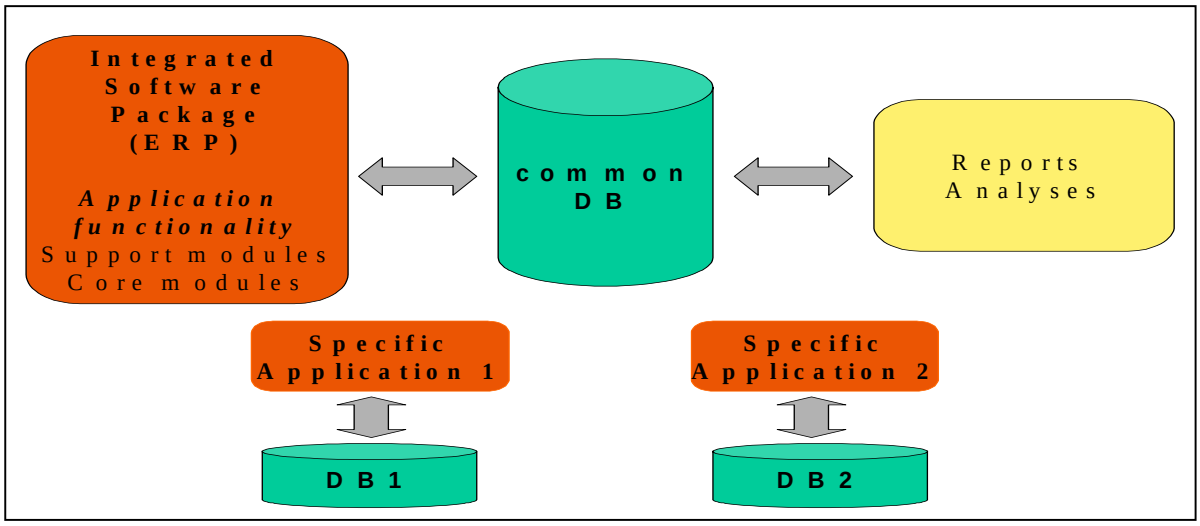


Figure 3. Partial integrated IT architecture

Category 3 : Hybrid Integration Architecture

Category 3	**36.36%**	**Hybrid Integration**

	Value Test	Category/Attribute	Attribute/Category	Total sample
Core module	7.97	67.61	92.31	49.65
4 to 8 modules	6.99	84.21	61.54	26.57
Support module	6.89	63.01	88.46	51.05
A unique ERP	5.71	58.90	82.69	51.05
> 8 modules	5.5	94.74	34.62	13.29
No core SA	5.46	58.33	80.77	50.35
No support SA	4.83	55.41	78.85	51.75
4 to 8 SA	4.44	57.14	69.23	44.06
> 501 employees	4.27	78.26	34.62	16.08
Unique DB	3.83	78.95	28.85	13.29
Several ERP	3.81	100	17.31	6.29
101 to 500 employees	3.39	57.78	50	31.47

EAI Platform	2.56	47.22	65.38	50.35

Table 7: Hybrid Integration

In this, more than in the previous categories, we find firms with a single unique database (29 % of firms). We also note that they are equipped with one (83 %) or more (17%) ERPs with more extensive functional coverage. This category generally has 4 to 8 modules (62 %) with more than a third having (35 %) more than 8 modules. They have at least a core activity module (92 %), and a support activity module (88%). In transitions to ERP most firms appear to have abandoned autonomous specific application for its core (81 %) and support (79 %) activities. They do often, have an EAI platform (65%). A third of this category are the largest firms of our total sample. This category represents 79 % of the firms having a unique logical database, and because they have generally an ERP and an EAI, they are the closest to the Integration type, although this is an hybrid of Markus typology (2001). We can sketch the standard type of MIS IT architecture of this category in the following Figure :

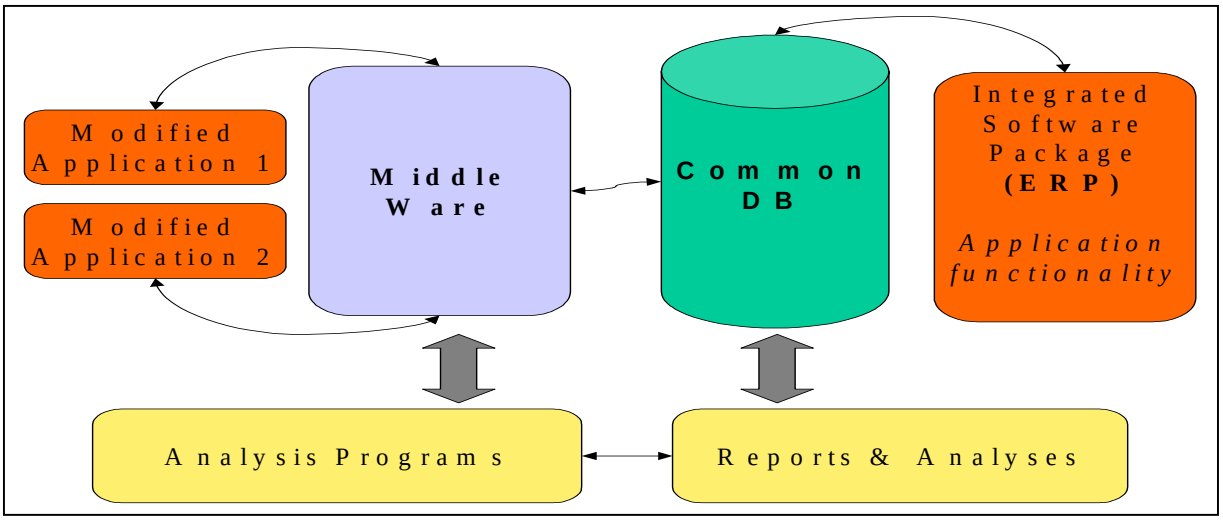


Figure 4. Hybrid integrated IT architecture

Therefore three main IT architectures stand out for MIS in this data set from French SMEs. Roughly characterized in this taxonomy they underline some real new faces in IS issues (Pollar et al, 1998). The first kind, 'federation', is typical of an entrepreneurship behavior – independence and defense - close to the world of smaller SMEs (Authors, forthcoming). However what we

have learnt here is that since there is no explicit or apparent integration strategy the CIO can be in charge of the IT architecture. When, however, there was a trend towards greater architectural integration, as is in he case of the second two categories, called 'Hybrid' and 'Partial Integration', we found it necessary to dig deeper yet. In so doing we observed interesting effects related to managerial involvement, the dynamics of innovation, and the standardizing effects, which contrasted sharply with the federated architectural types.

Conclusions

The paper not only explores the integration/federation of meta-systems from a technical viewpoint. We believe that this paper contributes to the literature by exploring the magnitude and type of meta-standardization derived in the implementation of ERP systems in SMEs.

There are several limitations inherent in the study. They may derive form the newness of the study, the cultural setting and the sample of firms chosen for the research. Such empirical studies are rare; additional studies will help further our knowledge of this standardizing process. We did not intend to test a model. The statistical analysis could characterize better C2 and C3 with further analysis and more data. This exploratory study is designed to test the existence of *de facto* versus *de jure* architectural standards. If apparent standards were found it was hoped we could identify candidate types. Follow up work is required. For example, it would have been interesting also to have a complementary survey on the leadership role in the case of federated architecture, even though the issues of standard is not as prominent in that type of firm. This is the first study of this type using French firms. And while we know of no substantive cultural difference that would not allow for some generalization from these findings, they are nonetheless drawn from a single cultural backdrop. Finally, the study set was conducted on a fair sized set of small to medium enterprises. And while that was our intended sample, it does not include very large firms nor does the sample include very small firms.

Having identified what we believe to be the contributions and the limitations of the study we will summarize our findings.

- We found three kinds of IT architectures for MIS in small to medium enterprises in France. However, there found no evidence for a 'pure' type of IT Architecture that means one based totally on a single tool. Even so this paper offers several important insights.

- Despite the inroads made by ERP vendors in convincing SMEs to adopt ERP implementations, Federated architectures are still numerous in the SME community.

- Partial IT architectural integration forms are found in SME's, especially when the goal of the IT architecture project is to structure the company.

- The greater the size of the firm, the greater the IT Architecture integration in SMEs. The highest integrated form in this population combines EAI with ERP; it is an hybrid form that departs from a clean slate approach (Davenport and Stoddard, 1994)

- The meta-standardization of IT architecture is principally based on the modularity of applications and depends to a much lesser extent on a standard database and on standard processes even if those processes are customized *vis a vis* the software vendor.

- The move towards meta-standardization of IT architecture is by no means deterministic. The IT architecture stage model of Ross was been derived from the study of *very large* firms. Strategically some firms will not go for modularity and integrated architectures, preferring the federated form instead.

Finally it appears that to deploy the tools without standardization leads to a degradation of the overall competitiveness of firms and the sectors in which they compete. This is why the genuine indicator of the value of the integration of the information systems is not the deployment of technology but the standardization of the processes through the company and industry. One can always deploy technology without standardizing the processes. But technological standardization alone does not guarantee improvement in organizational performance.

Clearly we need to dig deeper into the enforcement process of standardization. We believe that this will require qualitative field studies. Another interesting problem would be to analyze the satisfaction with the degree of integration achieved and to learn more about the drivers of that satisfaction. We hypothesize that in each category, there are firms that are satisfied and others that are dissatisfied with their integration. It would be interesting to know the role data standards versus technology standards play in achieving satisfaction. This would lead us towards greater the issue cognitive integration around the issue of standards (Beretta, 2002)

Bibliography

Alsene, E. “Computerized integration and the organization of work in enterprise”, *International Labour Review* (133:5-6), 1994, pp. 657-677.

Attewell, P. ”Technology Diffusion and Organizational Learning: The Case of Business Computing”, *Organization Science*, (3:1), 1992, pp. 1-19.

Avital, M., and Vandenbosch, B. "SAP Implementation at Metalica: An Organizational Drama", *Journal of Information Technology* (15:3), 2000.

Bassett, P. "Reusability: You reap what you sow," *Software Magazine [SMG]* (14:9) 1994, pp 110, 109.

Besson, P.and Rowe, F. “ERP project dynamics and enacted dialogue : perceived understanding, perceived leeway, and the nature of task-related conflicts”. *Database for Advances in Information Systems.* (32:4), 2001, pp. 47-66.

Bidan. M., ”Intégration du Système d’Information et Marché des ERP”, 6th Conference of Association Information et Management, Nantes, 2001, pp.239-248.

Bidan, M., Rowe, F. (2004), “Urbanization practices and strategic behavior: Openness of architecture and enactment in two medium sized companies”, *9th* Conference of Association Information, *Evry, Mai 2004.*

Blili, S., and Raymond, L. “Information Technology : Threats and Opportunities for Small and Medium-Sized enterprise”, *International Journal of Information Management* (13:6), 1993, pp.439-448.

Brancheau, J.C., and Wetherbe, J. C. "Information Architectures - Methods and Practice," *Information Processing & Management* (22:6) 1986, pp 453-463.

Brousseau, E. "EDI and inter-firm relationships: toward a standardization of coordination processes?," *Information Econimics and Policy* (6) 1994, pp 319-347.

Brown, C. V. and Vessey I., “Managing the next wave of enterprise systems : leveraging lessons from ERP”, *MISQ Executive*, (2:1), March, 2003, pp.45-57

Brown, C.V.,and Magill, S.L., “Alignment of the IS functions with the enterprise: toward a model of antecedents”, *MIS Quarterly*, (18:4), 1994, pp.371-403.

Cheney, P.H., and Kasper, G.M., “Responding to World competition : developing the global IS professional”. *Journal of Global Information Management,*. (1:1), 1993, pp.21-31.

Colomb, R.M., and Orlowska, M.E. "Interoperability in Information-Systems," *Information Systems Journal* (5:1) 1995, pp 37-50.

Davenport, T., and Stoddard, D. “Reengineering: Business Change of Mythic Proportions?”, *MIS Quarterly*, (18:2), 1994, pp. 121-127.

De Dreuzy, E. and Akoka, J. “Accompagner le changement chez l’utilisateur : le cas de Air Inter”, *Systèmes d’Information et Management*, (1:2), 1996, pp.61-78.

El Amrani, R., Bidan, M., Geffroy-Maronnat, B., Marciniak, R., and Rowe, F. “ERP Implementation and change: towards a cross-functional view”, 11th European Conference on Information System, Napoli, Italy, 2003

El Amrani, R., Bidan, M., Geffroy-Maronnat, B., Marciniak, R., and Rowe, F. “ERP Implementation, Cross-functionality and Critical Change Factors”, Proceedings of the 5th International Conference on Enterprise Information Systems, Angers, France, April 22-26, 2003, pp.600-619.

Evan, W.M. “Organizational Lag”, *Human Organization*, (25), 1966, pp.51-53.

Gerwin, D. “A Theory of Innovation Processes for Computer-Aided Manufacturing Technology”, *IEEE Transactions on Engineering Management*, (35:2), 1988, pp.90-96.

Gomaa, H. "Reusable software requirements and architectures for families of systems," *Journal of Systems & Software [JSS]* (28:3) 1995, pp 189-202.

Habrias, H. *Dictionnaire Encyclopédique du Génie Logiciel*, Editions Masson, Paris, 1997.

Hamilton, D. "Linking strategic information systems concepts to practice: systems integration at the portfolio level," *Journal of Information Technology* (14:1) 1999, pp 69-82.

Hanseth, O., Ciborra C.U., and Braa, B. “The Control Devolution: ERP and Side Effects of Globalization” *The Data Base for Advances in Information Systems*, (32:4), 2001, pp.34-46.

Irani, Z., Themistocleous, M. and Love, P.E.D. ”The impact of EAI on information system lifecycles”, *Information and Management*, (41:2), 2003, pp. 177-187.

Lebart, L., Morineau A., and Warwick, K.M. ”*Multivariate Descriptive Statistical Analysis: Correspondence Analysis and Related Techniques for Large Matrices*” Wiley Series in Probability and mathematical statistics, John Wiley & Sons. 1984.

Linthicum, D. *Enterprise Application Integratio*n, Addison-Wesley, Massachusetts, 1999.

Markus, M. L. ”Paradigm Shifts - E-Business and Business/Systems Integration”. C*ommunications of the AIS. (4:10), 2000.*

Markus, M. L. ”Reflections on the Systems Integration Enterprise”. *Business Process Management Journa*l. Special Issue on ERP, (7:3), 2001, pp.171-180.

Markus M. L., and Tanis C. “The Enterprise System Experience: from Adoption to Success”, in *Framing the Domains of I.T. Management*, Zmud R. (ed.), Cincinnati: Pinnaflex, 2000, pp. 173-208.

McKeen, J.D. and Smith, H. A., “New Developments in Practice II: Enterprise Application Integration”, *Communication of the AIS*, (8), 2002, pp.451-466.

Menard, C. "On clusters, hybrids and other strange forms. The case of the French Poultry industry", *Journal of Institutional Theory and Economics*, March, 1996.

Miller, D. “Configurations of Strategy and Structure : towards a synthesis”, *Strategic Management Journal*, 1986, pp.233-249.

Mintzberg, H. "The design school : reconsidering the basic premises of strategic management", *Strategic Management Journal*, (11), 1990, pp. 171-195.

Mintzberg, H. *Mintzberg on Management: Inside ou Strange World of Organizations*, New York: The Free Press, 1989.

Niederman, F., Brancheau, J.C., and Wetherbe, J.C. "Information systems management issues in the 1990s," *MIS Quarterly* (15:4) 1991, pp 477-499.

Pollar, C.E ,and Hayne, S.C “The changing Face of Information system Issues in Small Firms”, *International Small Business Journal*, (16,3), 1998, pp.70-86.

Radosevich, L. "Designing a growing back end," in: *InfoWorld*, 1999, pp. 34-35.

Raymond, L. “Organizational Characteristics and the Success of MIS in the Context of Small Business”, *MIS Quarterly*, (9:1), 1985, pp.37-52.

Raymond, L., and Bergeron. F. “EDI Success in Small and Medium-sized Enterprises : A Field Study”, *Journal of Organizational Computing and Electronic Commerce*, (6:2), 1996 ; pp. 171-172.

Ross, J.W. ”Creating a strategic IT architecture competency : learning in stages”. *MIS Quarterly Executive.* (2:1), 2003, pp.31-44.

Rowe, F. "Data Network productivity and competitive behavior ", *Technological Forecasting and Social Change*, (46:1), 1994, pp. 29-44.

Sambamurthy, V., and Zmud, R.W. "Research commentary: The organizing logic for an enterprise's IT activities in the digital era - A prognosis of practice and a call for research," *Information Systems Research* (11:2) 2000, pp 105-114.

Sanchez, R., and Mahoney, J.T. "Modularity, Flexibility, and Knowledge Management in Product and Organization Design," *Strategic Management Journal* (17) 1996, pp 63-76.

Segars, A.H., and Grover, V. "Strategic information systems planning success: An investigation of the construct and its measurement," *MIS Quarterly* (22:2 June) 1998, pp 139-163.

Sehth, A.P. and Larson, J.A., "Federated database systems for managing distributed, heterogeneous, and autonomous databases". *ACM Computing survey*, (22:3). 1990, pp.183-266.

