

INFORMATION SYSTEMS RESEARCH
CAPSULES: DIRECTIONS FOR NEW
SCHOLARS

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#CIS-2004-02

December 2004

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ABSTRACT

The purpose of this paper is to acquire an understanding of what IS research is all about, to define some of the main areas in the broad spectrum of IS research, and to provide a short overview for scholars to use as a springboard and a starting point to conduct future studies. A device is proposed called a research capsule. Each such capsule is a broad superficial overview of the particular IS research area and is intended to serve as a portal for a scholar who is interested in embarking on a path of research in that area.

ACKNOWLEDGEMENT: the authors would like to thank Ms. Yoko Katagiri for her contribution to an earlier version of Figure 1.

1. INTRODUCTION

Business transactions, educational modules, entertainment venues, communication media ... Virtually every aspect of everyday life is being revolutionized by information systems (IS). The astonishing pace at which technology progresses and changes the way we conduct our daily routine is breathtaking. And while society enjoys the benefits of ever-improving communication networks, business processes, and learning environments, researchers scurry to keep up. Given the fast pace of information technology (IT) innovation and the vast range of applications in its reach, the world of information systems can be an overwhelming place for researchers who seek to understand the phenomena that distinguish it as a field of study. Borrowing from as many disciplines as it touches, the field of information systems is, arguably, diversity defined.

IS research is a diverse field for a number of reasons. It is a relatively new discipline, still defining itself and its boundaries. Also, since IS scholars may come from and interface with a variety of backgrounds, including computer science, finance, management, economics and the social sciences, there is no one uniform research mode. Often scholars use the methodologies of a previous or associated area of research.

It is in this tumultuous environment that newcomers to IS research seek some order. Every year, newly minted IS scholars graduate into the workforce and, each year, another group of aspiring IS scholars enter doctoral programs in schools of business and, quite naturally,

ask what is IS research and how does the IS discipline differ from other disciplines that they may have previously studied.

The purpose of this paper is to acquire an understanding of what IS research is all about, to define some of the main areas in the broad spectrum of IS research, and to provide a short overview for scholars to use as a springboard and a starting point to conduct future studies. In fact, the work described herein began in a doctoral seminar “Introduction to Information Systems Research” in the Fall of 2003 (Altschuller et al. 2004).

The idea for this paper originated as a sort of clearinghouse, or repository, of IS research areas, so beginning scholars working in a particular area could have a place where they could get a sense of the work currently in progress in that area. The field of IS is young enough that this is still possible. Thus, this paper represents the beginning stages of the evolution of such a clearinghouse or repository.

What is IS research? ISWorld (Ives 2003) links to many sources (Magal 2003) and examples of IS scholarship (Crowston 2003), but a comprehensive overview of the IS research enterprise is lacking. The closest the field comes to defining itself is probably in the web page surveying IS researchers’ opinions about “Exemplary Works” in IS (Exemplary Works on IS Research 2003).

Of course, the answers to the naïve questions of new scholars and aspiring scholars appropriately belong to those at the other extreme of the career spectrum, the veteran IS

scholars with many years of expertise in the field. As we shall see, although the discipline does not speak with one voice on this issue, the debate itself has been very fruitful.

2. BACKGROUND AND A REVIEW OF THE RELEVANT LITERATURE

Over the past several years, the IS field has engaged in continuing efforts to define itself and determine its unique identity. Early on, Alavi and Carlson (1992), in an analysis of the MIS literature from 1968 – 1988, tried to summarize MIS research in terms of economic and political externalities, technology, and organization issues. They found the beginnings of a trend towards more empiricism and a relative paucity of MIS theory. Many scholars have tried to identify some set of core principles or properties (Orlikowski and Iacono 2001; Weber 2003) that distinguish IS from its reference disciplines of philosophy, computer science, management, business, economics, mathematics, engineering and, even, psychology and sociology.

IS research has been diverse since its inception (Benbasat and Weber 1996; Robey 1996; Vessey et al. 2002). Davis (1999) demonstrates that different views of IS research – e.g., technical, procedural, organizational, etc. – can lead to different research agendas.

Benbasat and Weber (1996) categorize three prominent types of diversity in IS research: diversity in the problems addressed; diversity in the theoretical foundations and reference disciplines; diversity in the research methods. However, the authors caution IS scholars to think more carefully about the consequence of diversity because it may threaten the

advance of IS discipline. Robey (1996), on the other hand, is more optimistic about the multidisciplinary aspect of the discipline, and considers it a strategy rather than an unfortunate side effect. Thus, diversity can and does benefit IS research by expanding the foundation of IS discipline, attracting talented scholars to IS research, and advancing the principles of academic freedom. Furthermore, Galliers (2003) argues that IS research should become less disciplinary and even more trans-disciplinary in nature. The author calls for acceptance and pluralism in IS research, because IS is indeed multi-leveled and multi-faceted and, "overly constraining the academy to a narrow field of interest is self-defeating."

In an introspective account by two veteran IS researchers (Hirschheim and Klein 2003), fragmentation and communication gaps are identified as problematic structural patterns that are the source of a perceived IS crisis. By way of solution, the authors propose the creation of a common body of knowledge for the field. Changing the way the field thinks about generalizations, changing publication practices, focusing on organizational stakeholders, and developing new knowledge creation and transformation networks.

Another issue of IS research debated among veteran scholars is relevance. Benbasat and Zmud (1999) argue that most IS academic research today lacks relevance to practice, although we do find that actually many IS studies are practice-oriented either in the way of defining research problems or in the way of solving the problems. Another type of relevance is relevance to the theoretical foundation of IS discipline or core of IS discipline (Benbasat and Zmud 2003). According to Swanson and Ramiller (1993), who conducted a

survey of the themes and reference disciplines underlying 397 submissions to the journal *Information Systems Research* from 1987 to 1992, IS researchers still borrow much from reference disciplines. Such a reliance on reference disciplines may be viewed as less of a contribution to the IS discipline's central identity and, thus, Benbasat and Zmud (2003) attempt to establish an identity for IS research. In addition, Orlikowski and Iacono (2001) argue that current IS research has not deeply engaged its core subject. While Benbasat and Zmud (2003) define the identity of the IS discipline as IT artifact and its immediate nomological net, Orlikowski and Iacono (2001) define it as the IT artifact only. Gregg et al. (2001) posit that software engineering is a major component of IS, that, in fact, it may be the differentiating factor between IS research and other disciplines. For these authors, IS research must be more closely relevant to the core of IS discipline than to reference disciplines.

While Benbasat and Zmud (2003) call for more rigid and coherent IS identity, Robey (2003) holds that the IS identity should be flexible and adaptable. Thus, establishing an identity for IS field is actually revising the identity. To foster the adjustment, it is recommended establishing and preserving pragmatic legitimacy, strengthening connections with IS's contributing disciplines and sharpening the focus on IT as core phenomenon but resisting the lure of a dominant paradigm.

DeSanctis (2003) observes that two legitimacies exist in the IS field: cognitive and behavioral legitimacy. Whereas Benbasat and Zmud (2003) call for greater cognitive legitimacy, which is rooted in the mindset of outsiders, DeSanctis (2003) studies

behavioral legitimacy, which refers to social interactions among insiders. DeSanctis argues that evidence of behavioral legitimacy is abundant within the community of IS practice, and further argues that the diversity and shifting boundaries of IS research are maturity effects. During the stage of maturing, IT transformations within the industry and institutional changes within universities are two major forces to shift attention to the IT artifact. Therefore, DeSanctis (2003) recommends focusing on questions rather than on the domain, and encouraging participation, and communication among both insiders and outsiders.

What is IS research? We applaud the efforts of veteran IS scholars to define and characterize the core of IS research. However, we believe that, especially for the new IS scholar, it is the very diversity of areas of IS research that defines it. In this paper we take an inclusive approach; we are more likely to consider an area of research to be part of the IS research universe than to exclude it.

3. NAVIGATING THE ISR UNIVERSE: A MULTIDISCIPLINARY PERSPECTIVE

Figure 1 presents our attempt at a unified framework for research areas in information systems. Clearly, our view of IS research places it squarely in the center of a multidisciplinary universe.

>> INSERT FIGURE 1 ABOUT HERE <<

Along the horizontal axis lies the continuum from technical to behavioral, with the fields of IS running from the field with more technical aspects, such as Modeling and Simulation and IS Productivity, to the behavioral and humanistic fields, such as E-Commerce and Group Support Systems. The IS research areas are clustered along this axis in three groups: system-to-system; person-to-system; person-to-person. System-system fields are the areas of IS research that study the relationships between two different computer systems and how they interact. Included in this category are: IS Effectiveness, IS Productivity, Knowledge Management, Modeling and Simulation, and Information Retrieval. These fields tend to be more technical. Person-person fields tend to be more behavioral; they are the areas that study human behavior – how people interact – while using information technology. These fields are: Virtual Communities, E-Commerce, Computer-Mediated-Communication, Global IT, Information Economics, Decision Support Systems, and Group Support Systems. The middle category is person-system. This category is between the technical and behavioral aspects of IS research. It studies the interaction of people with IT, and how IS affect people. These categories are: E-Government, IS Innovation and Diffusion, Human-Computer-Interaction, User Participation, Information Privacy, and IS Ethics. The vertical axis runs from the more applied / practical areas of IS research, such as E-government, to the more abstract / theoretical, such as IS ethics.