Singletary, L. "Empirical Study of Attributes and Perceived Benefits of Applications Integration for Enterprise Systems ", *A dissertation for the degree of Doctor of Philosophy in The Interdepartmental Program in Business Administration*, Information Systems and Decision Sciences, Louisiana State University. 2003

Singletary, L. "Empirical study of stakeholders' perceived benefits of integration attributes for enterprise IT applications" Eighth Americas Conference on Information Systems, 2002, pp. 2573-2579.

Sowa, J.F., and Zachman, J. A. "Extending and Formalizing the Framework for InformationSystems Architecture," *IBM Systems Journal* (31:3) 1992, pp 590-616.

Tavakolian, H. "Linking the informational technology structure with organizational competitive strategy : a survey". *MIS Quarterly*, (13 :3) , 1989, pp. 309-317.

Themistocleous, M., O'Keefe R., and Irani., Z. "ERP and application integration". *Business Process Management Journal*, (7:3), 2002.

Tractinsky, N. and Jarvenpaa, S.L. "Information Systems Design Decisions in a Global Versus Domestic Context", *MIS Quarterly* (19:4) 1995, pp507-529.

Truex, D.P. "ERP Systems as Facilitating and Confounding factors in Corporate Mergers: the case of two Canadian telecommunications companies.," *Systémes d'Information et Management* (1 No. 6:Speical issue on software project management) 2001, pp 7-21.

Van de Ven A.H., "Central problems in the management of innovation", *Management Science*, (32 :5), 1986. pp.590-607.

Van Everdingen, Y., Van Hillgersberg, J., and Waarts, E."ERP adoption by European midsize companies, *Communication of the ACM*, (43:4), 2000, pp. 27-31.

Verma, P.K. "A 1984 Perspective on Developments in Computer Communication Systems," *Computer Networks & ISDN Systems* (9:1) 1985, pp 43-48.

Weick, K. *The social psychology of organizing*, Reading, MA: Addison-Wesley, 1976.

DOES "PUBLICNESS" MATTER IN INFORMATION TECHNOLOGY IMPLEMENTATION?

Traci A. Carte
Robert W. Zmud
Yong-Mi Kim

University of Oklahoma
Norman, OK 73019

Public administration researchers have struggled for decades to understand the "publicness puzzle" – whether publicness does or does not affect organizational behaviors (Bozeman & Bretschneider 1994). Publicness refers to the degree of the combination of three key organizational factors that moderate the organizational context: ownership, funding sources, and mode of control (Perry and Rainey, 1988). Higher levels of public control (source) on these three aspects indicate higher levels of publicness.

While previous contingency and institutional research has generally supported that internal and external environments interact and create different organizational contexts to influence the behaviors of organizational members, there is little research on how publicness, representative of a specific set of such interactions, uniquely influences behavior -- with a focus here on IT implementation behaviors. This paper both develops a more robust view of the publicness construct than currently exists in the literature and explores the influence of publicness in creating a relatively unique context within which IT implementations occur. Our premise is that while IT implementation occurs within and across environmental and organizational boundaries, the publicness construct intrudes on these environmental layers to act as a rarely studied moderator.

External environmental characteristics such as uncertainty and complexity often influence organization management and decision-making (DiMaggio and Powell, 1983; Hannan

and Freeman, 1989). Organizational characteristics such as formalization and centralization are recurring topics in the debate regarding organizational differences between public and private organizations (Bozeman and Scott, 1996; Ring and Perry, 1985; Rainey, 1979, 1983; Buchanan, 1975; Emmert and Crow, 1988; Coursey and Rainey, 1990; Zeffane, 1994; Scott and Falcone, 1998). Internal IT environmental characteristics include constructs such as the hierarchical position of IT leadership, IT decision priority, and whether organizational IT strategies focus on internal efficiency or information sharing (Bozeman and Bretschneider, 1986; Caudle et al., 1991).

Using a publicness lens as a moderator of these three levels of environments, this paper contributes to the field by synthesizing existing work in these domains and by linking differences that exist between more-public and more-private contexts to the IT implementation context. As a result, guidance is provided to researchers interested in studying more-public contexts, given the paucity of empirical work in this domain published by IS researchers. Our analyses also suggest interesting areas for future research. It is hoped that the ideas contained in this manuscript make clearer the nature of the public/private distinction and will promote a dialogue that does not presume to already know that publicness either does or does not matter, but instead seeks to explore and validate the assumption that it does.

REFERENCES

Bozeman, B. and Bretschneider, S. (1994), "The Publicness Puzzle in Organization Theory: A Test of Alternative Explanations of Differences between Public and Private Organizations," *Journal of Public Administration Theory and Research*, Vol. 4, pp. 197-223.

Bozeman, B., and Scott, P. (1996), "Bureaucratic Red Tape and Formalization: Untangling Conceptual Knots," *American Review of Public Administration*, Vol. 26, pp. 1-17.

Buchanan, B. (1975), Red tape and the service ethic: Some unexpected differences between public and private managers. *Administration & Society*. Vol. 6, pp. 423-444.

Coursey, D., and Rainey, H. (1990), "Perceptions of Personnel System Constraints in Public, Private and Hybrid Organizations," *Review of Public Personnel Administration,* Vol. 10, pp. 54-71.

DiMaggio, P., and Powell, W. (1983), "The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields," *American Sociological Review,* Vol. 48, pp. 147-160.

Emmert, M., and Crow, M. (1988), "Public, Private and hybrid Organizations: An Empirical Examination of the Role of Publicness," *Administration and Society,* Vol. 20, pp. 216-244.

Hannan, M., and Freeman, J. (1989), "The Population Ecology of Organizations," *American Journal of Sociology,* Vol. 82.

Perry, J. and Rainey, H. (1988), "The Public-Private Distinction in Organization Theory: A Critique and Research Strategy," *Academy of Management Review,* Vol. 13, No. 2, pp. 182-201.

Rainey, H.G. (1979), "Perceptions of incentives in business and government: Implications for civil service reform," *Public Administrative Review,* Vol. 39, pp. 440-448.

Rainey, H. (1983), "Public agencies and private firms: Increasing structures, goals and individual roles," *Administration & Society,* Vol. 15, pp. 207-242

Rainey, H. G., Backoff, R. W., and Levine, C. H. (1976), "Comparing Public and Private Organizations," *Public Administration Review,* Vol. 36, No. 2, pp. 233-44.

Ring, P. and Perry, J. (1985), "Strategic Management in Public and Private Organizations: Implications of Distinctive Contexts and Constraints," *Academy of Management Review,* Vol. 10, pp. 276-286.

Scott P.G. and Falcone S. (1998), "Comparing Public and Private Organizations – An Exploratory Analysis of Three Frameworks," *American Review of Public Administration,* Vol. 28, No. 2, pp.126-145.

Zeffane, R. (1994), "Patterns of Organizational Commitment and Perceived Management Style: A Comparison of Public and Private Sector Employees," *Human Relations.* Vol. 47, pp. 977-1010.

Regional cluster adoption: The role of transaction costs, resource characteristics, and technology

Grant Castner, University of Oregon and Peter Green, University of Queensland

This paper examines the factors that affect the adoption of clusters by organisations. A cluster is a group of separate firms that collaborate for business purposes. These purposes include sharing resources, promoting and selling complementary products, group purchasing, and accessing global markets. Coordination of the cluster is achieved by using information technologies such as the World Wide Web, e-mail, and intranets.

Clusters are an important government strategy to increase economic development. Government agencies attempt to provide the initial impetus for clusters to develop. These agencies base their programs on reviewing naturally occurring clusters, the advice of cluster consultants, and relevant theory (for example, Porter, 1998; Porter, 2000). The success of these government initiatives has been mixed (see Anderson (2000)). The original motivation for this paper derives from government interest in cluster development.

The main objective of this paper is to develop a model of cluster adoption. It builds on the theories of innovation diffusion, the resource-based view of the firm, and transaction-cost economics. There are three basic premises that drive our model. First, the cluster is an innovation for the individual firms that are considering its adoption. This assumption means that the attributes of innovations – namely, relative advantage, compatibility, complexity, visibility, result demonstrability, and trialability – are hypothesised to affect the adoption decision. Second, the relative advantage of cluster adoption depends on the cluster providing individual firms with valuable, heterogeneous, and immobile resources. These characteristics are drawn from the resource-based view of the firm. The cluster must also be the appropriate governance structure for the transaction, so the transaction-cost-economics factors of asset specificity and transaction frequency are predicted to positively affect relative advantage. Third, the adoption of information technologies is required to co-ordinate the activities of the cluster. The other motivation for this paper is to examine the inter-relationships among the factors that comprise these theories. In particular, the relationships among the diffusion factors are examined. The objective is to discover why the diffusion factors do not consistently predict innovation adoption

The propositions were tested using a multi-method approach. Case studies and a survey provided corroborating empirical evidence. This paper focuses on the case study results. The results indicated that relative advantage has a positive effect on the extent of cluster adoption. Furthermore, relative transaction frequency and relative resource specificity were positively associated with relative advantage. The remaining results were mixed. The case-study evidence placed greater importance on information-technology use than the survey results. Many respondents believe e-mail was vital for cluster coordination. Unlike the survey results, complexity was found not to be an important determinant of relative advantage. The diffusion factors of result demonstrability, trialability, and visibility, however, were relevant to cluster relative advantage.

The results imply that future innovation-diffusion research should consider the effects of innovation attributes on each other, as well as innovation adoption. The paper also provides guidance to consultants and government agencies on how to formulate strategies to increase cluster adoption.

Guilt or innocence in e-commerce: Knowledge and power during a criminal trial

Mike Chiasson, Haskayne School of Business, University of Calgary

In many ways, the "new economy" and e-commerce activity have challenged traditional interpretations of business and individual activity in the courtroom. As a result of its often unusual successes and failures, e-commerce activity has come under increasing scrutiny by criminal courts, federal trade organizations, and anti-monopoly regulators -- Microsoft being a popular case in this area. On occasion, it has found its way into criminal, quasi-criminal, and civil courts. Both criminal and civil courts have begun pursuing individuals, found acting as businesses or intermediaries, committing credit card fraud, fraudulent advertising, and product and service fraud.

The task of interpreting guilt or innocence in such cases has been made difficult by a collision between the apparent newness of e-commerce practices and the court's conservative approach to law, steeped in legislated laws and case precedents. The value of virtual and intangible e-commerce activities challenges the courts. What is particularly complex for the courts is the determination of guilt or innocence of the individual(s) involved in e-commerce activities, where he or she is involved in selling and buying goods that may be far removed from each other and the location of the transaction.

What I report in this paper is one criminal case, involving a woman charged with fraud for her involvement in a multi-level marketing company (SkyBiz) selling web hosting services to small business and family users. At its core, this web hosting company provides server space for users to "publish" web pages and multimedia files that they develop and serve to others who use a web browser.

The case is interesting because of the special challenges it posed to the prosecution and the defense. The prosecutors needed to deal with jurisdictional issues, the determination of product value for the service, understanding multi-level marketing generally and specifically with this company’s policies, connecting the defendant's actions with a criminal code written in the 1930s, understanding telecommunication systems, and critiquing the value of web hosting products. The defense needed to deal with the quick pace of change in the SkyBiz web hosting product, to "normalize" this company's specific multi-level marketing approach, to justify the price of an invisible e-commerce service, to overcome previous MLM cases successfully prosecuted in this jurisdiction by both the prosecutor and the appointed judge, and to justify the defendant's activities as entrepreneurial, not criminal.

To analyze the dichotomous presentation of both guilt and innocence by the two sides, I will eventually use social theoretical concepts to explain the case findings – perhaps Latourian concepts to understand the political and social construction of the two competing "black boxes" of guilt and innocence. At this juncture, the case exposes legal and public opinions about e-commerce activity as both ephemeral (smoke and mirrors) and valuable. The case illustrates how e-commerce business practices challenged the court's interpretation of product and service possibilities and value. What emerged are three discourses in collision: the law, e-commerce, and marketing.

The Beneficial Effects of Restricting Internet Speech

Cecil Eng Huang Chua
Dept. of Information Technology & Operations Management
Nanyang Technological University
aehchua@ntu.edu.sg

It is commonly held that the unregulated Internet promotes free speech. In this paper, I demonstrate the existence of suppressive speech on the Internet and its ability to stifle community speech. Community speech can exist only when suppressive speech is restricted.

Members frequent a given virtual community to: (1) communicate about particular topics, and (2) not communicate about others (i.e., non-community speech). Non-community speech reduces the utility of the virtual community in three ways. First, members must read a posting to ascertain whether it is community speech. As the proportion of non-community speech rises, members expend more effort to obtain community speech. Second, some non-community speech has negative utility. For example, Jewish virtual community members are better off avoiding anti-semitic speech. Finally, some speech (both community and non-community) encourages non-community speech. Flames and confrontational speech are examples of this third category.

In many situations, the presence of non-community speech creates the impetus to split a virtual community, thereby increasing speech diversity. Non-community speech becomes community speech in the old community, and dissatisfied members defect to the new one. However, some non-community speech (e.g., hate speech directed at community members) must be non-community speech to have its effect. Such speech can never become community speech and thus always has a suppressive effect.

To illustrate, consider the two Jewish UseNet newsgroups, soc.culture.jewish (SCJ), and soc.culture.jewish.moderated (SCJM). Both newsgroups were created as forums for the discussion of Jewish culture. SCJ is an unregulated newsgroup, while postings to SCJM are screened by a panel of moderators. As a result, many non-community postings appear on SCJ, but not SCJM. Consider this example of non-community speech:

> *Will they instead believe God in life even as they believed God at their Salvation and be saved from Satan s kingdom? Or will they reject God's promises, effectively calling Him a liar, again, as the Exodus generation?*
> What will be the outcome? February 28, 1999

The speech is defined as off-topic in the SCJ FAQ. It has negative utility, as it claims that all Jews go to hell. Finally, it promotes flame-wars. The speech is also "suppressive," because to exist, it must target a Jewish community. When Jews form alternate communities to discuss their issues (e.g., alt.humor.jewish), the suppressive speech pursues them. This causes Jews to stop participating in Jewish virtual communities.

> *the combination of the high volume of postings and the large portion of those which are either off-topic, indiscriminately crossposted … or anti-Semitic has driven many readers and posters away from the newsgroup.*
> RESULT: soc.culture.jewish.moderated moderated passes 212:34, July 9, 2000

When suppressive speech is controlled, community speech can flourish. Many Jews in SCJM state that:

> *I haven't been in that sewer [SCJ] since SCJM came on-line.*
> Re: Newbie/First-timer, June 25, 2003

In contrast, SCJ is now:

> *…a largely non-functional group dominated by anti-Semitic nutcases, with some shouting matches about Middle Eastern politics … for variety.*
> Re: Torah banned on soc.culture.jewish.moderated, April 7, 2001

Learning Outcomes: Insights from Social Cognitive Theory

Tsai-hsin Chu, National Dong Hwa University
Bob F.Y. Kuo, National Sun Yat-sen University

Abstract

How people learn effectively through e-learning has become a common interest. Much research addresses this issue by analyzing information technology (IT) or instructional strategies (Alavi and Leidner, 2001). Although these studies provide a broad knowledge about the relationships between IT, instruction and learning outcome, little attention has been paid to learning outcome itself and the role of this construct. Pervious researches generally treat learning outcome construct as a dependent variable for their hypotheses testing. The suggested variables in this construct are knowledge and capability (Gagne, 1985), score of test (Piccoli et al, 2001; Leidner and Fuller, 1997; Alavi, et al, 1997; Vogel,et al, 2001), affective reactions (e.g. satisfaction) (Alavi, et al, 1995; Alavi, et al, 1997; Piccoli et al, 2001) and organizational efficiency (i.e. cost and time) (Alavi and Leidner, 2001).

Social cognitive theory, however, provides a new lens to understand the role of learning outcome. Social cognitive theory suggests people as adaptors who are both producers and products of social systems (Bendura, 1997). In this regards, social structures are created by human activity, and in turn impose constrains and provides resources for development and everyday functioning. To understand people's behaviors, therefore, it is necessary to consider the triadic reciprocal causations among external environment, internal factors and behavior (Bandura, 1986). In the triadic reciprocal interactions, people actively control their behavior by evaluating their belief on capability and predicting intended outcomes in particular situation. Exercise of control that secures desired outcomes and wards off undesired ones has immense functional value and provides a strong source of incentive motivations (Bandura, 1997).

With this lens, this study examines a real-world e-learning adoption in corporate training context. In the earlier stage of adoption, people reported several learning difficulties and confusions toward the learning effectiveness. With continuous participating the online training, however, learners adjusted their behaviors and formed informal learning groups to reach their desired learning outcome. The adaptation provide an opportunity to explore how people control the situation by altering their behaviors or by selecting and creating environmental supports to bring about the desired outcome. Thus, this study tries to explore two issues. First, we want to understand what the desired learning outcome would be in the specific

situation. And secondly, we try to present the dynamics among behavior, environment, and desired learning outcome to bring about effective learning.

Keywords: e-leaning, learning outcome, social cognitive theory.