As Figure 1 demonstrates, each axis, when followed to its natural “limit” reaches a fundamental discipline that feeds into information systems research as a reference discipline. Indeed, even the diagonal “axes” reach conceptual “limits” in terms of traditional IS reference disciplines. As one traverses outward from the center and the core of IS one reaches the boundaries of – and sometimes enters – these disciplines. The technical aspect of IS is related to math and physics; the behavioral aspect of IS is related to psychology and sociology. As one travels full circle around the plane starting at the technical aspect of IS one encounters the engineering field en route towards the applied/practical aspect. Leave the applied/practical aspect and move towards the behavioral aspect, and one encounters the business discipline. Continuing on the journey one encounters the psychology, sociology, economics, computer science, and physics disciplines. We hope this proposed model is comprehensive, and we invite the community of IS researchers to refine and expand the model.

Each of the areas in the IS research universe is summarized in the following section by means of a thumbnail sketch we call a research capsule.

4. THE RESEARCH CAPSULES

the research capsules developed here are an attempt to encapsulate the essence of specific research areas within IS. Each capsule was created based upon a broad superficial overview of the particular IS research area and is intended to serve as a portal for any

scholar who is interested in embarking on a path of research in that area. Following a short description of the area and some of its subtopics, each capsule mentions the reference disciplines that its area taps into along with a list of works and resources for researchers to use as a springboard for delving into the published literature in this area.

The resources cited include a few well-known textbooks written by experts in the area as a good place to start to acquire an understanding of what the research area includes. Next, the seminal papers – defined as the original works in the area that were instrumental in the creation of the research stream – to familiarize a new scholar with the most basic and often-quoted studies. Literature reviews are an excellent way to get a sense of many studies that have been done in the field, and are listed next. Finally, recent contributions are included to provide the newcomer with an idea of what types of research are currently being done in the area. Also included are any research centers that specialize in the area and links that are useful for a potential participant in the research area to tap into for direction. With a capsule in hand, a researcher has taken a first step into an area of IS research.

Our lists will attempt to be comprehensive, and will be subject to further refinement, but the major IS research streams will be represented. It is fine to speak of "different areas of research in IS" but researchers in the trenches know that research rarely splits itself into neatly exclusive areas. Most areas of research in IS tend to overlap other areas. Neat distinctions would be at best naïve and at worst misleading.

The following are the individual research capsules for the IS research areas reviewed for the purposes of this paper. We tried to include capsules from across the IS research spectrum. Clearly, an encyclopedic array of these areas would be an impossible task within the limited constraints of an academic paper. These areas chosen illustrate the breadth of IS research and the multidisciplinary nature of the enterprise.

4.1. RESEARCH CAPSULE: COMPUTER-MEDIATED COMMUNICATION SYSTEMS

Including such concepts as Media Richness, Social Presence, Group Support, and Synchronous vs. Asynchronous communication systems, this area of research encompasses various studies that look at the way people communicate using computer-mediated communication. System characteristics are just some of the variables looked at. Studies examine the tasks that people attempt to accomplish, the relationships they have, and the behavior they display using these systems. Computer-mediated communication in education is also a large focus of study in this area.

REFERENCE DISCIPLINES: Psychology, Sociology

TEXTS: Rapaport (1991); Harasim et al. (1995); Kerr and Hiltz (1982).

SEMINAL PAPERS: Daft and Lengel (1986); Sproull and Kiesler (1986); Rice (1987).

LITERATURE REVIEW: Fjermestad and Hiltz (1999).

RECENT RESEARCH: Sia et al. (2002); Yoo and Alavi (2001).

CENTERS: none found

USEFUL LINKS: JMIS Keyword search (http://jmis.bentley.edu/keywords/k_458/);

Links for Communication Study: Computer-Mediated Communication

(<http://www.uwec.edu/Sampsow/Links/CMC.htm>).

4.2. RESEARCH CAPSULE: DECISION SUPPORT SYSTEMS (DSS)

DSS are IS that support decision-making activities. DSS link interactive computer-based systems to large data warehouses in order to assist decision makers use data, documents, knowledge and models to identify and solve problems and make decisions. DSS research examines DSS user behavior and user characteristics; DSS user interface design, standards, and features; DSS capabilities including development of intelligent agents, and model management; impact of DSS on learning, problem knowledge, and problem structuring; DSS architecture; use of information in decision making; and effectiveness of computer graphics for decision support.

TEXTS: Tonfoni and Jain (2003); Turban and Aronson (2000); Whinston and Wolsapple (1987).

SEMINAL PAPERS: Ferguson and Jones (1969); Gerrity (1971); Alter (1977).

LITERATURE REVIEWS: Eom (1998); Shim et al. (2002); Kaplan(2001).

RECENT RESEARCH: Chen and Lee (2003); Lee and Park (2003); Lari (2003).

CENTERS: Institute of Information and Computing Sciences, Utrecht University,

Decision Support Systems Group (<http://www.cs.uu.nl/groups/DSS/>); Integrated

Decision Support Group, Colorado State University

(<http://www.ids.colostate.edu/>); IBM Cooperative Decision Support Group

(<http://www.research.ibm.com/CoopDS/>); Monash University's School of

Information Management & Systems DSS Lab

(<http://www.sims.monash.edu.au/dsslabs/>).

USEFUL LINKS: Decision Support Systems journal

(<http://www.elsevier.com/inca/homepage/sae/orms/dss/menu.htm>); DSS Resources

(<http://dssresources.com/>); ISWorld (<http://www.isworld.org/dss/index.htm>).

4.3. RESEARCH CAPSULE: E-COMMERCE

Electronic commerce (e-commerce) can be defined as any type of business transaction in which the two parties interact electronically rather than physically. It is the sharing of business information, maintaining business relationships, and conducting business transactions electronically, and has been transforming the way businesses are organized, managed and operated. It enables businesses to operate globally, and to conduct their affairs more efficiently. It also can help businesses satisfy their customers and be more responsive to their needs. E-commerce is very broad area with many sub-areas. Some of the issues studied are: architecture, technology, effectiveness, customer service, satisfaction, human-machine interaction, trust, and privacy and security. E-commerce can be categorized in different ways, e.g., business to business (B2B), which may use EDI, and business to consumer (B2C), which uses the Internet to buy and sell goods.

REFERENCE DISCIPLINES: marketing (consumer behavior), psychology.

TEXTS: Alter (2002); Chan et al. (2001); Laudon and Traver (2002).

SEMINAL PAPERS: Hoffman and Novak (1995); Zwass(1996).

LITERATURE REVIEWS: Burt and Sparks (2003); Grabner-Kräuter and Kaluscha (2003); Ngai and Wat (2002).

RECENT RESEARCH: Li and Horrocks (2003); Tarasewich et al. (2002); Trastour et al. (2003).

CENTERS: Murdoch University (Australia) Centre for Electronic Commerce and Internet Studies (<http://www.wcecis.murdoch.edu.au/>); Georgia Tech Electronic Commerce Resource Center (<http://www.ecrc.gatech.edu/welcome.html>); International Center for Electronic Commerce at Korea Advanced Institute of Science and Technology (KAIST). (<http://icec.net/>); Keio University, Japan Electronic Commerce Research Project. (http://www.ecrp.org/english/ecrp_e.html).

USEFUL LINKS: Ecommerce Info Center (<http://www.ecominfocenter.com/>); Roger Clarke's eCommerce Pages (<http://www.anu.edu.au/people/Roger.Clarke/EC/indexextl.html#journals>); List of E-commerce journals and other links (<http://ta.ba.ttu.edu/onlid/research/ecjournals.htm>).

4.4. RESEARCH CAPSULE: E-GOVERNMENT

Electronic Government (e-government), or Digital Government, refers to government organizations utilizing IT to collect data and to provide data and information or related services to its citizens, business units and internal users. Based on government's internal users (employees) and external customers (citizens, business units and other government agencies), e-government research can be classified into 4 categories: G2C (Government to Citizens), G2B (Government to Business), G2G (Government to Government) and G2E (Government to Employee). The National Science Foundation defines two classes of e-government research: 1) Multi-disciplinary and multi-sector research in IT and government

agencies at all levels; 2) Relationship between design and use of IT on a) forms, processes and outcomes of democracy, b) government organizational forms, learning and adoption, c) new forms of G2G collaboration, d) citizen to government interaction. There are three basic research schools in e-government: the IT technical group which focus on the information technologies development and implementation; the public administration school, which utilizes the politics and sociology; and the organizational group, which uses organization theory and behavioral methods.

REFERENCE DISCIPLINES: Sociology, Public Administration, Politics

TEXTS: Heeks (2004).

SEMINAL PAPERS: Schorr and Stolfo (1998).

LITERATURE REVIEWS: Muir and Oppenheim (2002).

RECENT RESEARCH: Edmiston (2003); Holden et al. (2003); Melitski (2003); Wagner (2003); Weber and Aha (2003); Wyld (2003); Shi (2002); Chen and Gant (2001); Muir and Oppenheim (2002);

CENTERS: Center for Technology in Government of the University at Albany, SUNY, (<http://www.ctg.albany.edu/>); John F. Kennedy School of Government at Harvard University (<http://www.ksg.harvard.edu/digitalcenter>); University of Michigan School of Information (<http://www.si.umich.edu/digarch/>).

USEFUL LINKS: The Digital Government Web site (www.digitalgovernment.org); IBM Endowment Business of Government, <http://www.businessofgovernment.org/>; National Research Council (http://www.cstb.org/web/pub_egovernment).

4.5. RESEARCH CAPSULE: GLOBAL INFORMATION TECHNOLOGY (GIT)

GIT, or Global Information Technology management, studies the connection between the growth of global economic activity (such as international commerce) and the growth of information systems, and examines such theoretical questions as, how does the growth of information technology facilitate globalization and, *vice versa*, how does globalization increase the need for more sophisticated information technology; do new technologies enable companies to consider new activities, *vice versa*, do desires of firms for new markets create the need for new technologies; do firms benefit from the availability of international information? Some of the main issues studied are the technical involvement of IS applications, international sharing and control of data, projects that span cultures, and relating global business and IS strategy. This research can incorporate various perspectives e.g., those of national governments, economic regions, firms, labor markets, and consumers.

REFERENCE DISCIPLINES: Marketing, Management, Psychology, Computer science

TEXTS: Palvia et al.(1992); Walsham (2001); Webb and Kirsch (1999).

SEMINAL PAPERS: Deans and Ricks (1991); Deans and Ricks (1993); Harrison and Farn (1990); Hofstede (1985); Ives and Jarvenpaa. (1991).

LITERATURE REVIEWS: Gallupe and Tan. (1999); Palvia et al. (2002); Palvia (1997).

RECENT RESEARCH: Trauth (2003), Vinaja (2003).

CENTERS: none found

USEFUL LINKS: ISWorld page on GIT (<http://www.isworld.org/globalIT/index.htm>);

Journal of Global Information Technology Management

(<http://www.uncg.edu/bae/people/palvia/jgitm.htm>); Global Information

Technology Management Association (GITMA) World Conferences

<http://www.gitma.org/>).

4.6. RESEARCH CAPSULE: GROUP SUPPORT SYSTEMS (GSS)

Group Support Systems (GSS) are information systems designed to allow groups to use information technology to overcome distance and time barriers and work together so that all members of the group can benefit. Research in this area studies how different environments, situations, groups, tasks, individuals and technologies impact the effectiveness and efficiency of the group while using the GSS. Also studied is the extent to which work groups can benefit from the use of information technology. GSS are sometimes referred to as electronic meeting systems (EMS) or Group Decision Support Systems (GDSS).

REFERENCE DISCIPLINES: Psychology

TEXTS: Jessup and Valacich (1992), Radford and Eden. (1990), Thierauf (1989).

SEMINAL PAPERS: DeSanctis and Gallupe (1987), Dennis et al. (1988), Jessup et al. (1990), Nunamaker et al. (1987), Nunamaker et al. (1989), Poole et al. (1985), Ziguers et al. (1988).

LITERATURE REVIEWS: Bamber et al. (1998), El-Shinnawy, and Vinze. (1998), Fjermestad and Hiltz. (2001), Fjermestad and Hiltz. (1999), Tung and Quaddus (2002).

RECENT RESEARCH: Klein et al. (2003), Wong, and Aiken (2003).

CENTERS: New Jersey Institute of Technology Cognitive & Decision Systems Group
(<http://www.ccs.njit.edu/cdsg/>).

USEFUL LINKS: none found

4.7. RESEARCH CAPSULE: HUMAN-COMPUTER INTERACTION

Human-Computer Interaction (HCI) brings people and technology together to accomplish a task, which may involve the processes, dialogues, and actions for a user to interact with a computer in a certain environment. Human-computer interfaces allow the user to input an instruction to the computer and then the computer provides a response or feedback. HCI research examines both sides of this interaction, drawing on psychology and / or computer science. HCI research may discuss human performance and human factors affecting system operation, development and design.

REFERENCE DISCIPLINES: Computer Science ; Psychology

TEXTS: Preece et al (1994); Carroll (2001); Dix et al (1998) ; Schneiderman(1998).

SEMINAL PAPERS: Brooks et al.(1986); Aykin and Aykin (1991) ; Button(1998)

LITERATURE REVIEW: Myers (1989); Laughery and Laughery (1985); Hilbert and Redmiles (2000).

RECENT RESEARCH: Horvitz et al (2003); Keates et al (2002).

CENTERS: ARPA - Advanced Research Projects Agency HCI Program

(<http://www.sei.cmu.edu/arpa/hci.html>); Carnegie Mellon University Human-Computer Interaction Institute (<http://www.hcii.cmu.edu/>); Massachusetts Institute of Technology

(MIT) The Human-Machine Systems Laboratory

(<http://www.mit.edu:8001/afs/athena.mit.edu/user/n/j/njmp/www/HMSL.html>)

Stanford University Human-Computer Interaction People

(<http://www-pcd.stanford.edu/hci.html>), Computers and Design (PCD,
<http://www-pcd.stanford.edu/>).

USEFUL LINKS: Human-Computer Interaction Resources on the Net by Mikael Ericsson
(www.ida.liu.se/labs/aslab/groups/um/hci/); The HCI Bibliography (HCIBIB) ,
(<http://www.hcibib.org/>); Human-Computer Interaction Resource Network,
(<http://www.hcirn.com/>); Human-Computer Interaction: a Journal of Theoretical,
Empirical, and Methodological Issues of User Science and System Design
(<http://hci-journal.com/>).

4.8. RESEARCH CAPSULE: INFORMATION ECONOMICS

Information Economics research focuses on the economic perspective of IT especially the Internet, information goods and intellectual property. The research sub-areas include pricing information, versioning information, intellectual rights management, managing lock-in, networks and feedback, cooperation and compatibility, information policy, information security and privacy.

REFERENCE DISCIPLINES: Economics

TEXTS: Shapiro and Varian (1998); Choi et al (1997).

SEMINAL PAPERS: Roach 1985; Rubin 1985; Spinello 1998.

LITERATURE REVIEW: Pau 2002;Einhorn 2002

RECENT RESEARCH: Carruthers 2003; Farrell 2003; Grimes 2003; Kleist 2003;
Freeman 2002; Smith 2001; Baalen 2000; Nagendra 2000

CENTERS: Center for Business and Economic Research at UTK (
<http://cber.bus.utk.edu/>); CRITO, at the University of California, Irvine (

<http://cber.bus.utk.edu/>); CIO E-business research center (

<http://www.cio.com/research/ec/>); CREC, University of Texas at Austin (

<http://cism.bus.utexas.edu/>).

USEFUL LINKS: [Information Economy](#), maintained by Hal Varian

(<http://www.sims.berkeley.edu/resources/infoecon/>); [Economics of Networks](#),

maintained by Nick Economides (<http://www.stern.nyu.edu/networks/site.html>).

4.9. RESEARCH CAPSULE: INFORMATION PRIVACY

Described most often in terms of an individual's perception of control over his personal information, the concern for information privacy continues to have a tremendous impact on businesses in many industries. Much of the research strives to uncover the nature of the concern for information privacy and to discern how it can best be handled. Collection of information for marketing purposes and the placement of cookies in consumer's browsers to track their Web usage are examples of issues that concern Web users. Within the workplace, the collection of personal information for personnel selection and employee surveillance of email are some grounds for concern. Researchers have taken three approaches. The first seeks to understand the nature of the people who are looking for privacy. The second research approach identifies factors within an information setting that can affect the concern for privacy. Finally, researchers describe the characteristics of the information that lead to privacy concerns and of the concern itself.

REFERENCE DISCIPLINES: Psychology, Law

TEXTS: Agre and Rotenberg(1977); Curtin (2001); Cate (1997); Rubin and Dervin (1989); Shaw (2001).

SEMINAL PAPERS: Mason (1986); Clarke (1988); Culnan (1993).

LITERATURE REVIEW: none found

RECENT RESEARCH: Stewart and Segars (2002); Hsu and Kuo (2003); Turner and Dasgupta (2003).

CENTERS: none found

USEFUL LINKS: Electronic Privacy Information Center (<http://www.epic.org/>); Roger Clarke's Dataveillance and Information Privacy Page (<http://www.anu.edu.au/people/Roger.Clarke/DV/>); Federal Trade Commission - Information Privacy & Security (<http://www.ftc.gov/privacy/>).

4.10. RESEARCH CAPSULE: INFORMATION RETRIEVAL

Information retrieval (IR) studies the retrieval of useful information from digital resources including digital libraries, the world wide web, and documents. In the traditional or non-WWW world, IR was primarily used to index text and to search for useful documents in a collection. Today, research in IR includes modeling, document classification and categorization, search engines, user interfaces, data visualization, information filtering, natural language processing, systems architecture, text mining, multimedia (audio, image and video) retrieval, and digital libraries.

REFERENCE DISCIPLINES: Computer Science, Information Science

TEXTS: Baeza-Yates and Ribeiro-Neto (1999); Frakes and Baeza-Yates (1992); Frants, et al. (1997); Salton and McGill (1983).

SEMINAL PAPERS:

LITERATURE REVIEW: Solomon (2003); Farber and Shoham (2002); Mitra and Chaudhuri (2000).

RECENT RESEARCH: Yun et al. (2003); Solomon (2003); Katopol (2003); Chang, et al. (2003); Jonas and Frey (2003); Shapiro and Taksa (2003).