Reference

1. Alavi, M., and Leidner, D. E. “Research Commentary: Technology-mediated Learning - A Call for Greater Depth and Breadth of Research.” *Information Systems Research,* vol.12, no. 1, 2001, pp. 1-10.

2. Alavi, M., Yoo, Y. and Vogel, D. R. “Using Information Technology to Add Value to Management Education.” *Academy of Management Journal,* vol.40, no.6, 1997, pp.1310-1333.

3. Alavi, M., Wheeler, B. C. and Valacich, J. S., “Using IT to Reengineer Business Education: An Exploratory Investigation of Collaborative Tele-learning,” *MIS Quarterly,* vol.19, no.3, 1995, pp.293-313.

4. Bandura, A. *Social Foundations of Thought and Action*, Prentice Hall, NJ: Englewood Cliffs 1986.

5. Bandura, A. *Self-Efficacy: The Excise of Control*, W.H. Freeman and Company, NY, 1997.

6. Gagne, R. M. *The Conditions of Learning and Theory of Instruction (4th edition)*. Rinehart and Winston, New York: Holt , 1985.

7. Piccoli, G., “Web-based Virtual Learning Environments: A Research Framework And A Preliminary Assessment of Effectiveness in Basic IT Skills Training,” *MIS Quarterly,* vol.25, no.4, 2001, pp.401-427.

8. Leidner, D. and Fuller, M. “Improving Student Learning of Conceptual Information: GSS Supported Collaborative Learning vs. Individual Constructive Learning,” *Decision Support Systems*, vol.20, no.2, 1997, pp.149-63.

9. Vogel, D. R., Davison, R. M. and Shroff, R. H. “Socio-cultural learning: a perspective on GSS-enabled global education,” *Communications of the AIS*, 2001.

A Structurational Model of the Dynamics of Free/Libre Open Source Software Development Teams

Kevin Crowston[1], Hala Annabi[2] and Robert Heckman[1]

[1] *Syracuse University*
School of Information Studies
Syracuse NY 13244

{crowston, rheckman}@syr.edu

[2] University *of Washington*
The Information School
Seattle, WA

hpannabi@u.washington.edu

We are studying distributed ICT-supported teams of Free/Libre Open Source Software (FLOSS) developers to understand the dynamics through which members form shared mental models, informal norms and formal rules, how individual roles and leadership emerge, and how these structures guide developers' behaviours. We have chosen FLOSS development teams for our theorizing because FLOSS development is an extreme example of distributed teamwork. Distributed teams are increasingly common and seem particularly attractive for software development because the code can be shared via the systems used to support team interactions (Nejmeh, 1994; Scacchi, 1991). While the research literature on software development emphasizes the difficulties of distributed software development, the case of successful distributed FLOSS development presents an intriguing counter-example.

To conceptualize the dynamics of FLOSS development teams, we adopt a structurational perspective (Barley & Tolbert, 1997; Orlikowski, 1992). By relating structure and function across time, structuration theory provides a framework for understanding the dynamics of a team (Gregory, 1989). To apply structuration as a perspective, we must first clarify the types of rules and resources that comprise the structure. For this work, we specifically consider three kinds of rules and resources that are "encoded in actors' stocks of practical knowledge" (Barley & Tolbert, 1997) in the form of 1) interpretive schemes that create structures of signification, 2) authoritative and allocative resources that create structures of dominations, and 3) norms that create structures of legitimation (Barley & Tolbert, 1997; Stein & Vandenbosch, 1996).

First, individual actors' interpretive schemes create structures of *signification*. Research on software development in particular has identified the importance of shared

understanding in the area of distributed software development, as in the case of FLOSS teams (Levesque, Wilson, & Wholey, 2001). In emphasizing the duality of structure, the structurational perspective draws our attention to how shared mental models are products of, as well as guides to, action. To identify specific actions that can help to build shared mental models, we draw on Brown and Duguid (1991), who identify the importance of socialization, conversation and narration in building shared mental models.

Second, the control of resources is the basis for power and thus for structures of *domination*. FLOSS team members face differences in access to expertise and in control of system source code. As their involvement with a project changes, individuals move from role to role, but the need for deep understanding of a group's practices again emphasize the importance of socialization.

Finally, actors' social norms and team rules embody structures of *legitimation*. To conceptualize this aspect of teams, we draw on Swieringa and Wierdsma's (1992) description of organizations as collections of implicit and explicit rules that guide member behaviours. The creation and implementations of rules is a key competency for any team or organization (March, Schulz, & Zhou, 2000).

Based on these three kinds of rules and resources, we propose a set of propositions (available from the authors) relating team practices to team effectiveness. Following Hackman (1987), we view a team as effective if task output is acceptable to the team and evaluating parties (e.g. users and management); the team is maintained and strengthened; and members are satisfied.

Bibliography

Barley, S. R., & Tolbert, P. S. (1997). Institutionalization and structuration: Studying the links between action and institution. *Organization Studies, 18*(1), 93–117.

Brown, J. S., & Duguid, P. (1991). Organizational learning and communities-of-practice: Toward a unified view of working, learning, and innovation. *Organization Science, 2*(1), 40–57.

Gregory, D. (1989). Presences and absences: Time-space relations and structuration

theory. In *Social Theory of Modern Societies: Anthony Giddens and His Critics*. Cambridge: Cambridge University Press.

Hackman, J. R. (1987). The design of work teams. In J. W. Lorsch (Ed.), *The Handbook of Organizational Behavior* (pp. 315–342). Englewood Cliffs, NJ: Prentice-Hall.

Levesque, L. L., Wilson, J. M., & Wholey, D. R. (2001). Cognitive divergence and shared mental models in software development project teams. *Journal of Organization Behavior*, *22*, 135–144.

March, J. G., Schulz, M., & Zhou, X. (2000). *The Dynamics of Rules: Change in Written Organizational Codes*. Stanford, CA: Stanford University Press.

Nejmeh, B. A. (1994). Internet: A strategic tool for the software enterprise. *Communications of the ACM, 37*(11), 23–27.

Orlikowski, W. J. (1992). The duality of technology: Rethinking the concept of technology in organizations. *Organization Science, 3*(3), 398–427.

Scacchi, W. (1991). The software infrastructure for a distributed software factory. *Software Engineering Journal, 6*(5), 355–369.

Stein, E. W., & Vandenbosch, B. (1996). Organizational learning during advanced system development: Opportunities and obstacles. *Journal of Management Information Systems, 13*(2), 115–136.

Swieringa, J., & Wierdsma, A. (1992). *Becoming a Learning Organization*. Reading, MA: Addison-Wesley.

Exploration of Successful KM in a Danish software organization adopting SPI

Thomas Elisberg

The IT University of Copenhagen

Rued Langgaards Vej 7

2300 Copenhagen S

elisberg@itu.dk

The Case

A Danish software house committed itself to Software Process Improvement (SPI) in 1997. In 2004 the organization was certified level 4 according to the Capability Maturity Model Integrated framework. In the effort to be compliant with and certified in accordance to CMMi level 4 the company has worked hard to establish an appropriate culture and to develop organizational structures that support SPI. This study examines the organizational implementation of four Knowledge Management (KM) initiatives in a software organization adopting a staged representation strategy for SPI.

Research Question

The study explores four distinct KM initiatives that were initiated in parallel with the organizational institutionalization and progression of the SPI programme. Two of the KM initiatives – Competence Development and Performance Metrics - were characterized as successful while the two others – Knowledge & Process Agents and Best Practice Collection - did not demonstrate the practical value as initially hoped for. The overall objective of the study is to give a plausible answer to why the two former initiatives succeeded while the two latter failed.

The Study

To answer the research question a theoretical framework is applied. The framework is developed by Peter Schütt on the basis of the research done by Peter Drucker on knowledge workers and the application of knowledge in the work processes originally suggested by Frederick Taylor. The framework is branded as a 3rd generation knowledge management concept. 3rd generation KM is characterized by having abandoned the idea of managing knowledge. Instead it attempts to establish an organizational context for knowledge to evolve. Unlike the previous generations of KM the productivity of the individual worker is in focus. Schütt refers to eleven factors grouped in three categories that influence the productivity. The categories are: processes, organization & culture and technology. The four cases are tested up against the factors to answer the research question.

Though the research relies on case studies as a strategy for inquiry it also draws on an ongoing action research project in which Systematic participates. The interpretation of the empirical data is thus supported by the insight obtained from the long term research project; especially issues concerning organizational culture.

Preliminary Findings

1) SPI has a positive effect on the successful implementation of KM given that the initiatives are aligned with the defined processes. 2) Processes play a central role in KM because they are designed to support knowledge workers in their daily work; in addition they are aligned with the business goals. 3) There is a positive correlation between the 11 factors of 3rd generation KM and the empirical findings in the two successful KM initiatives.

Contribution

1) Validation of the theoretical framework proposed by Schütt

2) Determination of how SPI can sustain KM

Towards an Analysis of Enterprise Systems Benefits in ERP Vendors Advertisement

Esteves, José – Instituto de Empresa, Madrid (Spain) – jose.esteves@ie.edu
Dans, Enrique – Instituto de Empresa, Madrid (Spain) – enrique.dans@ie.edu

After more than 30 years of software development for an ever-growing variety of institutional and organisational settings, few large-scale information systems are developed completely from scratch (Pollock 2004). Rather, most software applications are constructed by adapting existing 'packages' to new organisational contexts and settings. Generic software packages, such as Enterprise Resource Planning (ERP) systems, cover the fullest range of organisational activities and processes and are adopted with the aim of achieving substantial cost savings as well as improved access to 'tried and tested' solutions, new releases, and an opportunity to update procedures and align them with perceived 'best practice'. However, while organisations choose packages because of their economic benefits[1], this is potentially a costly and high-risk strategy.

The ERP software market is very competitive and lately we have seen companies fusions, alliances, etc. The saturation of big companies market also caused a shift to small and medium sizes market where there are a huge number of ERP vendors and players. Thus, ERP vendors make massive campaigns of marketing to promote their products. In order to obtain differentiation, ERP vendors focus on their product benefits and the business benefits achieved through the ERP implementations. However, the press is plenty of examples of not so successfully ERP implementations and, in some cases, there is the evidence of high expectations before the ERP implementation. The purpose of this research project is to investigate the types of business benefits advertised by ERP vendors.

We proposed a multimethod approach. First, we will collect all the advertisements and conduct a conceptual and relational content analysis (Palmquist et al. 1997) of them using a coding scheme developed for the study. We plan to collect both textual documents and images such as banner ads and ERP vendors brochures. As a preliminary coding scheme we will use the taxonomy of business benefits of enterprise systems proposed by Shang and Seddon (2000). We also attempt to conduct some case studies with advertisement agencies to understand the process of advertisement creation and what types of benefits the agencies tried to promote. Finally, we want to analyse the perception of ERP clients [and potential clients].

The results of this study will have an impact on the ERP vendors marketing strategy but also in the understanding of business benefits of ERP systems and their perception from ERP clients. The results may help to understand and improve the understanding of ERP success expected and perceived from ERP clients. To the best of our knowledge, the advertisement dimension was never explored as an antecedent of IS/ERP success vision.

[1] Benefits are defined as outcomes or consequences that consumers can obtain from using the advertised product (Spears 2003).

TRUST, COOPERATION, DEPENDENCE AND THE QUALITY OF INFORMATION IN INTERORGANIZATIONAL INFORMATION SYSTEMS

Paul W. Forster
Information & Systems Management
School of Business and Management
Hong Kong University of Science and Technology

Submission to OASIS 2004

TRUST, COOPERATION, DEPENDENCE AND THE QUALITY OF INFORMATION IN INTERORGANIZATIONAL INFORMATION SYSTEMS

1. Introduction

Effective use of interorganizational systems (IOS) (Kumar, 1996) is increasingly important for coordination of supply chains and the quality of information in these IOS has become a matter of increasing concern. Low information quality impacts organizations through direct costs of customer dissatisfaction, increased operational costs and lower employee job satisfaction (Redman 1998). Indirect costs of low quality information include impaired decision-making, missed opportunities, increased uncertainty and problem ambiguity, failed projects, and poor departmental relationships (ibid).

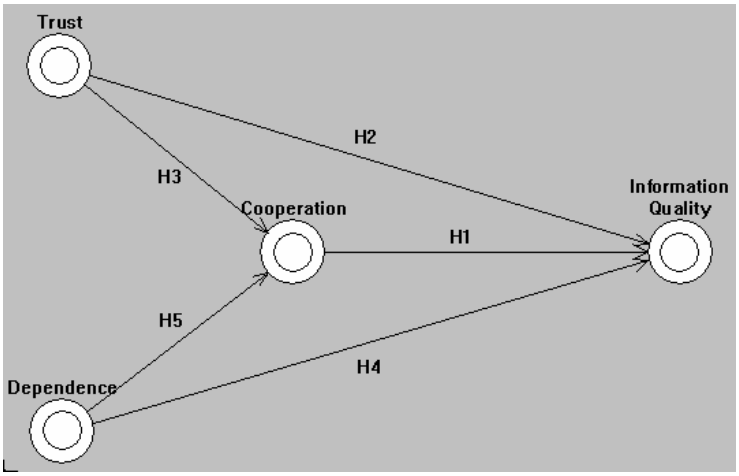
Definitions of data quality emphasize "fitness for use" (Wang and Strong 1996; Lee and Strong 2003; Lee 2003). Data consumers evaluate the quality of data in relation to the tasks they have to perform (Strong et al. 1997). In order to produce high quality data therefore, the data collector needs to understand the data consumer's needs.

Information creation can be perceived as a production process involving data collectors, data custodians and data consumers (Lee and Strong 2003). In the case of IOS, this production spans the legal boundaries of firms a key distinction between internal information systems and IOS. We ask to what extent the interfirm relationship between a firm and its partners influences the quality of information exchanged in an IOS.

2. Model Development and Hypotheses

The model is depicted in the figure below. Interfirm relationship dimensions of mutual trust, cooperation and dependence influence information quality. The theoretical link between interfirm relationships and information quality draws on an argument from Granovetter (1985) that action is embedded in social institutions. Information sharing practices rely upon both formal institutions such as negotiated standards and regulations and on the informal practices that develop out of the routines and scripts that guide individual behavior and become taken for granted. A positive interfirm relationship environment fosters the creation of formal and informal work practices that influence the quality of information.

Figure 1 Proposed Model

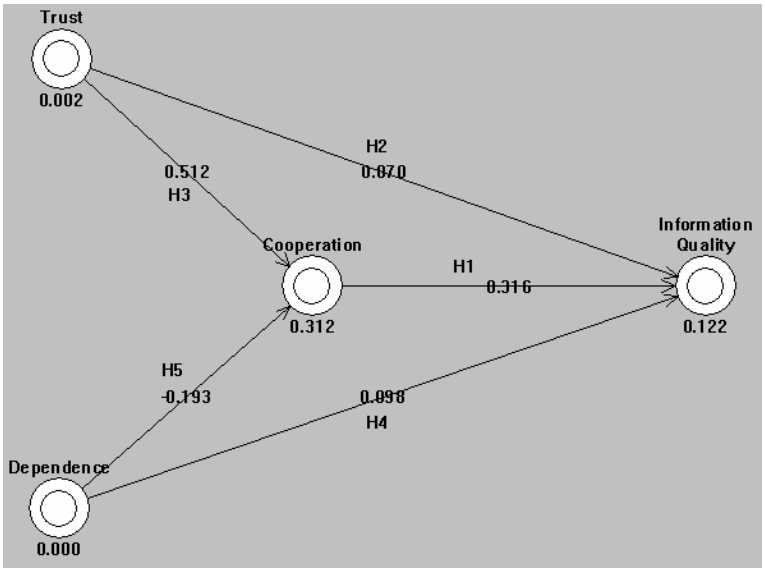


The interfirm relationship can be considered at several levels of analysis. Previous studies examining the relationship of interfirm relations and IOS adoption and use have examined the dyadic relations between a firm and a partner. However, information sharing is not a one-to-one problem between a firm and a single partner, but is a one-to-many problem between a firm and all partners that provide information through an IOS. The creation of practices for information sharing does not happen through dyadic firm-to-firm negotiations but through the development of formal and informal work practices that emerge under the umbrella of a supportive collective interfirm environment.

3. Method

The model is tested against survey data from firms in the U.S. air cargo supply chain. In-transit visibility of shipments provided by tracking and tracing information shared over IOS is critical to operations. The quality of information from electronic tracking and tracing systems is the dependent variable for this study. Construct of interfirm trust, dependence and cooperation are drawn from previously validated measures.

Figure 2 PLS Model



4. Discussion

A partial least squares causal modeling technique was used to test the model. The results support the research model. Dependence and trust are significantly associated with cooperation explaining 31.2% of variance in cooperation. The relationship between dependence, trust and information quality is fully mediated by cooperation. Cooperation is significantly associated with IOS information quality. Finally, the interfirm relationship explains a significant portion (12.2%) of the variance in IOS information quality.

The findings show that the interfirm relationship climate between a firm and its partners is positively associated with information quality exchanged through an IOS. Cooperation is the key determinant of information quality in our model fostering the development of formal rules and regulations and informal work practices that support quality of information. The study shows that data quality is not just a one-to-one problem but a one-to-many problem between a firm and its information sharing partners.