CENTERS: University of Maryland Information Filtering Project (http://www.enee.umd.edu/medlab/filter/filter_project.html); Natural Language Processing Laboratory (<http://www-nlp.cs.umass.edu/>).

USEFUL LINKS: Information Retrieval Links (<http://web.syr.edu/~diekemar/ir.html>); Machine Learning and Information Retrieval (<http://www.cs.ucsd.edu/users/rik/MLIA.html>); Text Mining, Web Mining, Information Retrieval and Extraction References (http://filebox.vt.edu/users/wfan/text_mining.html); Survey of Information Retrieval (<http://www.cs.jhu.edu/~weiss/ir.html>).

4.11. RESEARCH CAPSULE: INFORMATION SYSTEMS EFFECTIVENESS

IS effectiveness studies the measurement of specific contributions of information systems to organizational effectiveness. Three commonly-used measures of IS effectiveness are decision performance (a system's ability to support managerial decision-making), usage, and satisfaction. The most commonly researched aspects of IS effectiveness are the effects of IS on the individual, the organization, system quality, information quality, information use, user satisfaction, and service quality. Some elements that are investigated and measured in order to determine whether or not an information system is effective are system quality, information quality and systems success.

REFERNCE DISCIPLNES: Computer Science

TEXTS: Moreton and Chester (1996).

SEMINAL PAPERS: Bailey and Pearson (1983); Baroudi and Orlikowski (1988); Baroudi et al. (1986); Evans et al. (1988); King and Epstein (1983); King and Rodriguez (1978); King and Rodriguez (1981); Scott and Chervany (1981).

LITERATURE REVIEWS: DeLone and McLean (2002), Grover et al. (1996), Kanungo et al. (1999).

RECENT RESEARCH: there is no real new area of research

CENTERS:

USEFULL LINKS: IS World (<http://dmsweb.badm.sc.edu/grover/ISWorld/isoehom3.htm>); MIS Effectiveness (by Michael Palermo) (<http://www.stfrancis.edu/ba/ghkickul/stuwebs/btopics/works/miseffec.htm>); Measures of effectiveness (<http://www.glue.umd.edu/~kvijay/effectiveness.html>).

4.12. RESEARCH CAPSULE: INFORMATION SYSTEMS ETHICS

Original works in the study of information systems ethics attempted to validate the field itself by defining it and differentiating it from other forms of ethics. Later and more recent works in the IS ethics realm are quite diverse and discuss IS ethics as it pertains to people situated on all sides of information systems -- users, developers, managers, IS professionals, etc. While some analyze codes of ethics and determinants of ethical behavior in IS, others focus on construct and measurement development. Still others delve into specific phenomena that have ethical questions. A few such areas are information

privacy, software piracy, e-mail monitoring, etc. Some authors also discuss the ethical issues involved in systems development.

REFERENCE DISCIPLINES: Philosophy, Law

TEXTS: Dejoie et al. (1991); Stichler and Hauptman (1997); Anderson and Goodman (2001); Johnson (2001); Rudinow and Graybosch (2001); Kizza (2002); Salehnia (2002); Azari (2003).

LITERATURE REVIEW: none found

SEMINAL PAPERS: Moor (1985); Mason (1986).

RECENT RESEARCH: Cappel (1995); Moores and Dhillon (2000); Pierce and Henry (2000); Stewart and Segars (2002).

CENTERS: none found

USEFUL LINKS: ISWorld page on Cyberethics (<http://cyberethics.cbi.msstate.edu/>);
ETHICOMP 2001
(<http://www.ccsr.cse.dmu.ac.uk/conferences/ccsrconf/ethicomp2001/index.html>).

4.13. RESEARCH CAPSULE: INFORMATION SYSTEMS INNOVATION AND DIFFUSION

With Davis's Technology Acceptance Model as its banner, this area of research investigates technological change in social contexts. Issues studied include the success of technology innovations and the introduction and adoption of many different types of information systems into user environments.

REFERENCE DISCIPLINES: Psychology, Management

TEXTS: Rogers (1995); Larsen and McGuire (1998); Narayanan (2000).

SEMINAL PAPERS: Davis (1989); Moore and Benbasat (1991); Cooper and Zmud (1990).

LITERATURE REVIEWS: Allen (2000).

RECENT RESEARCH: Lucas and Spitler (1999); Jurison (2000); Al-Gahtani (2001).

CENTERS: none found

USEFUL LINKS: IFIP Working Group 8.6

(http://www.isi.salford.ac.uk/ifip/about_us.html).

4.14. RESEARCH CAPSULE: INFORMATION SYSTEM PRODUCTIVITY

In 1987, the MIT professor and nobel laureate Robert Solow, reviewing a book for *The New York Times* made the off-hand remark “We see the computer age everywhere except in the productivity statistics.” Roach (1988) coined the phrase “The Productivity Paradox” to describe this inconsistency.

REFERENCE DISCIPLINES:

TEXTS: Lucas (1999); Devaraj and Kohl (2002).

LITERATURE REVIEW: Brynjolfsson and Yang (1996).

SEMINAL PAPERS: Brynjolfsson (1993); Roach (1988, 1994); Solow NYT 1987???

RECENT RESEARCH: Shao and Lin (2001); Pinsonneault and Rivard (1998); Dewan and Kraemer (1998); Dedrick et al. (2003); Lee (2001).

CENTERS: The center for ebusiness at MIT: (<http://ebusiness.mit.edu/>).

USEFUL LINKS: none found

4.15. RESEARCH CAPSULE: KNOWLEDGE MANAGEMENT

A knowledge management system (KMS) is a class of IS applied to managing organizational knowledge. KMS are IT-based systems developed to support and enhance the organizational processes of knowledge creation, storage/retrieval, transfer and application. The nature of organizational knowledge and knowledge management is complex and multi-faceted. Current research reveals that KMS can play a variety of roles in support of organizational knowledge management. Research in KM investigates such issues as knowledge innovation, storage, repository, transfer and delivery, retrieval mechanisms, and knowledge capture.

REFERENCE DISCIPLINES: Organization Behavior, Business Management, Computer Science

TEXTS: Groff and Jones (2003); Bergeron (2003).

SEMINAL PAPERS: Tenkasi et al (1996); Zack (1999); Tuomi (1999).

LITERATURE REVIEW: Alavi and Leidner (2001); Argote et al. (2003); Beeby and Booth (2000); Huber (1991); Hislop (2003).

RECENT RESEARCH: Zarraga and Garcia-Falcon (2003); Smith and O'Neil (2003); McAdam (2000).

CENTERS: Knowledge Management Center (<http://www.cio.com/research/knowledge/>).

USEFUL LINKS: Resources on knowledge management
<http://www.media-access.com/resources.html>; Knowledge
Management Forum <http://www.km-forum.org/>.

4.16. RESEARCH CAPSULE: MODELING AND SIMULATION

A model is a simplified representation of a system at some particular point in time or space intended to promote understanding of the real system. System modeling is the process of describing both natural and engineered systems in precise mathematical terms. Simulation is the exploitation of a model in order to predict logical consequences of hypothetical situations. A simulation may be used to study the implications of the defined interactions of developed models running over time.

REFERENCE DISCIPLINES: Mathematics, Statistics, Computer Science, Operations
Research

TEXTS: Law and Kelton (1991); Friedman (1996).

SEMINAL PAPERS:

LITERATURE REVIEW: Friedman and Friedman (1986); Singh and Brar (1992).

RECENT RESEARCH: Haque et al. (2003); Andrews et al. (2002); Fu (2002) ; Sinha et al (2001).

CENTERS: ACMIS at University of Arizona (<http://www.acims.arizona.edu/>); Dynamics Simulation Research Center (www.riam.kyushu-u.ac.jp/DSRC/index_e.html); Scientific Computation Research at Rensselaer Polytechnic Institute (<http://www.scorec.rpi.edu/>); MSRC at Georgia Technology University (<http://www.msrec.gatech.edu/>); NASA Ames Simulation Laboratories (www.simlabs.arc.nasa.gov/).

USEFUL LINKS: A Collection of Modelling and Simulation Resources on the Internet (<http://www.idsia.ch/~andrea/simtools.html>).

4.17. RESEARCH CAPSULE: USER PARTICIPATION

Early research regarding the role of users in IS design attempted to prove that greater participation leads to an improvement in system success. A wide variety of measures of user participation (such as self reports or managerial accounts), indications of system success (such as attitude, system usage and data quality) and research methodologies (such as survey-based, or experimental manipulation) were employed in research studies, obtaining mixed results. Later research in this area develops rigorous measurements and theoretical models in attempt to resolve the inconsistency of user participation studies. Current work in this area continues to apply these concepts to specific systems such as DSS and collaborative systems.

REFERENCE DISCIPLINES: Management

TEXTS: Briefs et al. (1983); Conger (1993).

LITERATURE REVIEWS: Ives and Olson (1994); Cavaye (1995); Hwang and Thorn (1999).

SEMINAL PAPERS: Mumford (1981); Baroudi et al. (1986); Barki and Hartwick (1989); Doll and Torkzadeh (1989); Barki and Hartwick (1994).

RECENT RESEARCH: Doll and Deng (2001); Lawrence et al. (2002).