Does ISO 9000 Certification of Software Engineering Processes Pay?

Keith Fuller
University of British Columbia, Canada
keith.fuller@utoronto.ca

Ilan Vertinsky
University of British Columbia, Canada
ilan.vertinsky@commerce.ubc.ca

A very large proportion of software projects are commonly deemed to be failures. In most business sectors this situation would be dealt with by improving quality assurance processes, and frequently by certification of the business processes to standards such as ISO 9000 or the SEI CMMI. The field of software engineering is split on whether certification of software engineering processes is an appropriate response to quality issues. This paper describes a line of research based on the application of event study methodology to examine the market response to announcements of certification of software engineering processes.

The research hypothesis is that certification should lead to increased profitability either by reducing costs through reducing errors that need to be corrected, or by increasing revenues through providing third party assurances of quality.

We initially studied US companies engaged in software development that have announced that they had been successful in certifying their software development processes to the ISO 9000 standard. The results show that no significant abnormal profits or losses accrued to large companies from successful certification. Smaller companies showed significant negative abnormal profits.

The findings of the first study appeared to be so counter-intuitive that data was collected on Japanese companies that have made similar announcements. This second study also showed significant negative abnormal profits, although in the Japanese case the significant findings were found in the largest rather than the smallest companies.

This suggests that financial markets interpret the choice to certify as signaling problems or lack of confidence in their internal resources and capabilities. Alternatively it may indicate that the discipline imposed by certification is regarded by the market as a constraint on a more flexible culture of innovation, a key ingredient in the success of software development. The question remains, however, why this finding is found in small companies in the first American study and in large companies in the second Japanese study.

The Effects of Domain Knowledge on the Performance of Data Mining Models for Bank Failures

Wei Ge • Atish P. Sinha* • Huimin Zhao
School of Business Administration
University of Wisconsin – Milwaukee
Milwaukee, WI 53201, U.S.A.
weige@uwm.edu, sinha@uwm.edu, hzhao@uwm.edu

Abstract

The number of bank failures in the United States has increased significantly since the 1980s. Because on-site examinations tend to be expensive and time-consuming, they are complemented by off-site monitoring of bank conditions. Early warning systems built to predict likely bank failures sufficiently in advance help regulators allocate resources for on-site examinations and take appropriate actions.

Early warning systems are essentially classification models, which can be automatically learned by applying data mining techniques to historical data. So far, very little research has been conducted to examine if domain-specific human knowledge can be incorporated into data mining to improve performance. In many application areas, there exists domain knowledge that can be used to guide the mining process. As an example, extensive past research on bank failure prediction has identified various predictive variables, in the form of financial ratios, that are derived based on bank accounting variables and are believed to be more effective than the original variables in predicting bank failures.

The objective of this study is to examine the effects of domain-specific knowledge on the performance of automatically learned classifiers in the domain of bank failure prediction. Specifically, we conduct an empirical study comparing the performance of classifiers built using raw accounting variables with that of classifiers built using a set of financial ratios that were derived

from the raw variables using domain knowledge. The data mining models were trained using data from banks one year and two years prior to failure, along with data for non-failed banks. The predictive variables of the first training data set included 93 raw accounting variables directly available from the internal call reports in the Federal Reserve database. The predictive variables of the second training data set included 26 financial ratios that were derived from the raw accounting variables based on domain knowledge. Classifiers were trained on each data set using four classification methods—logistic regression, C4.5 decision tree, back-propagation neural network, and *k*-nearest neighbor. The performance of each learned classifier was measured in terms of expected misclassification cost and estimated using ten-fold cross validation.

A 2X4 factorial ANOVA was used to analyze the results, under all possible combinations of two prior probabilities and ten misclassification cost ratios. The results indicate that the performance of classifiers learned using the derived financial ratios is significantly better than the performance of corresponding classifiers learned using the raw accounting variables. The effect of the background knowledge (i.e., financial ratios) varies across classification methods. The use of financial ratios improves logistic regression and back-propagation neural networks more than C4.5 decision tree and *k*-nearest neighbor. The results are consistent across different settings of the prior probability of bank failure and the misclassification cost ratio, indicating that the findings are relatively robust. The main finding of our study is that domain-specific background knowledge improves the performance of data mining classifiers learned using data mining methods for bankruptcy prediction.

* Please address all correspondence to this author.

SPI versus SPI

Galina Hansen, PhD Student
The IT University of Copenhagen
Rued Langgaards Vej 7, DK-2300 Copenhagen S,
DENMARK
Phone: (+45) 7218 5154
Email: galina@itu.dk

Software Process Improvement (SPI) is a relatively new discipline. It arose in the late 80's as exasperation over typical software development problems: delays, budget excesses and failing functionality. The general idea of SPI is that quality of software depends straight on the quality of software processes which have been used to produce the software. SPI is not only about evaluating and improving of software processes in an organisation but also about introducing new development processes i.e. process innovation. However the most of software organization want to be innovative in their product as well.

The majority of software organisations recognize that their entire business is vitally affected by the quality and effectiveness of their development processes. However, approximately 50% of all software process improvement projects fail. The lack of particular competences for improvement and innovation may be a reason for the failing. Determining organisational strengths and weaknesses for Software Process Improvement and innovation can help an organisation to look critically at their capabilities and make necessary steps to further improvement. However, no organisations are completely identical and their capabilities are depending on both their external and internal environment/circumstances. The challenge is to define these environments and the way they influence the organisational capabilities.

However being efficient and innovative at the same time can be a challenge for an organisation. Software Process Improvement requires a Discipline that can have a negative impact on Creativity as a drive for innovation. A survival of a modern organization depends on how good they are to find the balance between Discipline and Creativity. The objective of the paper is to answer the question: Why does efficiency not inhibits innovation? If it does not - what impact does it have on an organisational implementation strategy of in a given context.

The research can offer two main contributions. First, it will contribute on knowledge on Software Process Improvement and Software Innovation by exploring the contradiction and similarity of those two paradigms. Second, it will inspire for further research in order to explore how to find the balance between SPI (software process improvement) – SPI (software process and product innovation).

Global Software Development

Haiyan Huang
Email: hhuang@ist.psu.edu
Ph.D. Candidate
School of Information Sciences and Technology
The Pennsylvania State University

Advisors: Professor Eileen Trauth and Professor Sandeep Purao

Our research interest is to study global software development and related issues. Global software development (GSD) refers to those software development works that are carried out collaboratively between two or more organizations across national boundaries or between one organization and its subsidiaries located in different countries. Global software development has become an established practice of information system and software development. Initially driven by economic incentives and organization strategic concerns, it has become such a distinct social phenomenon that stimulates a variety of economic and political debates and posts intriguing challenges in many research disciplines.

The activities of GSD are situated within the complex social contexts that span from macro levels to micro levels and involve a variety of socio-culture, socio-technical, and socio-cognitive issues. However most of GSD researches focus on one level of analysis and fail to address related problems from other levels. For example, at the global and societal level, the research themes are surrounding globalization, leveraging GSD for economic development, policy implications and social exclusions. At the organizational level, the research focuses are strategic decision making, risk assessment, and relationship management. At the team level, several disciplines such as software engineering and computer-supported cooperative work approach the globally distributed software development work from different perspectives. These researches at various levels are often informed or studied by using theories from different disciplines with little or no connections. They are limited by their disciplinary constraints and are not capable of explaining problems and related issues across different levels. There is lacking of systematic approaches to guide the researches and practices of global software development.

One attempt of our on-going researches is to develop a framework to map the complexity of the GSD research spaces. We see five potential contributions of this work. First, it helps to conceptualize the researches and practices of global software development. Second, it will help to clarify the concerns, the theories used, the advantages and the limitations of a variety of related studies. Third, it will help to identify the issues, the unaddressed problems, and the possible conflicts and tensions at different levels or across different levels. Fourth, it will help to identify the gaps between these issues and the current researches. Fifth, it may facilitate the integration of different research disciplines and the development of indigenous theories for studying global software development.

In continuing our researches, we would like to engage in intensive research to study how the socio-cultural factors may influence the global software activities. Although socio-culture factors are viewed as having great impacts on the global software development work, there is lacking of multiple analytical frameworks and methods in socio-cultural studies. Most studies on global software development use the existed cultural constructs at the national level. On one hand, these studies may provide a general understanding of the cultural differences at the certain level (national). On the other hand, such studies fail to address the dynamic and the richness of the socio-cultural influences from multiple perspectives (levels). Therefore, to gain in-depth and grounded understandings, there is a need to incorporate the intensive methods through interpretive and critical lenses to explore the complex socio-cultural, socio-technical, and socio-cognitive issues of global software development.

THE MOBILE KNOWLEDGE WORKER

By
Birgitta Bergvall-Kåreborn and Helena Oskarsson

ABSTRACT

The increasing use of Information and Communication Technologies (ICT) affect all parts of life. Within organisations ICT provides the means by which we can challenge traditional ways to communicate and coordinate. Most contemporary theories related to coordination focus on coordination of common activities within traditional organisations and with no or little reference to ICT (Mintzberg 1979; Thompson 1980; Mintzberg 1993). There are, however, some recent authors (Groth 1999; Melin 2002); who have studied how coordination is affected by ICT, and by the new organisational forms that are emerging.

The aim of this paper is to explore how ICT can facilitate and support coordination within project groups. To reach this aim two studies have been carried out were coordination and ICT use within project groups have been studied. The main difference between the studies has been the introduced ICT-tools. In the first study a prototype called *Reminde;* a SMS-service intended for groups who want to send massages to each other; was introduced. In the second study it was a Tablet PC, which apart from the traditional functions of a portable PC supported voice recognition, recognition of handwritten text, and had a note tool for digital ink.

The analysis of the results is not finished yet, but some results are already visible. Firstly, ICT does not only facilitate geographically dispersed working conditions, some ICT-tools also facilitate small groups to sit very close together and in areas normally not considered as working areas. While most groups in the first study mainly emphasises how ICT allowed them to work geographically dispersed the groups in the second study also emphasised how ICT had allowed them to work geographically very closely. Due to the Tablet PC they had been able to sit in public meeting places around a table and work together. This is a very important factor considering the literature that point at the importance of meeting places where we can meet and work across organisational “boxes” such as departments and subject areas.

Secondly, it is very clear that different ICT-tools support different types of communication and thus different types of coordination. The prototype Reminder mainly supported communication of short and simple messages. As a result it was mainly used to coordinate people as to where and when they should meet (time and place coordination), what they should do, when a task was done, ect. In other word, it involved coordination of support activities that need to be carried out in order to carry out the project task itself. The Portable PC on the other hand supported coordination of the project task by allowing the students to share files. This indicates that we need to be more precise and careful when we talk about ICT, and the effects of ICT.

Thirdly, the studies also indicate that the classic coordination mechanisms such as mutual adjustment, direct supervision, standardisation of work processes, etc. is still present but in some cases they take new forms.

References

Groth, L. (1999). Future Organizational Design: The Scope for the IT-based Enterprise. Chichester, Wiley.

Melin, U. (2002). Koordination och informationssystem i företag och nätverk. Information Science. Linköping, Linköpings University.

Mintzberg, H. (1979). The Structuring of Organizations: A Synthesis of the Research. Englewood Cliffs, N.J., Prentice-Hall.

Mintzberg, H. (1993). Structure in fives - Designing effective organizations. New Jersey, Prentice-Hall.

Thompson, J. D. (1980). Hur organisationer fungerar. Stockholm, Prisma.

Philosophy-Based Mechanisms for Communication between Business and IT Experts

Haim Kilov
Independent Consultant, and Stevens Institute of Technology
haimk@acm.org

Ira Sack
Stevens Institute of Technology
isack@stevens.edu

Communication is essential to facilitate proper interaction between people and organizations. Unfortunately, the proverbial communication gap between business and IT experts has been a sad reality for quite a while. This has led to substantial problems in information system design and development including significant monetary losses together with loss of customers' trust and patience. As noted in *Computerworld* (October 11, 1999), "85% of IT departments in the US fail to meet their organizations' strategic business needs". Since not all IT projects fail, it would be instructive to determine – and make explicit – essential properties of successful business-IT communication.

Thanks to the division of labor, experts can concentrate – and achieve a lot – in their specific areas of expertise. They also can, and should, refer to the context, that is, to the achievements of other experts. To do that, it is necessary to use a common ground – a system of concepts that does not belong to any specific area of expertise, but rather is used as a foundation of all of these areas. The importance of understanding and *explicitly* using these concepts increases in such a general area of expertise as that of information systems, especially in proper handling of complexity.

These common elegant concepts — such as abstraction, system, structure, relationship, composition, pattern, name in context, etc. — come from exact philosophy and mathematics. They have been stable for centuries, and have been successfully used in theory, in industrial practice (including international standards), and in teaching of business and IT modeling. The essential stable *semantics* of these fundamental concepts and of systems specified using them ought to be clearly separated from the accidental (often IT-industry-imposed excessively complex and rapidly changing) details. Proper exactification of this semantics became possible only more recently, thanks to the developments in exact philosophy, semiotics, mathematics, and computing science.

Many philosophical foundations for these fundamental concepts were exactified by Mario Bunge. Other thinkers, as diverse as Wittgenstein and F.A.Hayek, also contributed a lot. Some fundamentals go back to Aristotle: consider a very important difference between the Aristotelian and a prototypical (example-based) approach to modeling. The former provides for the intension of the model; the latter – despite being buzzword-compliant in some popular IT methodologies – provides for its incomplete and overspecific extension. The former explicitly determines whether a fact corresponds to the model, while the latter often cannot do that.

While crucial business concepts have been known and used for a long time, for example, in works by Adam Smith, we observe, with great pleasure, that Smith's – more specialized – *Wealth of Nations* was based on philosophical foundations laid in his *Theory of Moral Sentiments*. Similarly, the paper shows how a system of important concepts and approaches proposed by system thinkers (such as philosophers, mathematicians, and computing scientists) has been used to understand and specify various kinds of business and IT systems, and to base the IT work on a solid foundation that can be used for communicating with non-IT experts, thus establishing successful and meaningful interactions between business and IT experts and organizations.

REFERENCES

1. Kilov, H. (2002). Business Models. Prentice-Hall.
2. Kilov, H., and Baclawski, K. (Eds.) (2003). Practical Foundations of Business System Specifications. Kluwer Academic Publishers.
3. Morabito, J., Sack, I., and Bhate, A. (1999). Organization Modeling: Innovative Architectures for the 21st Century. Prentice Hall.

Enterprise integration: Challenges to understand the phenomena

Jiunn Chieh Lee, The University of Auckland, New Zealand

Enterprise Integration in the form of supply chain management, enterprise resource planning, customer relationship management etc. has pervaded current information systems research and practice. These systems are not only multi-level, multi-functional spanning multiple career time frames but are inscribed with hidden agendas, power centers, strategic rationales and intentions of interacting parties such as consultants, managers and software vendors. In the process of trying to achieve enterprise integration, a translation occurs where intentions of managers, software vendors and consultants interact at a point in time of history. This historical nature requires a perspective that takes into account historical nature of IS research. Moreover, the current interpretive paradigm based on the model of the text that has its roots in the semiotic extension of the model of the text to the social sphere may be insufficient. An alternative approach that combines the critical aspects of hermeneutic inquiry with phenomenological hermeneutics was initially adopted but still missing was an IT artifact. Thus a combination of critical hermeneutics and structuration theory was used to account for the lack of criticality in the latter and lack of an artifact in the former. Moreover, questions on how to conduct research that is fundamentally re-conceptualizing a certain phenomenon still need to be answered. The author argues given the infancy of this area, research projects to understand enterprise integration have to be reflexive in at least four aspects: philosophy, theory, methods and unit of analysis. The issues mentioned above are illustrated in the discussion of a research project to fundamentally investigate the phenomenon of enterprise integration in a holistic manner. The project adopted a critical structuration ethnographic approach after traversing the terrain of philosophy, theory, methods and units of analysis in an iterative and emergent manner. Evidence that questions current assumptions on enterprise integration will also be discussed such as the cyclical nature of enterprise integration.

The author hopes to open up a dialogue on three fronts:

1) Philosophy where using Heidegger's approach as referenced by Gadamer, we should ask the question: "How philosophy should be influence the way we view the world?". Related to that, by being aware of our basic philosophical assumptions, is there a way where we would be appropriately reflexive in research that aims to understand phenomena in a fundamentally manner that may re-conceptualize and debunk certain assumptions and long-standing tenets in information systems research?

2) Theory creation, adaptation and revision where limits to current theoretical frameworks to understand enterprise integration are discussed. Many theories in the information systems field have been "imported" from other disciplines. However, given the fact they have been disconnected from the philosophical context in which they were created, inconsistencies exists. It is not until when these theories are applied with a multi-level multi-function and longitudinal project that the cracks begin to show.

3) Methodological limits to understand enterprise integration where current methods had to be revisited in attempted to understand enterprise integration in a holistic multi-level multi-functional longitudinal level.

Insights are sought to improve the author's effort to understand enterprise integration in a holistic manner.

Restructuring IS in Government for free?

Kristian Hjort-Madsen & Jan Pries-Heje
The IT University of Copenhagen
Rued Langgaards Vej 7
2300 Copenhagen S
email: khm@itu.dk, jph@itu.dk

The largest reform in 30 years

The Danish government has just passed the largest structural reform in 30 years. The idea is to decentralize more government responsibilities. By 2007 it is expected that the existing 271 municipalities will be merged to 100 and that the existing 14 regions will be merged into five. A kind of pilot was undertaken in 2002-2003 when 5 municipalities merged into one at the Danish island of Bornholm. The Secretary of the Interior, who is in charge of the restructuring process, claims that merging and restructuring IS can be done within existing budgets, and he even expects a "leap forward" in functionality and diffusion of IT within government. Or said in another way: It is a free lunch!

Our study

Our study focuses on IT architecture and work processes before, during and after the merger. We aim to understand the business processes and the IS infrastructure. Over a period of three months we have carried out an in-depth interview-study of the restructuring and merging process. We have interviewed executives, middle-level managers, IT-people and users.

Findings

Our findings are quite interesting. (1) First of all lack of time dramatically increases the cost. It is not just a linear function. The closer you get to the actual merge the very much higher the cost. (2) From a technical standpoint the merge was seen as a simple merge of databases. However, reality is rarely as simple as the book; we tell the ugly story of why it wasn't simple at all. (3) Users were expected to take responsibility for the restructuring. But in reality the main semi-private supplier of governmental IS were setting the agenda. So the "empowered users" didn't dare using their power! (4) Users were offered a modest leap forward by moving from text-based terminals to a windows environment. But they insisted on staying in the old environment. (5) Furthermore users did not know their IS architecture and had no urge to get to know it. That was one of the key reasons why empowerment failed. (6) Last but not least the merger of IS was part of a larger organizational merger and restructuring. Here we found that alignment is key to success.

Discussion

So to sum up we are quite critical towards the ambitious plan laid out by the Minister of the Interior. We believe it will be a failure if Denmark tries to run 100 parallel merging projects all starting January 2007. Based on our findings from Bornholm we discuss how failure may be avoided.

Designing Knowledge Infrastructures

Ronald Maier
Martin-Luther-University of Halle-Wittenberg
Dept. of Management Information Systems
email: maier@wiwi.uni-halle.de

Abstract

Despite growing interest about the use of knowledge management systems (KMS) in organizations, there is still a lack of knowledge about how to design a comprehensive knowledge management (KM) initiative that includes, but is not limited to the design and implementation of information and communication technologies (ICT) in support of KM. KMS can be both, tools that support particular KM tasks or platforms that provide an infrastructure supportive of handling knowledge in and between organizations. This contribution to the workshop reviews the current state of practice of KM initiatives, defines the concept of knowledge infrastructures and elaborates on methods and instruments to design such infrastructures.

Many organizations as well as societal institutions that support networking between organizations such as Universities, clusters, libraries and other governmental institutions, set up what could be called knowledge infrastructures that support sharing knowledge as well as networking of knowledge providers and seekers.

A knowledge infrastructure is a comprehensive ICT platform for collaboration and knowledge sharing with advanced knowledge services built on top that are contextualized, integrated on the basis of a shared ontology and personalized for participants networked in communities that fosters the implementation of KM instruments in support of knowledge processes targeted at increasing their effectiveness (see figure 1).

Knowledge infrastructures are implemented as part of a KM initiative that comprises a number of KM instruments, e.g., lessons learned, best practices, skill management, knowledge mapping, semantic content management. The design of knowledge infrastructures requires the joint consideration of (1) KM instruments, (2) the organizational design, i.e. knowledge tasks and processes, roles and responsibilities, (3) people, i.e. their skills, communication and cooperation in networks and communities, (4) knowledge topics and structures, i.e. the type of knowledge, structures, taxonomies, ontologies and meta-data and (5) ICT tools and systems in support of KM, i.e. the functions, structure and interaction of knowledge infrastructures.

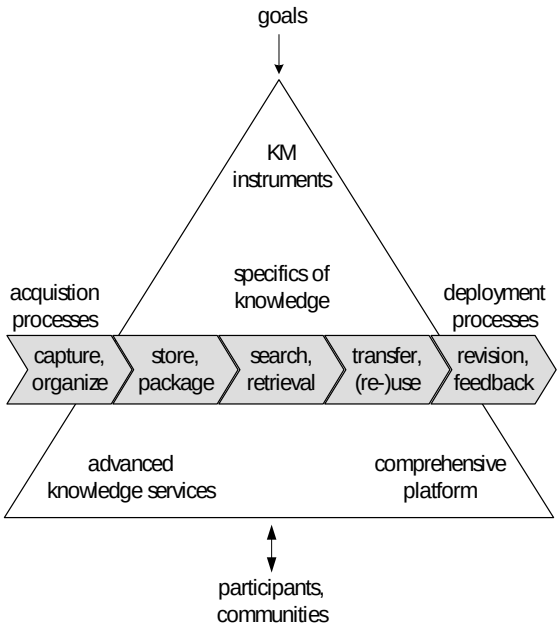


Figure 1: Knowledge infrastructure

Designing knowledge infrastructures requires adequate modeling techniques that consider the specifics of modeling context in knowledge work. The contribution reviews modeling techniques from the perspective of their suitability to guide the design of knowledge infrastructures. Particularly, business process management and activity theory are compared and concepts are studied that connect the two.

Bibliography

Alavi, M., Leidner, D. E.: Review: Knowledge Management and Knowledge Management Systems: Conceptual Foundations and Research Issues, in: Management Information Systems Quarterly - MISQ, Vol. 25, No. 1, 2001, 107-136.

Hansen, M. T., Nohria, N., Tierney, T.: What's Your Strategy for Managing Knowledge?, in: Harvard Business Review, Vol. 77, No. 2, 1999, 106-116.

Holsapple, C. W. (2003) (ed.): Handbook on Knowledge Management, Vol. 1+2, Berlin et al. 2003

Maier, R.: Knowledge Management Systems. Information and Communication Technologies for Knowledge Management. 2nd edition. Berlin et al. 2004

Swan, J.: Knowledge Management in Action: Integrating Knowledge Across Communities, in: Sprague, R. (ed.): Proceedings of the Thirty-Fourth Annual Hawaii International Conference on System Sciences - HICSS 2001.

Wiig, K. M.: What Future Knowledge Management Users May Expect, in: Journal of Knowledge Management, Vol. 3, No. 2, 1999, 155-165.

IFIP 8.2 OASIS 2004 Workshop

Scaling the wall: Challenges in the provision of mobile information services

Carleen Maitland
cmaitland@ist.psu.edu

Internet technologies make possible the sharing of information between widely diverse sources and audiences. With the fixed Internet the provision of this information is undertaken on both commercial and non-commercial bases. For some information suppliers the choice to provide information on a non-commercial basis is a result of under-developed payment systems. On the mobile Internet the operator's control of the network infrastructure and ownership of the customer relationship resolves this payment dilemma as long as the information provider is willing to conform to the technical and administrative requirements of these powerful players. Thus, through control and ownership operators are potentially in a position to influence the information made available to consumers.

In this research we seek to understand the relationships between providers of information services and the powerful mobile network operators that dominate the industry, as well as the subsequent effects of these relationships on diversity of information sources. At the outset of the mobile Internet industry there was speculation of two likely outcomes. One outcome would be a mobile Internet industry where the network operators would maintain their dominance and serve as gatekeepers for mobile Internet content. The second outcome would be an industry where powerful content providers would turn the network operators into 'bit pipes', limited to merely transmitting a wide variety of content. In the current early stages of industry development it appears the first outcome has taken hold. Mobile operators or intermediaries serve as gatekeepers for the information that is available to mobile Internet users. The question then becomes: why did the industry develop in this way? What forces are at play in the industry that can explain the continued control of the operators? How have factors such as technology, complex systems, and power helped reinforce the existing industry structure?

To understand the forces at work we have undertaken a research project in which we follow the attempts of a small firm to commercialize their information service. The project combines knowledge of industry structures with the first hand experience of a small firm. The goal is to use this top down and bottom up understanding of the industry to first confirm that the important factors include technology, complex systems and power and, if justified, to more clearly understand the interactions between the factors. Once their interactions are understood a more clear picture of the implications for information availability should appear.

Preliminary results from the project indicate that industry fragmentation is an important determinant of the processes to provision mobile Internet information services. The fragmentation appears to be the result of factors including the pace and timing of technological innovation, standards competition, power, and system complexity. It is unclear how long the current level of fragmentation will last as it may simply be an artifact of the young age of the industry. These findings raise questions about the importance of industry evolution for the research question and its implications for diversity of information sources on the mobile Internet.

Developing a Research Model to Study Advanced Mobile Phone Services Adoption

En Mao
Management information Systems
College of Business
University of Wisconsin – Milwaukee
Milwaukee, WI 53201, USA
enmao@uwm.edu

Mark Srite
Management information Systems
College of Business
University of Wisconsin – Milwaukee
Milwaukee, WI 53201, USA
msrite@uwm.edu

Jason Bennett Thatcher
College of Business and Behavior Science
Clemson University
Clemson, SC 29634, USA
jthatch@clemson.edu

Onur Yaprak
College of Business and Behavior Science
Clemson University
Clemson, SC 29634, USA
oyaprak@clemson.edu

Developing a Research Model to Study Advanced Mobile Phone Services Adoption

Extended Abstract

Mobile communication technologies have penetrated consumer markets throughout the world. Initially, mobile services primarily facilitated voice communication. Recently, new mobile services have made possible text messaging, web surfing, digital imaging, payments, banking, financial instrument trading, and shopping. Globally, mobile phone services have led to diverse social phenomena. In Japan, text messaging has enabled the formation of "virtual youth cultures" and with more than 40% of the population able browse the Internet using their cell phones, the mobile Internet has become a reality. In the United Kingdom, Bluetooth has enabled clandestine social liaisons. This richer communication medium makes for a more complex phenomenon to be studied.

The increase in mobile phone use and related services adoption gives rise to our research question. What factors affect the adoption of mobile phone services? To better understand mobile communication technologies' implications, research needs to consider how users' characteristics and their beliefs influence their use of mobile services. Through understanding how individual differences affect mobile phone use, telecommunications firms may develop strategies that appeal to specific segments of consumer markets. All major technology research corporations have been watching closely the economic impact of m-commerce. They estimate that m-commerce will generate anywhere from $1.7 billion (Jupiter Research) to $20 billion (Merrill Lynch) in the U.S. in 2004 (Epaynews 2004).

As of September 17, 2004, there are more than 169 million mobile phone subscribers in the U.S. (CTIA 2004). More than 43% of the current mobile phone users would replace their

phones within a year (Rosenthal 2004), which translates into close to 100 million new mobile phones that will be adopted in 2004. Wireline-to-wireless number portability implemented since November 2003 as part of the FCC's Wireless Local Number Portability (WLNP) mandate is making the mobile phone an increasingly prominent communication device in the U.S. households. About 14.4% of the consumers use their mobile phone as the primary phone in 2004 and of the remaining landline owners, 26.4% would be willing to permanently switch to mobile phones (Instat 2004). Consequently, more individuals will own phones that are equipped and packed with more advanced features and capabilities that will allow them to use text messaging and browse the Internet. While many own m-commerce capable phones, few U.S. users have adopted the advanced services.

Clearly, while the advanced mobile phone services are available and consumers own new generation phones, the individual acceptance of these services is not guaranteed. A more indepth understanding of the factors influencing the adoption of mobile phone services would help U.S. businesses stimulate faster and deeper penetration of mobile phone services and realize benefits from m-commerce.

The research plan is as follows. First, the Technology Acceptance Model will be utilized as the starting point. Into this model, we will integrate price, accessibility, efficacy, and innovativeness. Next, we will carry out a survey. Expected outcomes will be discussed at the workshop.

REFERENCES AVAILABLE UPON REQUEST

Strategic Information Systems Planning for Globalisation in the Financial Industry Cross-cultural Comparison between a Swiss/American financial institution and a Japanese financial institution in London, Tokyo and Singapore

Hideyuki Matsumoto & David W Wilson

The School of Computer Science and Information Systems, Birkbeck College, University of London

Abstract

Though international trade has been facilitated by the interaction of human beings with new technologies, paradoxically it has been asserted that a higher proportion of the global population was engaged in global trade at the end of the 19th Century than at the end of the 20th.

However, the latter half of the 20th Century saw an active expansion of multinational corporations' activities beyond national boundaries both for the sourcing of goods and services and the development of markets. Whilst the reasons for the high level of globalisation at the end of the 19th Century pertained to the spheres of influence and domination of the rival colonising powers there is reason to believe that corporations, which may or may not cling to national identities, will drive the globalisation of the 21st century.

Currently it appears that globalisation is being delivered from the western capitalist multinational corporations to the diverse cultures of the world. The spread of capitalistic economies and information technologies, which are usually under the control of western multinational corporations, brings challenges to cultures and values of non-western countries whilst the migration of tasks, increasingly knowledge based, poses challenges both to provider and serviced.

As we enter the 21st Century, globally networked corporate computer systems are of strategic importance to multinational corporations. Global IS promise knowledge and expertise transfer, global efficiency and local responsiveness amongst other benefits. Penalties may exist in high costs, loss of autonomy and inappropriate systems. Do global Information Systems (IS) imprint a new cultural imperialism? Some major Western financial institutions have already developed Global IS, but most of the Japanese financial institutions have been less agile in taking up the challenges, nevertheless recognising the importance of Global IS.

Many Japanese companies have studied theories and practices of human resource management from Western society, but strong differences exist. The traditional Japanese style of human resource management is characterised by lifetime employment and seniority

based reward and power distribution. Lifetime employment fosters excellent internal communication, long-term training, and strong employee loyalty and motivation within the company. What are the implications on Strategic Information Systems Planning (SISP) for globalisation? The emphasis on seniority appears to be favoured by Japanese employees but does this mean that Japanese prefer Top-Down Management though Japanese companies seem to make decisions by consensus through involvement and participation at various level of management. What are the implications for Japanese companies seeking to operate globally and non-Japanese companies seeking to operate in Japan?

This research is focused on SISP for globalisation in the financial industry. Careful comparative analysis between a Japanese company and a Swiss/American company will identify cultural mechanisms in multinational corporations with diverse roots. There will be study of a Swiss/American financial institution's SISP in Tokyo and Singapore and study of a Japanese financial institution's SISP in London.

Grounded theory has been selected as a research strategy because of its strength for cross-cultural research. The outcome of the research will be beneficial for management in multinational corporations, global financial institutions, and IT/IS departments when developing global IS strategy.

This paper explains the methods of research and the cases.

Examining the Linkage between Technology Use, Emotional Expression and Service Quality Perceptions:
The Data Collection Protocol

Rachel McCalla
Dept of Information and Operations Management
Henley Management College
Greenlands, Henley-on-Thames
Oxon, RG9 3AU, England
E-mail: rachel.mccalla@henleymc.ac.uk

In this paper, the data collection protocol is presented for a programme of research, which seeks to investigate the interplay between technology use, emotional expression and service quality perceptions in a technology-mediated relationship context. Specifically, the research investigates this linkage within a business to consumer (B2C) context where employees are using customer relationship management (CRM) technologies at the point of interaction with the customer in a voice-to-voice situation.

Research investigating the linkage between emotional expression and service quality perceptions in service contexts has been extensive with contributions to theory appearing predominantly in the marketing and organisational behaviour literature. It is widely recognised that technologies are increasingly pervading interactions in such contexts and yet an understanding of the impact of technology on emotional expression and the implications at the level of the interaction between employees and consumers has not been extensively examined.

In designing a research approach to tackle this gap in the literature, it has been necessary to adopt a multi-disciplinary approach to both 'evidence' emotion in the interaction and develop an approach for linking this to technology use. The approach is Interpretivist in nature and emphasises the importance of the context of the individual, the interaction and the organisation in developing a valid interpretation of the link between technology use, emotional expression and service quality perceptions.

At the **Individual** level, the protocol deals with the data and technique for identifying in the case of employees, people's propensity to show positive and negative emotion and propensity to accept and reject technology. For customers the protocol outlines the process for capturing their perception of the interaction and the service experience.

At the **Interactional** level, the data collection protocol makes a contribution to methodology as it describes the data types and the process of linking and integrating data at three key layers. Firstly at the *instrumental* layer which is concerned with the 'content' of what is said in the interaction and seeks to evidence when technology is directly referred to as having an impact on the interaction. Secondly, the *emotional* layer which seeks to highlight both emotion words and emotional intonation or indeed notable lack of it during the interaction. Finally the *navigational* layer links the first

two layers with those aspects of functionality that have also been accessed and used during the interaction.

At the **Organisational** level the data collected deals with the social norms at play and in particular emotional labour constraints reinforced by the organisation through procedures and processes.

Essentially this is an analysis of discourse, which seeks to integrate a diverse range of data types in order to produce a valid interpretation. The work of Goffman is referred to and applied to voice-to-voice contexts. Specifically it is argued that his ideas on front stage and back stage provide rich ground for linking emotional expression and technology use concepts.