CENTERS: none found

4.18. RESEARCH CAPSULE: VIRTUAL COMMUNITIES

A virtual community is a community of people sharing common interests, usually over the Internet. This area is closely related to the computer-mediated communication area of IS research.

REFERENCE DISCIPLINES: Sociology

TEXTS: Rheingold (1993); Horn (1998); Renninge and Shumar (2002).

LITERATURE REVIEWS: Jones (1997)

SEMINAL PAPERS: Brown and Duguid (1991); Rheingold (1993)

RECENT RESEARCH: Maharg (2001); Owens and Thompson (2001); Kuo (2003);
Smith (2003).

CENTERS:

USEFUL LINKS: Virtual Community Research Resources

(<http://webpages.charter.net/stormking/research.html>); Howard Rheingold's

personal page: (<http://www.rheingold.com/howard/>); VIRTUAL

COMMUNITIES. by Ian Hughes 2000

(<http://www2.fhs.usyd.edu.au/bach/pub/community/virtcom.htm>); Fernback, Jan &

Thompson, Brad. Virtual Communities: Abort, Retry, Failure?

(<http://www.well.com/user/hlr/texts/Vccivil.html>).

5. CONCLUSION

Undoubtedly, the universe of IS research is complex and diverse. This paper tries to organize IS research in a somewhat structured manner. This paper has some limitations: Certainly this paper did not completely exhaust all IS research areas. Indeed, that may not even be possible. There was an inherent bias in selecting the research areas as well as the

citations, due to the limit of the authors' knowledge in these specific fields. By design, this paper chooses breadth over depth in any one IS research area.

It is hoped that this overview of the IS research universe, along with the associated research capsules, may serve as a portal to the richness of the sub-disciplines of the IS field, an open door for aspiring IS scholars. With capsules in hand, let newcomers confidently begin a promising journey into IS research.

REFERENCES

- Alavi, Maryam and Patricia Carlson (1992). "A Review of MIS Research and Disciplinary Development," *Journal of Management Information Systems* 8 (4, Spring), 45-62.
- Altschuller, Shoshana W., Qian Peng, Sheridan Yeates, Tziporah Stern, and Linda W. Friedman (2004). "An Introductory Doctoral Seminar in Information Systems Research," *Proceedings of The 2004 Northeast Decision Sciences Institute Conference*, Atlantic City, New Jersey, March 24-26.
- Benbasat, Izak and R. Weber (1996). "Research commentary: Rethinking "diversity" in information systems research." *Information Systems Research* 7 (4), 389.
- Benbasat, Izak and Robert W. Zmud (1999). "Empirical research in information systems: the practice of relevance." *MIS Quarterly*, 23 (1, March), 3-16.
- Benbasat, Izak and Robert W. Zmud (2003). "The Identity Crisis Within the IS Discipline: Defining and Communicating the Discipline's Core Properties." *MIS Quarterly*, 27 (2, June), 183-194.
- Crowston, Kevin (Ed., 2003). ISWorld Net Doctoral Programs in Information Sciences <<http://www.isworld.org/isprograms/phd/index.asp>> (December 8, 2003).
- David, Gordon B. (1999). "A Research Perspective for Information Systems and Example of Emerging Area of Research," *Information Systems Frontiers* 1 (3), 195-203.
- DeSanctis, Gerardine (2003). "The Social Life of Information Systems Research: A Response to Benbasat and Zmud's Call for Returning to the IT artifact." *Journal of The Association for Information Systems*, 4 (7, December), 360-376.
- Exemplary Works on IS Research (2003). Survey of Exemplary Works on IS Research <<http://itresearch.kennesaw.edu/isr/>> (October 2, 2003).
- Galliers, Robert D. (2003). "Change as Crisis or growth? Toward a trans-disciplinary view of information systems as a field of study: A response to Benbasat and Zmud's call for returning to the IT artifact." *Journal of the Association for Information Systems*, 4 (6, November), 337-351.
- Gregg, Dawn G., Uday R. Kulkarni, and Ajay S. Vinzé (2001). "Understanding the philosophical underpinnings of software engineering research in information systems." *Information Systems Frontiers*, 3 (2, June), 169-183.
- Hirschheim, Rudy and Heinz K. Klein (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), 237-293.

- Ives, Blake (Ed., 2003). ISWorld Net Home Page < <http://isworld.org/>> (October 2, 2003).
- Magal, Simha (Ed., 2003). ISWorld Net Teaching Division < <http://isworld.org/>> (December 8, 2003).
- Orlikowski, Wanda J. and C. Suzanne Iacono (2001). "Research Commentary: Desperately seeking the "IT" in IT research – A call to theorizing the IT artifact." *Information Systems Research*, 12 (2, June), 121-134.
- Robey, Daniel (2003). "Identity, Legitimacy and the Dominant Research Paradigm: An Alternative Prescription for the IS Discipline: A response to Benbasat and Zmud's Call for Returning to the IT Artifact" *Journal of the Association for Information Systems*, 4 (7, December), 352-359.
- Robey, Daniel (1996). "Research Commentary: Diversity in Information Systems research: Threat, promise, and responsibility." *Information Systems Research*, 7 (4, December), 400-408.
- Swanson, E. B. and N. C. Ramiller (1993). "Information Systems Research thematics: Submissions to a new journal, 1987-1992." *Information Systems Research*, 4 (4), 299.
- Vessey, Iris, V. Ramesh, Robert L. Glass (2002). "Research in Information Systems: An Empirical Study of Diversity in the Discipline and its Journals." *Journal of Management Information Systems*, 19 (2, Fall), 129-174.
- Weber, Ron (2003). "Editor's Comments: Still desperately seeking the IT artifact." *MIS Quarterly*, 27 (2, June), iii-xi.

REFERENCES FOR RESEARCH CAPSULE:
COMPUTER-MEDIATED COMMUNICATION SYSTEMS

- Daft, R.L. and R.H. Lengel (1986). Organizational Information Requirements, Media Richness, and Structural Design. *Management Science*, 32 (5), 554-571.
- Fjermestad, J. & S.R. Hiltz (1999). An Assessment of Group Support Systems Experimental Research: Methodology and Results. *Journal of Management Information Systems*, 15(3), 7-149.
- Harasim, L., L. Teles, S.R. Hiltz, and M. Turoff (1995). *Learning Networks: A Field Guide to Teaching and Learning On-Line*. Cambridge: MIT Press.
- Kerr, E.B. and S.R. Hiltz (1982). *Computer-Mediated Communication Systems: Status and Evaluation*. New York: Academic Press.
- Rapaport, M. (1991). *Computer Mediated Communications: Bulletin Boards, Computer Conferencing, Electronic Mail, and Information Retrieval*. New York: Wiley.

- Rice, R. (1987). "Computer Mediated Communication and Organizational Innovation." *Journal of Communication*, 37 (4), 65-94.
- Sia, C.L., B.C.Y Tan, and K.K. Wei (2002). "Group Polarization and Computer Mediated Communication: Effects of Communication Cues, Social Presence and Anonymity." *Information Systems Research*, 13 (1), 70-90.
- Sproull, L. and S. Kiesler (1986). "Reducing Social Context Cues: Electronic Mail in Organizational Communication." *Management Science*, 32 (11), 1492-1512.
- Yoo, Y. and M. Alavi (2001). "Media and Group Cohesion: Relative Influences on Social Presence, Task Participation, and Group Consensus." *MIS Quarterly*, 25(3).

REFERENCES FOR RESEARCH CAPSULE: DECISION SUPPORT SYSTEMS

- Alter, S.L. (1977). "Why Is Man-Computer Interaction Important for Decision Support Systems?" *Interfaces*, 7(2)
- Chen, J.Q. and S.M. Lee. "An exploratory cognitive DSS for strategic decision making." *Decision Support Systems* 3(2), 147-160.
- Eom, S.B. (1998). "Relationships between the decision support system specialities and reference disciplines: An empirical investigation." *European Journal of Operational Research* 104 (1), 31-45
- Ferguson, R. L. and C. H. Jones (1969). "A Computer Aided Decision System," *Management Science* B550-B561.
- Gerrity, T. P., Jr. (1971). "The Design of Man-Machine Decision Systems," *Sloan Management Review* (2), 59-75.
- Lari, Alireza (2003). "A decision support system for solving quality problems using case-based reasoning." *Total Quality Management & Business Excellence*. 14 (6), 733.
- Lee, J.H. and S.C. Park (2003). "Agent and data mining based decision support system and its adaptation to a new customer-centric electronic commerce" *Expert Systems with Applications*, 25 (4), 619-635.
- Kaplan, B. (2001). "Evaluating informatics applications—clinical decision support systems literature review." *International Journal of Medical Informatics* 64 (1), 15-37.
- Shim, J. P., M. Warkentin, J.F. Courtney, D.J. Power, R. Sharda and C. Carlsson (2002). "Past, present, and future of decision support technology." *Decision Support Systems* 33 (2), 111-126.
- Tonfoni, G. and L. Jain (2003). *Innovations in Decision Support Systems*. Advanced Knowledge International Pty Ltd.
- Turban E., and J.E. Aronson (2000) *Decision Support Systems and Intelligent Systems*. Upper Saddle River, NJ: Prentice Hall.
- Whinston A.B., and C. W. Wolsapple (1987). *Decision Support Systems: Theory and Application*. NY: Springer-Verlag.