POSITIONING THE INSTITUTIONAL PERSPECTIVE IN INFORMATION SYSTEMS

Author: Muriel Mignerat
HEC Montréal
e-mail: muriel.mignerat@hec.ca

There is a growing interest for institutional theory in information systems (e.g. Robey & Boudreau, 1999; Barrett & Walsham, 1999; Orlikowski & Barley, 2001; Lamb & Kling, 2003; Teo et al., 2003). The institutional perspective is appealing for IS researchers because it proposes that, in a context of uncertainty, agents will seek legitimacy and external support (Meyer & Rowan, 1977) and not only efficiency. Their decisions will be made under the constraint of institutional forces, such as coercive, mimetic and normative pressures (DiMaggio & Powell, 1983). In organization theory, institutionalists have tried to understand such phenomena as: Why do organizations of the same type (hospitals, schools) resemble one another (Scott, 2001)? How do institutions appear, diffuse and die (Jennings and Greenwood, 2003)? Institution here is not a synonym for firm: it should be seen as a social structure that allows control and constrains the action of an agent, while giving the agent a framework for action (Scott, 2001).

This research-in-progress seeks to review the institutional perspective in IS in order to make two contributions.

The first contribution will be to provide, in a model, a synthesis of what the institutional perspective has taught us so far, and to identify potential areas for future research. Two strands of research are acknowledged. One is concerned with the diffusion of innovations (e.g. King et al., 1994). The other stream of research is concerned with the identifications of institutional forces which lead to the adoption of IT (e.g. Teo et al., 2003) and the strategic responses of firms (e.g. Ang & Cummings, 1997). So far, our research suggests that IS institutionalists often take a classical top-down view, but also acknowledge that bottom-up processes exist. Their approach is very influenced by DiMaggio and Powell (1983) and neglects other contributions.

The second contribution will be methodological. We wish to understand how research could be conducted with an institutionalist approach, in terms of levels of analysis chosen,

epistemological approach, and conceptualization of information technology. IS institutionalists may have a disproportionate focus on the individual levels, while higher levels of analysis are more common in organization theory and sociology, where the theory originates. However, there seems to be room for IS contributions at intermediate levels of analysis such as groups, departments, processes. In organization theory, Bowring (2000) shows that institutional theory, which had an interpretive beginning, became a structuralist positivist vehicle. In IS, those who studied top-down processes as well as those who tried to use the three institutional forces simultaneously (Teo et al., 2003) share a positivist deterministic approach. A different view is shared by those who use structuration theory and have a very interpretive point of view (see Boudreau & Boudreau, 1999; Orlikowski's works). Interestingly, the IT artefact can be seen as a carrier of institutional forces (Scott, 2001; Orlikowski, 1992).

The author would welcome suggestions on how to proceed with this research, and would appreciate feedback on how to improve the model synthesizing the institutional approach to IS.

A Research Programme on Enterprise Systems Management

Charles Møller, Pernille Kræmmergaard, Pall Rikhardsson Aarhus School of Business, DENMARK

Abstract

Today virtually every major business has implemented one or more ERP system or more simply enterprise system (ES). It is estimated that organizations worldwide has spend around US$18.3 billion every year on ES. In the recent years ES has developed tremendously and the ERP systems evolved into what often is summarized as ERP II. ERP II extends on the ES concepts in several ways and consequently there is a need to reconsider ES.

This presentation will present a position paper. The paper argues that we are facing a new emerging practice of what is called Enterprise Systems Management (ESM). The issue of the work-in-progress is to design a research program on ESM.

ESM is dealing with second-generation ES issues. The new focus is on creating and sustaining business benefits through the utilization of the corporate ES. Second wave ES projects are spurred by the some of the questions managers are asking after having gone through first wave ES projects. These include: How can we gain greater benefits from our ES investments? How can we manage and enhance our ES to continuously align the system with the strategy and structures of the organization? How will the ES impact the business and create new ways of working? This means that implementation issues are no longer of primary concern.

ESM elaborate on existing ERP theory and enhance concepts and models towards dealing with managerial and inter-disciplinary issues. This presents a challenge – not only to research but also to the way ES is embedded in the curriculum at universities and business schools.

ESM implies a new distinctive management activity focusing on critical issues where the ES manager carefully needs to manage of the overall business impact of the ES in order to be successful:

. • Business Strategy. ES are having an impact on the strategic development of many organizations, and inflict the way organizations collaborate across boundaries.
. • Performance measurement, accounting and control. ES are having an impact on how managers can account for and evaluate corporate performance, ensure that objectives are met and how plans are carried out.
. • Organization and culture. ES require different capabilities and competencies that involve new ways of working and organizing.
. • ES Technology. The ES technology is rapidly evolving. Each new release of the software packages opens new opportunities and brings on new constraint to the infrastructure of an enterprise.
. • Human Resources. The ES change the daily work of most employees and the way they learn and develop new competencies with the system will be crucial.

. • Business processes. ES is a central component in most business process development project and managers should carefully consider the role of ES in the projects.

The overall aim of the ESM research effort will be both academic and practical. Academic aims include further developing various theoretical perspectives on ESM as well as developing methodological tools for researching the application of these systems. Practical aims include developing and disseminating knowledge and experiences to managers engaged in managing enterprise systems.

Allison J. Morgan
Ph.D. Candidate
School of Information Sciences and Technology
Pennsylvania State University
Email: amorgan@ist.psu.edu
Phone: 814-865-8952

The Impact of Individual Differences on Web Searching Performance: Issues for Design and the Digital Divide

In recent times, the Internet has become a very important technology in everyday life. However, this technology is presently not being utilized by all people. In 2000, the National Telecommunications and Information Administration reported that only 41.5% if all American households had Internet access. Many strides have been made to help lessen the digital divide by providing physical access to computers and the Internet. Yet, the problem of the digital divide still remains.

Early digital divide research has focused on providing people with technological access to the Internet. This type of access is concerned with providing people the ability to attain the hardware, software, and connectivity necessary to actually use Internet technology. This type of access is important, but another type of access, social, is a key factor in the motivation to use Internet technology. Social access, as defined by Kling (1998), is the mix of professional knowledge and technical skills that augment professional practices and social life. This type of access is increasingly important and possibly even more of a factor in the disparity among Internet users and non-users. Therefore, this project is one that will proceed under the umbrella of research into social access issues with technology.

Currently, web search engines provide users with their primary source for locating content on the web. It appears however, that different searchers have different experiences in terms of their ability to find the information that they seek using web search engines. In addition, the experience that a user may have with a web search engine may also impact their attitude towards Internet technology as a whole. The characteristics that make one searcher more effective than another are presently not well defined. Therefore, individual differences may play a role in the web searching skills of users and their performance with web search engines.

The goal of this study is to investigate if individual differences of Internet users impact their searching performance and to assess the related implications for the digital divide.

This study will employ multiple methods to collect both qualitative and qualitative data. The quantitative data methodology will be based upon previous research in the area by Ford et al. (2001). A questionnaire on the topic of individual differences as well as a cognitive style analysis will be administered to the study participants. Following the questionnaires, a short open ended interview will be conducted. This interview will evaluate the users' personal background information and influences, as well as their experiences with web search engines.

This is an important area of study for a number of reasons. First, it addresses a potential barrier to users of Internet technology. Second, it may provide insight into a way to

address a motivating factor for the digital divide and those persons who do not participate with Internet technology. Third, it works to advance the emergent theory of Individual Differences being researched by Trauth. Finally, it also works to advance the area of individual differences and information retrieval.

The Skill-set of Successful IT Project Managers: An Exploratory Study using the Repertory Grid Technique

Nannette P. Napier

Mark Keil

Georgia State University

Felix Tan

Auckland University of Technology

The Standish Group reports that 49% of all Information Technology (IT) projects are late and/or over budget; an additional 23% either fail outright or are cancelled prior to completion [1]. Successful project management has long been recognized as one of the critical skills needed to turn around this trend. Although the Project Management Institute (PMI) has created training and certification programs for project managers (PMs), these offerings address generic PM skills, ignoring the possibility that the skill-set of successful IT PMs may be somewhat unique [2]. In fact, little empirical research has been conducted to investigate the skill-set that is needed in order to be a successful IT PM.

This research uses the repertory grid (RepGrid) interviewing technique to elicit the key attributes of successful IT PMs. Hunter and Beck have outlined several benefits to using this technique over other research alternatives [3]. First, the RepGrid technique does not require the researcher to specify *a priori* the relevant project manager attributes. Instead, these attributes emerge naturally from the data. Second, the structured interview format results in a ranked list of attributes of excellent project managers, making subsequent quantitative analysis easier. Finally, the technique minimizes researcher bias allowing for "a response based upon the participant's views on the topic" [3, p. 70].

Currently, 14 IT PMs have been interviewed. These 7 men and 7 women each have a minimum of 3 years experience in project management. Interviews with additional IT PMs will be conducted until theoretical saturation has been met – that is, subsequent interviews fail to produce new skills. Consistent with Tan and Hunter's recommended sample size of 15 to 25 [4], it is expected that another 4-5 interviews will be required.

A grounded theory approach will be used to code and analyze the interview data. Preliminary analysis of the interviews highlights the importance of team building, complexity management, leadership skills, personal integrity, communication, and technical competency. Once all interviews are completed, the identified IT PM skill-set will be compared to the existing literature on attributes of (a) successful PMs in general and (b) successful Information Systems Professionals.

This research represents a significant contribution for researchers, practitioners, and educators. It provides the first rigorous look at the skill-set that must be developed or imparted to create successful IT PMs. This list of skills would be helpful for assessing hiring and training needs and shaping curriculum decisions. With the right IT PM skills, it should be possible to reduce the incidence of IT project failure.

REFERENCES

[1] The Standish Group International, INC., "Extreme Chaos", www.standishgroup.com, 2001.

[2] Vaas, Lisa, "The Right Project Management Skills," *eWeek*, www.eweek.com, April 15, 2002.

[3] Hunter, M. Gordon and John E. Beck. "Using Repertory Grids to Conduct Cross-Cultural Information Systems Research," *Information Systems Research*, 11 (1): 93-101, March 2000.

[4] Tan, Felix B. and M. Gordon Hunter. "The Repertory Grid Technique: A Method for the Study of Cognition in Information Systems," *MIS Quarterly*, 26 (1): 39-57, March 2002.

What can organizational information systems learn from biological information systems?

Oded Nov
Department of Management
Polytechnic University, New York, USA
onov@poly.edu

Oliver Grimm
Institut de Biologia Molecular de Barcelona (CSIC)
Barcelona, Spain
ogrbmc@cid.csic.es

The research literature acknowledges the relationship between the study of biological systems and that of social and technological systems. In addition, advances in computer-based information systems (IS) have contributed to research of biological systems, and have spawned the research discipline of Bioinformatics. However, while the relationship between the two seems to offer valuable insights, there has been little attention paid to how insights from the research of biological systems can inform the research of organizational IS.

Reflecting this literature gap, the objective of this presentation is to discuss possible insights from biological systems, as well as to demonstrate how such insights might be incorporated into organizational IS research. We suggest a few directions for progress that may be interest to IS researchers by exploring the similarities and differences between biological and organizational IS, and discuss the relevance to potential information practices in organizations.

Reflecting on Technology Acceptance:
Lessons from Commercial Creative Processes

Oded Nov
Department of Management
Polytechnic University, New York
E-mail: onov@poly.edu

Rachel McCalla
Department of Information and Operations Management
Henley Management College
E-mail: rachel.mccalla@henleymc.ac.uk

In this paper, technology acceptance is discussed from the perspective of *'what can be learnt from recent data collected in creative process contexts?'*. The technology acceptance research has been dominated by the Technology Acceptance Model (TAM). Despite criticisms of TAM, extensions and subsequent consolidations of it, the central tenants of TAM are regarded as the key factors to consider when debating technology acceptance. The recent 'Unified Technology Acceptance Model' (UTAM) is perhaps one of the most significant developments in this area and consolidates key theories into one parsimonious model. Whilst recognising over two decades of useful contributions in technology acceptance research, there seems to be some mileage in reflecting on lessons learnt from recent case data.

Firstly, from a review of the literature on creativity, culture and technology, the UTAM is critiqued and the ground set for a further examination of the key constructs within UTAM. Four case studies of organisations that are using technology to support various aspects of creative processes in the advertising industry are then introduced. They provide illustrations for a further critique of the UTAM and lead into a discussion of each of the UTAM variables, providing an opportunity for reflection on technology acceptance within the context of creative processes.

It is argued that contextual factors must be more proactively considered, going beyond those contextual variables captured within the UTAM. A key contextual factor presented is process flexibility. It is argued that in creative environments where processes are highly flexible and yet organisational and inter-organisational systems are in use, it is more useful to consider technology acceptance around key aspects of system *functionality* than to consider technology as one homogenous system factor. Specifically, it is argued that technology acceptance for personnel in the creative industries may be considered from two different perspectives. Firstly, from the perspective of *'direct ideation support'* (support of idea generation as it occurs) and secondly from the *'indirect ideation support'* (general support for creative personnel whilst not engaging in the process of idea generation itself) perspective. Further, the nature of certain industries and the historical use of technology within these industries also seem to have significance, which at the moment is subsumed into social norms and experience variables. By failing to explicitly recognise the significance of historical contexts, it is argued, sensitivity to technology acceptance issues is radically reduced.

A number of propositions are presented which may lead to further research:

1. A consideration of *'functionality acceptance'* is more appropriate than *'technology acceptance'* when evaluating organisational spanning systems in highly flexible contexts.

2. The historical context of technology use is key, and oversimplification of this factor into the UTAM dependent variables of 'social norms', 'facilitating conditions' dilutes a key aspect of the context of technology and functionality acceptance.

3. In such organisational and process contexts, those aspects of functionality, which support indirect ideation processes, are more likely to be accepted than in direct ideation process contexts.

Management of Complex Outsourced Information Systems Projects

Antti Nurmi
Helsinki School of Economics, Information Systems Science
antti.nurmi@hkkk.fi

Organizations are seeking new ways to cut cost in the more competitive marketplace. One instance of this phenomenon is the joint information system development projects, where several organizations develop the common information system. Joint development is a way to divide development cost with other organizations, but on the other hand, the management of such projects is very challenging. Our research focuses on management of outsourced system development in a setting where several vendors and several client organizations develop a common information system. These many-to-many relationships increase the complexity of the system development process.

We have studied a common student record system of a group of Finnish universities that has been developed already for ten years. Given the complex organizational environment qualitative research approach seems most appropriate. Hence, our research method is in-depth case study. The actual system development is outsourced to external vendors. Between vendors and the group universities there is a mediating organization called consortium. Therefore, the system development process involves several many-to-many relations that complicate the management and development processes. Especially agreements on the mutually incompatible goals have been difficult to negotiate.

Our case provides us several interesting avenues to study. So far, we have studied evolution of coordination mechanisms as well as evolution of evaluation practices in such complex organizational setting. What we have found in these studies is that compromising was a characteristic feature of system development in such a multiple customer- multiple vendor environment. Varying organizational and technological environments of different organizations made decision making and finding a mutual understanding difficult. Other observable pattern has been the been the decrease of the dependence on each other between the customers as the system has become more functional, forcing tighter controlling mechanisms. In particular, in the beginning of the development project the universities were very dependent on each other as they all needed new information system. In other words the incompleteness of the system made organizations dependent on each other. Our third finding is that as the system project has matured the goals of different stakeholders have spread. This is reflected in several instances and is an implication of the decreased dependence on other members of the university consortium.

In the future we are interested to study the differences of coordination and control mechanisms in such multiple customer-multiple vendor environments. Questions like how and when control should be practiced are of great importance to us. Consortium as an organizational form has its own implications to system development process. What are these advantages and challenges is also part of future research. As we have case example that have a relatively long history, we have good opportunity to study different

processes and their long-term development. Additionally, we would like to compare our case to another multiple customer-multiple vendor setting in a different environment.

Does Space have a Place in IS Research? Exploring explicit and Implict notions of space in IS research

Carsten Østerlund
Assistant Professor
School of Information Studies
Syracuse University

As modern organizations have become more global and distributed, the workers and management is becoming increasingly dependent on the involvement of others who are distant in time and space. Organizations invest heavily in IT to support a distributed and mobile work force and the IT industry seems eager to understand and support emerging spatial and temporal organizations of work. In the IS field we find an abundance of research focusing on distributed, virtual, global, and outsourced work. Yet, rarely do those studies offer any explicit discussion or definitions of space and place. This trend stands in contrast to neighboring social sciences. In recent years, sociology, anthropology, social geography, and science and technology studies have witnessed a strong debate and research programs focusing on space and place and how those concepts relate to technology use. In this paper I will first outline the explicit and implicit notions of space and place in current IS research on distributed and virtual work. Second, I summarize some of the current approaches to space and place in related disciplines. Third, I discuss how the IS field may benefit from integrating some of the social science approaches to space and place into IS research.

Research Proposal: A Field Study of the Role of ICTs in Work-Life Balance

Jeria L. Quesenberry
Ph.D. Candidate
School of Information Sciences and Technology
The Pennsylvania State University
jquesenberry@ist.psu.edu

ABSTRACT
In the transition to an information-based global economy, the lines between work and home are blurring as technology reshapes the workplace and the nature of home life evolves. Yet, little empirical evidence investigates how information communication technologies (ICTs) are embedded in our social and economic lives with regard to work-life balance. Thus, additional research from a diverse range of perspectives is necessary to gain a stronger understanding of the long-term outcomes and consequences of ICTs in the transformation of the nature of work and home life. The purpose of this paper is to propose a qualitative study that examines the role of ICTs in blurring and/or reshaping the boundaries between work (work spaces, hours and schedules) and life (family interactions and domestic responsibilities). This study would integrate and refine theories, concepts and methods at the intersect of the social, behavioral and business/economic sciences and computer and information technology sciences. These theories will be coupled with empirical evidence American participants to develop new interdisciplinary knowledge that contributes to a wider theoretical resonance and future recommendations.

OASIS Submission

(Extended Abstract)

ERP Implementation:

An Exploratory Study of Customization Levels

Marcus Rothenberger
Department of MIS
Univ. of Nevada – Las Vegas
4505 Maryland Pkwy
Las Vegas, NV 89154-6034
(702) 895-2890
Marcus.rothenberger@ccmail.nevada.edu

Mark Srite
School of Business Administration
Univ. of Wisconsin-Milwaukee
PO BOX 742
Milwaukee, WI 53201
(414) 229-5502
msrite@uwm.edu

The implementation of commercial enterprise resource package (ERP) systems, such as SAP and PeopleSoft, has become a prominent issue for many firms. Many ERP implementation projects fail in their early stages or exceed the projected cost substantially (Scott & Vessey, 2002). For the success of an ERP adoption effort, it is crucial that the right decisions are made to smoothly integrate the system into the organization. These decisions include appropriate changes to the business processes, as well as suitable customization of the system. Although experience has shown that implementations are most successful when modifications of the software are kept to a minimum, many organizations are reluctant to modify their business processes.

This research investigates why some organizations pursue high levels of customization of the ERP system contrary to best-practices; the study explores the factors that affect an organization's customization choices. This research stream is in an exploratory phase for which qualitative research is appropriate (Platt, 1992). We have conducted case studies of eight organizations, in three regions of the world (North

America, Central Europe, and the Southern Europe), that have adopted an ERP system. Two individuals involved in the implementation at the management level have been interviewed in each organization. In most instances, they were representing the IT and the organizational functions, respectively. In order to ensure construct validity for the study we are basing our conclusions on multiple sources of evidence, particularly by comparing our findings to insights obtained in a second set of interviews with three consulting firms operating in the same respective regions of the world and specializing in ERP system implementation. The focused interview process aimed not only at identifying the customization factors, but also at obtaining a detailed understanding of the factors' effect on the implementation decision (Yin, 1994). We have completed the data collection and we are currently working on the iterative analysis process of the qualitative data. Based on the analysis conducted so far, we have developed a preliminary model (Figure 1).

Although a case study does not aim for statistical significant due to its small sample size, it still thrives for external validity (Yin, 1994). This is being achieved through analytic generalization, which develops a broader theory from the particular set of results. The development of such theory is the final step in our analysis. The results of this study provide insights on the drivers for excessive customization in ERP adoption. The findings can be a basis for adopting organizations to improve the customization decisions, as well as enable ERP adopters to control inhibitors of process redesign. Organizations that understand the possible pitfalls of customization decisions early will be able to generate awareness in the organization which may increase the willingness to modify business processes in the operational departments.

References – Available Upon Request

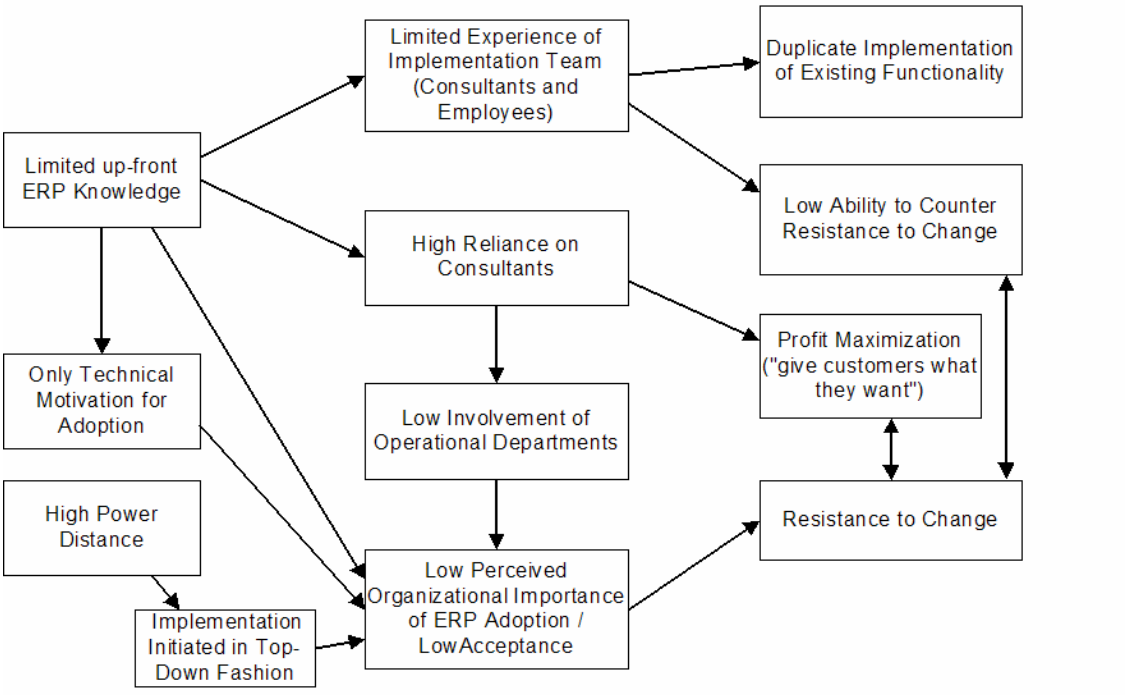


Figure 1: Enterprise System Customization Drivers

THE BEHAVIOR OF ACADEMIC INVESTIGATORS USING AN INSTITUTIONAL REPOSITORY

Maria Fernanda Sarmento e Souza[1] - fsarmento@dsi.uminho.pt
Ana Alice Baptista[2] - analice@dsi.uminho.pt
Isabel Ramos[2] - iramos@dsi.uminho.pt

1 Ph.D. Student – Department of Information Systems, Engineering School, University of Minho, Guimarães, Portugal; Supported by the Brazilian government – CAPES – Brazil; São Paulo State University (UNESP), São Paulo State, Brazil.
2 Ph.D. Professors - Department of Information Systems, Engeneering School, University of Minho, Guimarães, Portugal.

Institutional repositories (IRs) are a new strategy for universities to expedite changes in scientific communication. They are digital collections that store, preserve, and make available the intellectual output of one or more universities[1]. Housing this production in an IR can solve problems such as the high acquisition and maintenance costs of collections, and the publication of gray literature, reports and post-prints. However, the IR brings new questions about copyright that are still in discussion. It can also improve the situation of the universities that are responsible for producing 70% of the scientific papers, buying from commercial editors about 90% of the articles they consume, compromising part of the budget in the acquisition of periodicals that bring back the results of their own work[3].
The use of open archives by IRs should stimulate self-archiving, since it assures a more efficient dissemination of digital documents. However, self-archiving is a new task, sometimes perceived as an additional burden in overcrowded schedules, not yet part of the habits and routines of researchers and academic staff[4].
Thus, the main problem that directs this work refers to:

1. How do researchers react to this technology? What is involved in this reaction? What motivates it?
2. How does the reaction change happen (and how this change is expressed) across disciplines? And across cultures?
3. What are the important factors that help this technology to be better accepted? What can motivate researchers to use it? What management initiatives should be implemented to foster a better communication and sharing of research results through the intensive use of an IR?

Thus, we have 3 objectives that will be reached by means of an interpretative approach, which will enable the analysis of the researchers' interpretations as for the use of IRs, allowing the knowledge of important socio-cultural aspects.

1. To describe, analyze, and understand the behavior of investigators as producers and consumers of scientific information from different knowledge areas and cultures in relation to accepting and using an Institutional repository. Qualitative techniques of collection and analysis of research data will be used to understand the meanings attached to the practices observed, according to the specific historical and socio-cultural factors that have been shaping those meanings. Literature review, participative observation and semi-structured interview will be used to investigate the behavior of scientists regarding their acceptance of information technology in different contexts. Content and context analyses will be applied to collected data according to the parameters defined in the study as a way to develop a consistent interpretation of the observed behavior.

2. To determine its acceptance by these researchers as producers and consumers of scientific information. This will be investigated by qualitative techniques. A questionnaire will measure the variables included in the Technology Acceptance Model[2], which allows determining the intention of using the system.

3. To identify the success factors in implementing an IR, and to define a list of better strategies to be adopted in order to conduct the change, motivate the sharing of information, reduce costs, and assure the dissemination of the scientific information stored. Based on previous results, strategies and changes to be adopted by academic institutions will be proposed to successfully implement the system.

The comparative case study method will be used, evolving the researchers from the University of Minho and from a non-Portuguese university.

This work is justified in a socio-cultural context, especially in understanding the behavior of investigators from different knowledge areas and cultures in their acceptance and use of IRs, being possible to know important factors in its adoption.
This way, we intend to provide the academic managers guidelines that help them to promote a culture of sharing and disseminating the scientific information produced by their institutions, increasing the investigation's excellence.

1. CROW, R. The case for institutional repositories: A SPARC position paper. SPARC: Washington. 2002. Disponível em http://www.orl.org/sparc/IR/ir.html. Acesso em: 15 set. 2003.

2. DAVIS, F.D; BAGOZZI, R.P., WARSHAW, P.R. User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, v.35, n.8, p.982-1003, 1989.

3. OKERSON, A. Back to academia? The case for American Universities to publish their own research. *Logos*, v.2, n.2, p.106-112, 1991.

4. RODRIGUES, E.; BAPTISTA, A.A.; RAMOS, I.; SARMENTO E SOUZA, M.F. RepositóriUM - implementing DSpace in Portuguese: Lessons for the Future and Research Pathways. In: INTERNATIONAL CONFERENCE ON ELECTRONIC PUBLISHING, 8., 2004, Brasília, Brasil. Proceedings... Brasília: Universidade de Brasília, 2004. p.314-322.

Real-Time Enterprises Development Features with Anticipation of Information Change: Preliminary Findings

Vikas S. Shah
Advanced Technologies Group
Global Symphony Software (India) Pvt. Ltd.
Embassy Heights, #13 Magrath Road, Bangalore-560025, INDIA
vshah@symphonysv.com

Abstract

Recent industry trends, global competition, and technological innovations are driving enterprises to either adapt or develop practices of real-time enterprises (RTE). RTE are organizations that enable automation of processes spanning different systems, media, and enterprise boundaries. It provides time sensitive information to employees, customers, suppliers, and partners implementing processes to ensure that all information is up-to-date and consistent for "adaptability" to change and accept "change as the process". Real-time operations facilitate enterprises to gain competitive advantages by reducing lead times and improving efficiency as well as responsiveness to customer demands. Enterprises desire to recognize that "real-time" means different effects in different elements of the business before stirring to RTE.

The challenge lies to address the reactions of organizations in respond to external anxieties such as globalization and the rapid fluctuations of the market, however, dealing with different perspectives and organizational structures or cultures. The primary question is: to what extend if the specific organizational structure of information system (IS) characterized as RTE? This leads to the initial steps in the direction of accumulating known and investigated differences in structure, strategy formation, and work enclosed during design and implementation of RTE. If we are able to provide comprehensive and holistic development methods to integrate social interpretations, organizational processes, and contexts then it certainly be enriched in general.

Legacy application and data structure have become entrenched in organizations and significantly hinder information flow across infrastructure. Inconsistency, fragmentation, and duplication are the hallmark of most stovepipe infrastructures. The key to unleashing the power of RTE lies at the intersection of three essential restraints; integration, transformation, and reuse. Vendors advocate that integration is part of the development process. The risk in pursuing "development + integration" strategy is that the applications begin to include integration logic and as a result, business processes, data routing, and data mapping become baked into the applications. It compels developers to revise each application with corresponding changes in enterprise. Preserving the separation between development and integration is critical to achieving business agility.

RTE must be prepared to anticipate and manage a host of behavioral and organizational changes caused by the introduction of an integrated IS. Due to network of interdependencies in IS, the anticipation of information change needs to be assessed, evaluated, and improved for future harnesses. Developers are required to comprehend when design extends beyond their own decision making competence based on a detailed analysis and techniques. Thus developing RTE within specified infrastructure is incremental and progressive in nature. Primary advantages through the evolutionary steps to building RTE are lower integration and operational cost, ability to add and remove applications without disrupting services, end-to-end process visibility, reduction in barriers to collaboration, strategy-driven business process design, and flexibility to restructure applications to meet evolving mission requests.

During our simulation study and analysis to develop RTE, we have identified requirements addressing information change that includes collective planning, design decisions, integration issues, specific cooperation support, standardization, and service processes. We discuss limitations along with advantages of modern approaches introducing our view and conclusions to develop generalized RTE. Further research is devoted in two directions, service processes and RTE extensions, respectively. We anticipate implicating RTE in different domain and investigate the criteria towards domain characterization that are valuable to select methodologies for development process.

"RECONSTRUCTING" BEST PRACTICES EMBEDDED IN SOFTWARE PACKAGES: AN ACTOR-NETWORK PERSPECTIVE

Submitted to:
IFIP 8.2 Working Group on Information Systems in Organizations
Organizations and Society in Information Systems (OASIS) 2004 Workshop
Washington D.C., USA, December 2004

Siew Kien SIA*
Nanyang Business School
Nanyang Technological University
Nanyang Ave
Singapore
E-mail:asksia@ntu.edu.sg

Adrian YEOW
R. H. Smith School of Business
University of Maryland, College Park
College Park, Maryland
USA .
Email: yongkwang_yeow@rhsmith.umd.edu

* Address for correspondence

"RECONSTRUCTING" BEST PRACTICES EMBEDDED IN SOFTWARE PACKAGES: AN ACTOR-NETWORK PERSPECTIVE

ABSTRACT

Management and consultants frequently preach the notion of "best practices" as a set of normative business practices that can be adopted to achieve superior organizational performance. However, the plausibility of a set of objective and context-free knowledge that can be readily acquired, stored, and transferable is questionable. Recent research has shown that "best practices" embedded in software packages can become potentially troublesome for local operations. The process by which organizations arrive at a consensus of what constitute best practices and how they recast the best practices embedded in software packages remains a black-box and presents an under-researched area of study. The research agenda is crucial, given the prevalent trend of package software adoption and that system vendors, as producers of such systems, are increasingly shaping the definition of industry best practices or standards for organizational consumers (Sawyer 2001).

In this paper, we seek to open up this black box to describe and understand how the best practices embedded in software packages are reconstructed during the package implementation process. We adopt a narrative approach, to describe the negotiation and the modification of best practices during the implementation of a $14 million e-procurement system in a military organization across its 6,000 Army, Navy, and Air-Force users. The adoption of a commercial-oriented software package by a large public sector organization presents a rich context to understand the process of appropriating best practices, especially given the explicit project policy of "no modification" despite obvious inherent incompatibilities. Specifically, the key best practices that were contested and renegotiated relate to the incompatibilities between the organization's and software's financial models (decentralized responsibility centers versus centralized vote management structure) and the acceptable security management practices (open/passive versus closed/active enforcement).

Our longitudinal study uses the actant-network perspective to theorize the eventual e-procurement artifact as part of an ensemble of networked agencies and to analyze how best practices as socially enacted knowledge were inscribed in that artifact (Pentland 1995). More specifically, we trace the interactions among different agencies given their institutional histories, their conceptions of work problems and perceived goals of the technology, through their scripts of actions and rhetorical justifications used during negotiations, which eventually led to the eventual set of negotiated best practices that was inscribed upon the e-procurement artifact. By doing so, we highlight the politics and issues involved in localizing and appropriating purportedly "best practice" IT artifacts. As noted by Wagner et al. (2004), the process is not ruled by the majority – but the best practices are interpreted and constructed by a small group of actors who are able to materialize the preferred patterns of use. By opening up the black-box on the appropriation of best practices within package software, we hope to sensitize the IS

community/practitioners to the importance of structuring healthy dialog among the networked agencies to make the best of “best practices” embedded in software packages.

References:

Pentland, B.T. "Information Systems and Organizational Learning: The Social Epistemology of Organizational Knowledge Systems," *Accounting, Management & Information Technologies* (5:1) 1995, pp 1-21.

Sawyer, S. “A market-based perspective on information systems development,” *Communications of the ACM* (44:11) Nov 2001, p. 97.

Wagner, E.L., Galliers, R.D., and Scott, S.V., “Under Construction: Making the Best of “Best Practices””, IFIP WG 8.2, Manchester 2004 Relevant Theory and Informed Practice, paper accepted.

India's emergence in the IT arena: Accident, luck or social engineering?