REFERENCES FOR RESEARCH CAPSULE: ELECTRONIC COMMERCE

- Alter, S. (2002). *Information Systems: Foundation of E-Business*. Upper Saddle River, NJ: Prentice Hall.

- Burt, S., and L. Sparks (2003b, *Journal of Retailing and Consumer Services* 10(5), 275-286.
- Chan, H., R. Lee, T. Dillon, and E. Chang. (2001). *Electronic Commerce: Fundamentals & Applications*. NY: Wiley.
- Grabner-Kräuter, S. and E.A. Kaluscha (2003). Empirical research in on-line trust: a review and critical assessment," *International Journal of Human-Computer Studies* 58 (6), 783-812.
- Hoffman, K.I. and T.O. Novak (1995). Commercial scenarios for the web: opportunities and challenges, *Journal of Computer Mediated Communication* 1 (3).
- Laudon, K.C. and C.G. Traver (2002). *E-Commerce: business. technology. society*. Pearson Addison Wesley.
- Li, L. and I. Horrocks (2003). "E-commerce: A software framework for matchmaking based on semantic web technology," *Proceedings of the twelfth international conference on World Wide Web*.
- Ngai, E. W. T. and F. K. T. Wat (2002) "A literature review and classification of electronic commerce research," *Information & Management* 39 (5), 415-429.
- Trastour, D., C. Bartolini, and C. Preist (2003). "Semantic Web support for the business-to-business e-commerce pre-contractual lifecycle," *Computer Networks* 42 (5), 661-673.
- Tarasewich, P., R.C. Nickerson, and M. Warkenin (2002). "Issues in Mobile E-Commerce. Communications for the Association for Information Systems," 8 (3), 41.
- Zwass, V. (1996). "Electronic commerce: structure and issues," *International Journal of Electronic Commerce* 1 (1), 3-33.

REFERENCES FOR RESEARCH CAPSULE: E-GOVERNMENT

- Brown, M. M. (2003). "Technology diffusion and the "knowledge barrier": The dilemma of stakeholder participation." *Public Performance & Management Review* 26(4), 345.
- Chen, Y. and J. Gant (2001). "Transforming E-Government Services: The Use of Application Service Providers in U.S. Local Governments," *Proceeding of 7th American Conference on Information Systems*. Boston, MA.
- Edmiston, K. D. (2003). "State and local e-government: Prospects and challenges." *American Review of Public Administration* 33(1), 20.
- Gansler, J. S. (2003). "Digitally Integrating the Government Supply Chain: E-Procurement, E-Finance and E-Logistics," *IBM Endowment for the Business of Government*.
- Heeks, Richard(2004) *e-Government: An International Text on Public Sector Information Systems*, Thousand Oaks, CA: Sage Publications.
- Hiller, J. and F. Belanger (2003). Privacy Strategies for Electronic Government, *IBM Endowment Business of Government*.
- Holden, S. H., D. F. Norris, et al. (2003). "Electronic government at the local level: Progress to date and future issues." *Public Performance & Management Review* 26(4), 325.
- Latham, M. and N. LaRocque (2003). The Promise of E-Learning In Africa: The Potential for Public-Private Partnerships, *IBM Endowment Business of Government*.

- Melitski, J. (2003). "Capacity and e-government performance: An analysis based on early adopters of internet technologies in New Jersey." *Public Performance & Management Review* 26(4), 376.
- Muir, A. and C. Oppenheim (2002). "National information policy developments worldwide I: Electronic government." *Journal of Information Science* 28(3), 173.
- Schorr, H. and S. J. Stolfo (1998). "A digital government for the 21st century." *Association for Computing Machinery, Communications of the ACM* 41(11), 15.
- Shi, W. (2002). "The contribution of organizational factors in the success of electronic government commerce," *International Journal of Public Administration* 25(5), 629.
- Wagner, C. (2003). "Knowledge Management in E-government," *Proceeding of Ninth American Conference on Information Systems*, Tampa, FL.
- Weber, R. O. and D. W. Aha (2003). "Intelligent delivery of military lessons learned." *Decision Support Systems* 34(3), 287.
- Wyld, D. C. (2003). "The Auction Model: How the Public Sector Can Leverage the Power of E-Commerce through Dynamic Pricing," *IBM Endowment Business of Government*.

REFERENCES FOR RESEARCH CAPSULE:
GLOBAL INFORMATION TECHNOLOGY

- Collins, R. Webb and L.J. Kirsch (1999). *Crossing Boundaries: The Deployment of Global IT Solutions*. Pinnaflex Educational Resources.
- Deans, P.C. and D.A. Ricks (1991). MIS Research: A Model for Incorporating the International Dimension. *The Journal of High Technology Management Research*, 2(1), 57-81.
- Deans, P.C. and D.A. Ricks (1993). An Agenda for Research Linking Information Systems and International Business. *Journal of Global Information Management*. 1(1), 6-19
- Gallupe, R.B. and F.B. Tan (1999). A Research Manifesto for Global Information Management. *Journal of Global Information Management*. 7(3), 5-18.
- Harrison, W.L. and C.K. Farn (1990). A Comparison of Information Management Issues in the United States of America and the Republic of China. *Information and Management* 18, 177-188
- Hofstede, G. (1985). The Interaction Between National and Organizational Value Systems. *Journal of Management Studies*, 22(4), 347-357.
- Ives, B. and S.L. Jarvenpaa (1991). Applications of Global Information Technology: Key Issues for Management. *MIS Quarterly*, 15(1), 32-49.
- Palvia, P.C. (1997). Developing a model of the global and strategic impact of information technology, *Information & Management*, 32(5), 229-244
- Palvia, P.C., C. Shailendra, J. Palvia and J.E. Whitworth. (2002) Global information technology: a meta analysis of key issues. *Information & Management*, 39(5), 403-414.
- Palvia, P., S. Palvia and R. Zigli. (1992). *The Global Issues of Information Technology Management*. Idea Group Publishing.

- Trauth , E.M. (2003). Cases on Global IT Applications and Management: Successes and Pitfalls Information Society. 19(1),107
- Vinaja, R. (2003). Technology, Globalisation and Poverty. *Global Information Technology Management* 6 (1).
- Walsham, G. (2001). *Making a World of Difference: IT in a Global Context*. NY: Wiley.

REFERENCES FOR RESEARCH CAPSULE: GROUP SUPPORT SYSTEMS

- Bamber, E., M. Hill, M. Callahan, and R.T. Watson (1998). Audit Groups And Group Support Systems: A Framework And Propositions For Future Research. *Journal of Information Systems* 12 (2).
- DeSanctis, G., and R.B. Gallupe (1987) A Foundation for the Study of Group Decision Support Systems *Management Science* 33(5), 589-609.
- Dennis, A., J. George, L. Jessup, J. Nunamaker, and D. Vogel (1988). Information technology to support electronic meeting. *MIS Quarterly* 591-619.
- El-Shinnawy, M. and A.S. Vinze (1998). Polarization and persuasive argumentation: A study of decision making in group settings. *MIS Quarterly* 22(2), 165.
- Fjermestad, J. and S.R. Hiltz (2001). Group Support Systems: A Descriptive Evaluation of Case and Field Studies. *Journal of Management Information Systems*. 17(3), 115 – 160.
- Fjermestad, J. and S.R. Hiltz (1999) An Assessment of Group Support Systems Experimental Research: Methodology and Results. *Journal of Management Information Systems* . 15(3), 7 – 150.
- Jessup, L. M., T. Connolly, and J. Galegher (1990). The Effects of Anonymity on GSS Group Process with an Idea-Generating Task *MIS Quarterly* 14(3), 313-321.
- Jessup, L.M., and J.S. Valacich. (1992). *Group Support Systems: New Perspectives*, Upper Saddle River, NJ: Prentice Hall.
- Klein, E.E., C.C. Clark and P.J. Herskovitz (2003). Philosophical dimensions of anonymity in group support systems: Ethical implications of social psychological consequences. *Computers in Human Behavior*, 19(3), 355-382.
- Nunamaker, J. F., Jr., L. Applegate, and B. Konsynski (1987). Facilitating Group Creativity: Experience With a Group Decision Support System. *Journal of Management Information Systems* 3(3), 5-19.
- Nunamaker, J. F., D.R. Vogel, A. Heminger, B. Martz, R.Grohowski, and C. McGoff (1989). Experiences at IBM With Group Support Systems: A Field Study Decision Support Systems 5(2), 183-196.
- Poole, M. S., D.R. Seibold, and R.D. McPhee (1985). Group Decision Making as a Structuration Process. *Quarterly Journal of Speech* 71, 74-102.
- Radford, J., and C. Eden. (1990). *Tackling Strategic Problems: The Role of Group Decision Support*. Sage Publications.
- Thierauf, R.J. (1989). *Group Decision Support Systems for Effective Decision Making: A Guide for MIS Practitioners and End Users*. Greenwood Publishing Group.
- Tung, L.L., and M. A. Quaddus (2002). Cultural differences explaining the differences in results in GSS: implications for the next decade. *Decision Support Systems*, 33 (2), 177-199.

- Wong, Z., and M. Aiken (2003) Automated facilitation of electronic meetings. *Information & Management*, 41(2), 125-134.
- Zigurs, I., M.S. Poole, and G. DeSanctis (1988). A Study of Influence in Computer-Mediated Group Decision Making. *MIS Quarterly* 12(4), 625-644.