Ramesh Subramanian
Quinnipiac University – School of Business
Hamden, CT 06518

Much has been written in the recent literature (both popular as well as academic) about India's rapid emergence in the global IT services sector. India is fast becoming a favorite destination for software services such as help-desk, customer relations, back-end office processing, remote systems and network administration and more recently, IT research and development (R & D). From a business-model perspective, India seems to have perfectly integrated both vertically and virtually in the range of IT services it provides to developed countries.

This success in offering IT enabled services globally has spurred the growth of many Indian IT companies that are rapidly becoming global players in IT. These developments have also spurred research papers on the strategic as well as practical aspects of outsourcing, off-shore software development and related issues.

The literature also makes note of India's apparently sudden and meteoric rise in the IT area. Much of it takes one or more of the following views:

- India's growth in the IT area was fueled by successful immigrants from India who settled in the United States of America, and who started up several successful IT ventures. These IT experts then played a major role in transferring their know-how to India, or set up collaborative IT ventures and development centers in India.

- The IT industry in India received a major boost through the "year-2000" (Y2K) problem. The manpower and specialized skills required by organizations to address the legacy code that caused the Y2K problem in the first place was not available in the US or in Europe. IT-services companies in India stepped in to fill the void. This created awareness in the USA and in Europe about the Indian software services industry and its capabilities.

- The economic downturn in 1999-2000 caused several US and European organizations to turn to software outsourcing for economic reasons, and India clearly benefited by offering qualified, English-speaking manpower at a fraction of the costs of similarly trained manpower in the western countries.

The vein of these discussions is that the emergence of India's IT sector is a comparatively recent phenomenon fueled by external needs and by "being at the right place at the right time."

While research on strategic outsourcing and related issues are very relevant and of great value to the IT research community, it would be interesting to study in-depth the

development of the Indian IT sector by taking a historical perspective. It would be useful to conduct a methodical study to record the growth of the Indian IT sector from its tentative beginnings in the 1950s to its current position of power. Studying the genesis of India's IT sector in detail will help one understand more about the "post-colonial" psyche as well as forethought of a newly independent under-developed nation's political and industrial leaders. In addition, such a study will also provide details of the specific factors that have influenced the emergence of India's IT sector, and its ramifications for the developed world in the future.

In this research, I have undertaken a qualitative study of the genesis and history of India's IT sector. The methodology that I have used is the long, in-depth interview. I have interviewed eight subjects connected to India's IT industry. The subjects range from a cabinet secretary in the government who served under four of India's Prime Ministers and actually helped write India's IT policy, a head of research in a specialized IT laboratory, academics and entrepreneurs. My aim is to synthesize the "data" that I have collected into distinct streams such as the temporal, human, organizational and social dimensions of the growth of the Information Systems/IT sector in India.

A major objective of this research is to test the three points above (my three "hypotheses") that relate to the "spurt" in India's IT sector and determine if they are true, **or** if there has been a more gradual, planned, or evolutionary path in India's development in the IT sector. Initial results of the research seem to indicate the latter.

WIDE AUDIENCE REQUIREMENTS ENGINEERING (WARE): A PRACTICAL METHOD AND CASE STUDY

Tuure Tuunanen
Information Systems Science
Helsinki School of Economics
P.O.Box 1210
FIN-00100 Helsinki, Finland
Tel +358 9 431 39283, Fax +358 9 431 38700
Email tuure.tuunanen@hkkk.fi

Ken Peffers[1]
MIS Dept., College of Business Administration
University of Nevada, Las Vegas
4505 Maryland Parkway
Las Vegas NV 89120
Tel (702) 807 1181 Fax (702) 446 8370
Email k@peffers.com

Charles E. Gengler
Baruch College, City University of New York
Marketing Department
17 Lexington Avenue
New York NY 10010
Tel: +1 973 763 4848
Email: Charles_Gengler@baruch.cuny.edu

ABSTRACT

This is a design research effort to develop a better method for requirements engineering (RE) for information systems where users are wide dispersed outside the organization. More and more IS development involves systems for which the end users are outside the organization because many new systems are intended to integrate outside users, such as suppliers, customers, and business partners, with automated internal operations and because many new systems are embedded in products intended for use outside the firm.

We identified seven problems associated with RE for such users: the lack of user relationships with the firm, data collection cost, modeling diverse user ideas, aggregating user models, presenting user information for decision making, effective decisionmaking, and the requirements-design interface. We reviewed the many attempts by researchers in the RE, IS and manufacturing to address these problems, finding partial, but not complete solutions.

[1] Corresponding Author

We develop an RE method, called wide audience requirements engineering (WARE), intended to support a solution to these problems. WARE features include a flexible, structured interviewing process (laddering), cognitive modeling (CSC), interpretive analysis, and a presentation tool that allows managers to view the requirements at several levels of aggregation by "drilling down" all the way to the original interviews. WARE involves seven steps: pre-study, project definition and participant selection, requirements gathering, model aggregation, presentation and management of requirements, workshop, ranking requirements, and requirements-design interface.

We used WARE to develop the requirements for a major system for advertising design and ordertaking at *Helsingin Sanomat*, Finland's largest newspaper. The demonstration showed that WARE is effective for its intended purpose. The requirements developed using WARE have become the basis for a three year development roadmap for the firm's strategic business system. WARE helped managers and developers understand user preferences, reasoning, and priorities.

The paper makes several contributions to the RE and IS literature. It identifies seven RE problems that are specific to systems intended for use by widely dispersed end-users and it proposes a method that would address these problems. It reviews RE, IS and manufacturing literature to show how these problems have been addressed in the existing literature, showing that they have been partially addressed. It proposes a method for systematically addressing all seven of these problems. It demonstrates the practicality and efficacy of the method.

IT BASED INNOVATION IN A SOCIAL LEARNING PERSPECTIVE

-A KNOWLEDGE TRANSFER MODEL EXPLORED IN PRACTICE AND THEORETICALLY REVISITED-

D.A. Wassenaar
Associate Professor in Business information systems
University of Twente, The Netherlands
Email: d.a.wassenaar@utwente.nl
Tel: 0031 53 489 3500

C.P. Katsma
Assistant Professor in Business Information Systems
University of Twente, The Netherlands
Email: c.p.katsma@utwente.nl
Tel: 0031 53 4893500

Abstract

It is broadly acknowledged that it is difficult to embed IT based innovations in existing organisations and to realise business value (Davenport et al., 1998; Zack, 1999). Many researchers are putting forward that the element of knowledge transfer and organisational learning is an important issue in the implementation of IT systems. This development will endure because the tangible container element of software is enhanced more and more with the intangible element of best practice(s) and knowledge. A good example are Enterprise Systems (ES) that deliver both an information system and best practices (or proven knowledge). In this perspective IT based innovations are becoming more and more knowledge intensive. In this paper we present the progress of our research framework on IT innovation in a social learning perspective (Wassenaar & Katsma, 2004). In this framework we combine:

- The implementation theory of Markus (2000, 2004) (focussing on stages in the implementation),
- The social learning framework of Boisot (1995) (focussing on cycles of knowledge exchange) and
- The innovation theory of Rogers (1995) (focussing on the innovation process that is communicated through certain channels over time among the members of a social system).

In the framework the processes of knowledge exchange, organizational learning -and change, between the source organisation and host organisation, are split up into four cycles: (i) scanning (strategic system planning), (ii) problem solving (system realisation), (iii) diffusion (system introduction) and (iv) absorption (system usage and institutionalisation).
Our analysis of three case studies with the framework shows: 1) there are significant varieties in these cycles between the mutual case studies and 2) we can discern the following three elements that influence the variety in the patterns of these four cycles:

(1) The characteristics of the IT based innovations and especially their (broad or limited) scope, their aspiration level in innovation and their organisational impact and finally their underlying (simple, well proven or complex technology).
(2) The characteristics of the destination (host)organisation and especially their attitude (culture), organisational structure and low or high innovation capabilities
(3) The characteristics of the intermediary organisational project arrangements channelling the learning -and change processes between the aspired innovation and the hosting organization.

In two cases we see a direct relation between the misalignment among these three elements and problems that occur in the four cycles. In one case the alignment between these three elements results in a successful progress through the cycles. Based on our analysis we present the revised research framework and conclude successful implementation of IT based innovations requires a continuous balance between the characteristics of the four learning cycles, the IT based innovation, the host organization and the organizational project arrangements. These elements mutually influence each other, but are also affected by existing practices (Giddens, 1984; Boisot, 1995). Our framework contributes to the dialectical concept (Robey et all, 2000) by identifying the denominating characteristics of two contradictory elements, but especially by making explicit the characteristics of the bridging part, i.e.: the organizational project arrangements, that we call the intermediary channelling function.

A Practitioner Centred Maturity Model of IS Development

by Dr. David W. Wilson,
Birkbeck College, University of London

This is a proposal to re-boot his own deep research interest by an academic who has spent too much time recently in pedagogical pursuits. He believes that it is useful to predict the shape of the Information Systems Developer of the future, primarily to help developers envision career paths and secondly to help educators envision the curricula of the future.

Avison & Fitzgerald (1988) proffered a model of the fragmentation of roles in IS. More recently Markus & Benjamin (1996) have proffered a model of shedding light on three key roles in organisational information systems provision. Monin & Dewe (1994) found that more experienced members of the IS profession recognised the importance of skills management and proposed research into wider skill sets. Arnold & Niederman (2001) have recognised a global IS skills food chain and the research of Schwarzkopf, Saunders, Jasperson and Croes (2004) that organisations do not manage their long term skill needs but treat them as a source of uncertainty. They also found that IT skills are treated differently outside the regular HRM processes.

Maturity Models have long been used in Information Systems to understand growth processes and justify investments (Greiner, 1972, Gibson & Nolan 1974, Nolan 1979, 1984, Galliers and Sutherland, 1989). Wilson (1997) promulgated a definition of a strict maturity model. In software Engineering various maturity models (Humphrey, 1988, Paulk 1991) have enjoyed celebrity in the quality assurance movement in that discipline.

This research will develop a practitioner centered model. The practitioner's career will be seen as a growth process and hopefully stages will be identifiable. These are expected to be ever more complex roles. It is posited that this growth process is surrounded by a number of other significant growth processes. Those identified so far are the hard technology growth process. This was identified by Couger, Coulter & Knapp (1982) as a series of generations. Several layers of soft technology follow similar (but lagging) generations. These are the layers concerned with software, systems design at the artefact architecture level and systems design at the level of organizational fit. Recently there has been a move of systems beyond organisations to market facilitators.

Different growth process stages can be observed in the in the employment relationship of the practitioner to organisations and there is also a stage process in the shape of the organisations and markets in which the developer is employed.

Much of this research will document recent history. The purpose of resenting to this meeting is to explore candidate research methods.

The Political Behavior in Information System Implementation—Interpretation From Multi-Perspectives

Christina Ling-hsing Chang, Assistant Professor, Department of Information

Technology of National Pintung Institute of Commerce

zubada22@yahoo.com.tw

Abstract

This paper explores the political behavior process in information system (IS) implementation process. The organizational politics is the critical success/failure factor in the IS implementation process. We expect to find out what kind of political behavior will occur? What will be the events and processes of these political behaviors? Who is the initiator? At what time? In what setting? What will be the interaction among these dimensions? How will these political behaviors affect IS outcomes and the organization? This study will explain political behavior in IS implementation process from different interpretations and perspectives. This study relies on qualitative data collected over thirteen months from --***manufacturer Theta***--in the form of interviews, documented data, archival data, and observation. The data are interpreted through three internally coherent theoretical perspectives: strategic contingency theory, social exchange theory, and structuration theory. Contributions include the following. In practice, the detailed descriptions we use to describe the political behavior process in IS implementation process can help in similar cases to show how to reduce or prevent any negative consequences. Academically, we conduct contextual and process theory analyses of these processes, and use three theoretical perspectives to interpret these phenomena.

Key words：Organizational Politics, Political Behavior, Information System, Strategy Contingency Theory, Social Exchange Theory, Structuration Theory

Moving On with Technology

Noriko Hara[1]
Hamid Ekbia[2]
1) School of Library and Information Science, Indiana University
nhara@indiana.edu
2) Computer Science Department, University of Redlands
hamid_ekbia@redlands.edu

Abstract

Social movements are widely studied by social and political scientists, but the role of technologies in these movements has been rarely investigated. Historically, various types of technologies have influenced social movements. For example, the use of the printing press affected European social movements in the late eighteenth century (Tarrow, 1998). However, the relationship between technologies and social movements becomes increasingly important with the advent and proliferation of new information and communication technologies (ICT). In 2003, one type of collective action against the war in Iraq was organized through the medium of the Internet. On February 15, 2003, peace demonstrations against the Iraq war were organized throughout the world which involved approximately 10 million people (Boyd, 2003). It was reported that the Internet played a major role in facilitating the mobilization of this massive social action (Lee, 2003; Packer, 2003).

Collective action involves the organization of oppressed populations in order to make positive changes in their social situations (Gamson, 1975; Tarrow, 1998). Blumer (1969) characterizes social movements as "collective enterprises to establish a new order of life." There have been studies on the use of the Internet by feminist activists (Ayers, 2003), for the promotion of democratization in Burma (Danitz & Strobel, 1999) and in Mexico, i.e., the Zapatista Movement (Arquilla & Ronfeldt, 2001), and by environmental activists (Galsusky, 2003). Yet, the importance of ICTs is not considered, and the concept of ICTs is not integrated in the theories of social movements in general. The proposed presentation will redress this anomaly.

In this study, we use a qualitative case study method to examine the activities of a social activist group, MoveOn, which was one of the groups facilitating the anti-war movement mentioned above. According to the group's website (http://www.moveon.org), over two million social activists are subscribing to their e-mail list. To investigate the role of information technologies that assist collective action, data will be collected about participants' motivation to become a part of MoveOn, perceptions towards political activities, and activities triggered by MoveOn. We wish to obtain feedback from colleagues at IFIP WG8.2.

The purpose of the study is three-fold. The major purpose is to examine the roles of ICTs in a social activist movement, both as an enabler and as an impediment. The second purpose is to contribute to the literature of social movements by examining how a social

activist movement operates and to what extent it is different from other social movements. The third purpose is to identify the strengths and weaknesses of the current social activist movement and to provide constructive advice to the consortium promoting this movement.

References

Arquilla, J., & Ronfeldt, D. (2001). Emergence and influence of the Zapatista social netwar. In D. Ronfeldt & J. Arquilla (Eds.). *Networks and netwars: The future of terror, crime, and militancy*, pp. 171-199. Santa Monica, CA: RAND.

Ayers, M. D. (2003). Comparing collective identity in online and offline feminist activists. In M. McCaughey & M. D., Ayers (Eds.), *Cyberactivism: Online activism in theory and practice*. New York: Routledge.

Blumer, H. (1969). Social movements. In B. McLaughlin (Ed.), Studies in social movements: A social psychological perspective, pp.3-29. New York: The Free Press.

Boyd, A. (2003, August 4). The web requires the movement. *The Nation*. Retrieved September 25, 2003, from http://www.thenation.com/doc.mhtml?i=20030804&c=1&s=boyd

Gamson, W. (1975). *The strategy of social protest* (2nd ed.). Belmont, CA: Wadsworth Publishing.

Galusky, W. (2003). Indentifying with information: Citizen empowerment, the Internet, and the environmental anti-toxins movement. In M. McCaughey & M. D. Ayers (Eds.), *Cyberactivism: Online activism in theory and practice*. New York: Routledge.

Lee, J. (February 23, 2003). Critical mass: How protesters mobilized so many and so nimbly. *New York Times*, WK 3.

Packer, G. (March 9, 2003). Smart-mobbing the war. Eli Pariser and other young antiwar organizers are the first to be using wired technologies as weapons. *New York Times Magazine, Section* 6, p. 46.

Tarrow, S. (1998). *Power in movement: Social movements and contentious politics* (2nd ed.). Cambridge: Cambridge University Press.

The Armageddon Machine: Critical Action Research at BCTel

Duane Truex, Georgia State University, USA
Jeremy Rose, Aalborg University, Denmark

Abstract

Enterprise Resource Planning (ERP) systems are widely presented as being exceptionally pervasive in their influence and as imposing a distinctive logic on organizational practices. This influence is generally presented from a managerial perspective, but in an action research project concerning the implementation of SAP in a Canadian telecommunications company, the union characterized the ERP system as 'the Armageddon machine' – the machine which would bring about the end of the union's world. Such claims may be seen to relate to a long-standing debates in the IS literature concerning the relationship between technological and human organizational actors. One of those debates may be characterized as 'the problem of agency'. A second debate deals with the question of whose interests should be served by any information technology. ERP systems could be described as a managerialist debate about a mangerialist technology. Moreover much of action research itself has a strong managerial bent because of its close ties to managerial sponsorship. This paper adds to the discourse on both of these topics via the vehicle of a critical action research project. The paper develops an argument and logic for a type of action research arising from the shared intellectual premises from critical social theory and action science themselves. In the process it illustrates how action research can make a good contribution to theoretical development as well as theory use, especially in areas, such as the study of agency or of embedded power differentials in organizations, which are its natural province.

Keywords: action research, agency, structuration theory, actor network theory, ERP systems

ISRL categories: AI0101, AI0802, AI08, AJ, BA0212