REFERENCES FOR RESEARCH CAPSULE: HUMAN-COMPUTER INTERACTION

- Aykin, Nuray M. and Aykin, Turgut (2003). Individual differences in human-computer interaction. *Computers & Industrial Engineering*, 2003
- Aykin, Nuray M. and Aykin, Turgut (1991). Individual Differences in Human-Computer Interaction. *Computers & Industrial Engineering* 20 (3), 373-379.
- Brooks, H. M., P. J. Daniels, and N.J. Belkin (1986). Research on Information Interaction and Intelligent Information Provision Mechanisms. *Journal of Information Science*. 12 (1,2), 37-44.
- Button, Graham (1998). Humans, Computers and Wizards: Analysing Human (Simulated) Computer Interaction. *Sociology: the Journal of the British Sociological Association*. 32 (4, Nov), 896.
- Carroll, J.M. (2001). *Human Computer Interaction in the New Millenium*, Prentice Hall.
- Dix, A., J. Finlay, Gregory Abowd, and Russell Beale (1998). *Human-Computer Interaction*. Prentice Hall.
- Hilbert, David M and David F. Redmiles (2000). Extracting usability information from user interface events. *ACM Computing Surveys*. 32 (4), 384-421.
- Horvitz, Eric, Carl Kadie, Tim Paek, and David Hovel (2003). Models of attention in computing and communication: From principles to applications. *Communications of the ACM*. 46 (3), 52.
- Keates, Simeon, Patrick Langdon, P. John Clarkson, and Peter Robinson (2002). User Models and User Physical Capability. *User Modeling and User - Adapted Interaction*. 12 (2-3), 139
- Laughery, K. Ronald, Jr. and Kenneth R Laughery, Sr. (1985). Human Factors in Software Engineering: A Review of the Literature. *The Journal of Systems and Software*. 5 (1), 3-14.
- Myers, B. A. (1989). User-interface Tools: Introduction and Survey. *IEEE Software*, 6 (1), 15-23.
- Preece, Jenny, Yvonne Rogers, Helen Sharp, David Benyon, Simon Holland, and Tom Carey (1994). *Human-Computer Interaction*, NY: Addison-Wesley.
- Schneiderman, B. (1998). *Designing the User Interface: Strategies for Effective Human Computer Interaction*. NY: Addison-Wesley.
- Tate, Mary (2002). Human Computer Interaction; Issues and Challenges, *Online Information Review*. 26 (5), 351.

REFERENCES FOR RESEARCH CAPSULE: INFORMATION ECONOMICS

- Baalen, P. V. (2000). "Knowledge Assets: Securing Competitive Advantage in the Information Economy." *Management Learning* 31 (1), 127.

- Choi, Soon-Yong, Dale O. Stahle and Andrew B. Whinston (1997). *The Essential Economics of Doing Business in the Electronic Marketplace*. Macmillan.
- Carruthers, J. I. (2003). "The Information Economy and American Cities." *Regional Science and Urban Economics* 33 (3), 379.
- Einhorn, M. A. (2002). "International telephony: A review of the literature." *Information Economics and Policy* 14 (1), 51.
- Farrell, D. (2003). "The real new economy." *Harvard Business Review* 81 (10), 104.
- Freeman, R. B. (2002). "The labour market in the new information economy." *Oxford Review of Economic Policy* 18 (3), 288.
- Grimes, S. (2003). "Ireland's emerging information economy: Recent trends and future prospects." *Regional Studies* 37 (1),: 3.
- Kleist, V. F. (2003). "An Approach to Evaluating E-Business Information Systems Projects." *Information Systems Frontiers* 5 (3), 249.
- Nagendra, P. B. (2000). "Leadership development for the information economy." *International Journal of Commerce & Management* 10 (3/4), 1.
- Pau, L. F. (2002). "The communications and information economy: Issues, tariffs and economics research areas." *Journal of Economic Dynamics & Control* 26 (9,10), 1651.
- Roach, S. S. (1985). "The Information Economy Comes of Age." *Information Management Review* 1 (1), 9.
- Rubin, M. R. (1985). "Strategic Planning in an Information Economy." *Information Management Review* 1 (2), 47.
- Shapiro, Carl and Hal R. Varian (1998). *Information Rules: a strategic guide to network economy*. Cambridge, Boston: Harvard Business School Press.
- Smith, G. (2001). "The new information economy takes shape: Business information resources survey 2001." *Business Information Review* 18 (1), 5.
- Spinello, R. A. (1998). "Privacy rights in the information economy." *Business Ethics Quarterly* 8 (4), 723.

REFERENCES FOR RESEARCH CAPSULE: INFORMATION PRIVACY

- Agre, Philip E. and Marc Rotenberg (1997). *Technology and Privacy: The New Landscape*. Boston: MIT Press.
- Cate, Fred H. (1997). *Privacy in the Information Age*. Washington DC: Brookings Institution Press.
- Clarke, Roger A. (1988). Information Technology and Dataveillance, *Communications of the ACM*. 31 (5), 498.
- Culnan, M. (1993). How Did They Get My Name?: An Exploratory Investigation of Consumer Attitudes toward Secondary Information Use, *MIS Quarterly* 17 (3), 341.
- Curtin, Matt (2001). *Developing Trust: Online Privacy and Security*. Berkeley: APress.
- Hsu, Meng-Hsiang and Feng-Yang Kuo (2003). The Effect of Organization-based Self-esteem and Deindividuation in Protecting Personal Information Privacy. *Journal of Business* 42 (4), 305.

- Mason, R. (1986). Four Ethical Issues of the Information Age, *MIS Quarterly*, 10 (1), 143–156.
- Rubin, Michael Rogers and Brenda Dervin (1989). *Private Rights, Public Wrongs: The Computer and Personal Privacy*. Westport: Greenwood Publishing Group.
- Shaw, Paul (2001). *E-Business Privacy and Trust: Planning and Management Strategies*. NY: Wiley.
- Stewart, Kathy A. and Albert H. Segars (2002). An Empirical Examination of the Concern for Information Privacy Instrument, *Information Systems Research* 13 (1), 36.
- Turner, Eric C. and Subhasish Dasgupta. (2003). Privacy on the Web: an Examination of User Concerns, Technology, and Implications for Business Organizations and Individuals, *Information Systems Management*, 20 (1), 8.

REFERENCES FOR RESEARCH CAPSULE: INFORMATION RETRIEVAL

- Baeza-Yates, Ricardo and Berthier Ribeiro-Neto (1999). *Modern Information Retrieval*, NY: Addison Wesley Longman.
- Brachman, Ronald J, Tom Khabaza, Willi Kloeegen, Gregory Piatetsky-Shapiro, and Evangelos Simoudis (1996). Mining business databases. *Communications of the ACM* 39 (11, Nov), 42.
- Chang, Chia-Hui , Chun-Nan Hsu, and Shao-Cheng Lui (2003). Automatic information extraction from semi-structured Web pages by pattern discovery. *Decision Support Systems*. 35 (1), 129.
- Farber, Miriam and Snunith Shoham (2002). Users, end-users, and end-user searchers of online information: A historical overview. *Online Information Review*. 26 (2) 92.
- V. Frants, Valery J. Frants, and Jacob Shapiro (1997). *Automated Information Retrieval*. Academic Press.
- Frakes, W. B. and R. Baeza-Yates (1992). *Information Retrieval: Data Structures & Algorithms*. Upper Saddle River: Prentice-Hall.
- Hanani, Uri, Bracha Shapira, and Peretz Shoval (2001). Information Filtering: Overview of Issues, Research and Systems. *User Modeling and User - Adapted Interaction*. 11 (3, Aug), 203.
- Jonas, Eva and Dieter Frey (2003). Information search and presentation in advisor-client interactions. *Organizational Behavior and Human Decision Processes*. 91 (2, July), 154.
- Katopol, Patricia (2003). Knowledge Management in the Socio Technical World - The Graffiti Continues. *Information Retrieval*. 6 (2, Apr), 281.
- Mitra, M. and B.B. Chaudhuri (2000). Information Retrieval from Documents: A Survey,. *Information Retrieval*, 2 (2-3, May), 141.
- Salton,G. and M. J. McGill (1983). *Introduction to Modern Information Retrieval*. NY: McGraw-Hill.
- J.Shapiro and I. Taksa (2003). "Constructing web search queries from the user's information need expressed in a natural language", *Proceedings of the Eighteenth Annual ACM Symposium on Applied Computing*, March, 1157-1162.

- Solomon, Paul (2003). Looking for Information--A Survey of Research on Information Seeking, Needs, and Behavior, *Information Retrieval*. 6 (2, Apr), 284.
- Yun, Hyunyon Danshim Ha, Buhyun Hwang, Keun Ho Ryu (2003). Mining association rules on significant rare data using realtive support. *The Journal of Systems and Software*. 67 (3), 181.

REFERENCES FOR RESEARCH CAPSULE: IS EFFECTIVENESS

- Bailey, J.E. and S.W. Pearson, (1983). Development of a Tool for Measuring and Analyzing Computer User Satisfaction. *Management Science*, 29(5), 530-545.
- Baroudi, J.J. and W. J. Orlikowski, (1988). A Short Form Measure of User Information Satisfaction: A Psychometric Evaluation and Notes on Use *Journal of Management Information Systems*. 4(4), 44-59.
- Baroudi, J. J., M.H. Olson and B. Ives, (1986). An Empirical Study of the Impact of User Involvement on System Usage and Information Satisfaction," *Communications of the ACM*, 29(3), 232-238.
- DeLone, W.H., and E.R. McLean (2002). Information Systems Success Revisited. *Proceedings of the 35th Hawaii International Conference on System Sciences*, 238.
- Evans, P.A., J.E. Bailey, W.C. Moor, and A.L. Roberts. (1988). An Instrument for Measuring Effectiveness of Information Systems. *Computers & Industrial Engineering* 14(3), 227.
- Grover, V., S.R. Jeong, and A.H. Segars (1996). Information systems effectiveness: The construct space and patterns of application. *Information and Management*. 31 (4), 177.
- Kanungo, S., S. Duda, and Y. Srinivas. (1999). A structured model for evaluating information systems effectiveness. *Systems Research and Behavioral Science*. 16(6), 495.
- King, W.R. and B.J. Epstein, (1983) Assessing Information System Value *Decision Sciences*, 4(1), 34-45.
- King, W.R. and J.I. Rodriguez, (1978). Evaluating Management Information Systems *MIS Quarterly*, 2(3), 43-51.
- King, W.R. and J.I. Rodriguez, (1981) Participative Design of Strategic Decision Support Systems *Management Science*, 27(6), 717-726.
- Moreton, R., and M. Chester. (1996). *Transforming the Business: The IT Contribution*. NY: McGraw-Hill.
- Scott, H. and N.L Chervany, (1981). Evaluating Information System Effectiveness. Part I. Comparing Evaluation Approaches *MIS Quarterly*, 5(3), 55-69.

REFERENCES FOR RESEARCH CAPSULE: INFORMATION SYSTEMS ETHICS

- Anderson, J.G. and K.W. Goodman (2001). *Ethics and Information Technology*. New York: Springer-Verlag.
- Azari, Rasool (2003). *Current Security Management & Ethical Issues of Information Technology*. Hershey, PA: Idea Group Publishing.

- Cappel, J.J. (1995). A Study of Individuals' Ethical Beliefs and Perceptions of Electronic Mail Privacy. *Journal of Business Ethics*, 14(10), 819.
- Dejoie, R, Fowler, G., Paradice, D. (1991). *Ethical Issues in Information Systems*. Boston: Boyd & Fraser.
- Johnson, D.G. (2001). *Computer Ethics*. Englewood Cliffs: Prentice Hall.
- Kizza, J. (2002). *Ethical and Social Issues in the Information Age*. New York: Springer-Verlag.
- Mason, R.O. (1986). Four Ethical Issues of the Information Age. *MIS Quarterly*. 10(1).
- Moor, J.H. (1985). What is Computer Ethics? *Metaphilosophy*. 16(4).
- Moore, T. & G. Dhillon (2000). Software Piracy: A View from Hong Kong. *Communications of the ACM*, 43(12), 88-93.
- Pierce, M.A., & J.W. Henry (2000). Judgments about computer ethics: Do individual, co-worker, and company judgments differ? Do company codes make a difference? *Journal of Business Ethics*, 28,(4).
- Rudinow, J. & Graybosch, A. (2001). *Ethics and Values in the Information Age*. Belmont, CA: Wadsworth.
- Salehnia, A. (editor). (2002). *Ethical Issues of Information Systems*. Hershey, PA: Idea Group Publishing.
- Stewart, K.A. & A.H. Segars (2002). An empirical examination of the concern for information privacy instrument. *Information Systems Research*, 13(1), 36-49.
- Stichler, R.N. & R.N. Hauptman (1997). *Ethics, Information and Technology: Readings*. Jefferson, NC: McFarland.

REFERENCES FOR RESEARCH CAPSULE: INFORMATION SYSTEMS INNOVATION AND DIFFUSION

- Al-Gahtani, S. (2001). The Applicability of TAM outside North America: An Empirical Test in the United Kingdom. *Information Resources Management Journal*, 14(3), 37.
- Allen, J.P. (2000). Information Systems as Technological Innovation . *Information Technology & People*, 13(3), 210.
- Cooper, R.B. and Zmud, R.W. (1990). Information Technology Implementation Research: A Technology Diffusion Approach. *Management Science*, 36(2), 123-139.
- Davis, F.D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly*, 13(3), 319-340.
- Jurison, J. (2000). Perceived Value and Technology Adoption Across Four End User Groups. *Journal of End User Computing*, 12(4), 21.
- Larsen, T.J. and McGuire, E. (1998). *Information Systems Innovation and Diffusion: Issues and Directions*. Hershey, PA: Idea Group Publishing.
- Lucas, H.C. & Spitler, V.K. (1999). Technology Use and Performance: A Field Study of Broker Workstations. *Decision Sciences*, 30(2), 291-311.
- Moore, G.C. and Benbasat, I. (1991) Development of an Instrument to Measure the Perceptions of Adopting an Information Technology Innovation. *Information Systems Research*, 2(3), 192-222

- Narayanan, V.K. (2000). *Managing Technology and Innovation for Competitive Advantage*. London: Pearson Education.
- Rogers, E. (1995). *Diffusion of Innovations*. New York: The Free Press.

REFERENCES FOR RESEARCH CAPSULE: INFORMATION SYSTEM PRODUCTIVITY

- Brynjolfsson, Erik (1993). "The productivity paradox of information technology: Review and Assessment." *Communications of the ACM*, 36 (12).
- Brynjolfsson Erik and Shinkyu Yang(1996). "Information Technology and Productivity: A Review of the Literature." *Advances in Computers*, 43, 179-214.
- Dedrick, Jason, Vijay Gurbaxani, Kenneth L. Kraemer (2003). "Information Technology and Economic Performance: A Critical Review of the Empirical Evidence." *Computing Surveys* 35 (1) 1-28.
- Devaraj, Sarvanan, Kohl, Rajiv (2002). "The IT Payoff: Measuring the Business Value of Information Technology Investments" *Financial Times*.
- Dewan, Sanjeev and Kenneth L. Kraemer (1998). International dimensions of the productivity paradox. *Communications of the ACM*; 41 (8) 56, 7.
- Lee, C. Sophie. (2001). Modeling the business value of information technology. *Information & Management* 39 (3) 191.
- Lucas, Henry C., Jr. (1999). *Information Technology and the Productivity Paradox: The Search for Value*. Oxford University Press.
- Pinsonneault, Alain and Suzanne Rivard (1998). Information technology and the nature of managerial work: From the productivity paradox to the Icarus paradox?" *MIS Quarterly* 22 (3), 287-311.
- Roach S. (1988): "White Collar Productivity: A Glimmer of Hope?" Special Economic Study, Morgan Stanley, September 16.
- Roach, Stephen (1994). Lessons of the productivity paradox *Computerworld*, 28 (38), September 19, 55.
- Shao, B. B. M. and W. T. Lin (2001). Measuring the value of information technology in technical efficiency with stochastic production frontiers., *Information and Software Technology* 43 (7), June 1, 447-56.
- Solow, R.M. (1987). "We'd better watch out," *The New York Times*, July 12, p. 36.

REFERENCES FOR RESEARCH CAPSULE: KNOWLEDGE MANAGEMENT

- Alavi, Maryam and Leidner, Dorothy E (2001). Review: Knowledge management and knowledge management systems: Conceptual foundations and research issues. *MIS Quarterly*. 25, (1), 107-136.
- Argote, Linda and Bill McEvily, Ray Reagans (2003). Managing knowledge in organizations: An integrative framework and review of emerging themes. *Management Science*. 49, (4); 571.
- Beeby, Mick and Booth, Charles (2000). Networks and inter-organizational learning: a critical review, *The Learning Organization*. 7,(2), 75

- Bergeron, Bryan P. (2003). *Essentials of Knowledge Management*. NY: Wiley.
- Groff, Todd and Thomas Jones (2003). Introduction to Knowledge Management - KM in Business, Butterworth-Heinemann.
- Hislop, Donald (2003). Linking human resource management and knowledge management via commitment: A review and research agenda, *Employee Relations*. 25 (1/2), 182.
- Huber, George P. (1991). Organizational Learning: The Contributing Processes and the Literatures. *Organization Science*. 2 (1), 88-115.
- McAdam, Rodney (2000). Knowledge management as a catalyst for innovation within organizations: a qualitative study, *Knowledge and Process Management*. 7 (4), 233.
- Smith, Peter A. C. and O'Neil, Judy (2003). A review of action learning literature 1994-2000: Part 2--signposts into the literature, *Journal of Workplace Learning*. 15 (4), 154-166.
- Zack, Michael H. (1999). Managing Codified Knowledge, *Sloan Management Review*, 40, (4), 45-58.
- Zarraga, Celia and Garcia-Falcon Juan Manuel (2003). Factors favoring knowledge management in work teams. *Journal of Knowledge Management*. 7 (2), 81.

REFERENCES FOR RESEARCH CAPSULE: MODELLING AND SIMULATION

- Andrews, Rick L and Andrew Ainslie, Imran S Currim (2002). An empirical comparison of logit choice models with discrete versus continuous representations of heterogeneity. *Journal of Marketing Research*. 39 (4), 479-487.
- L. W. Friedman and H.H. Friedman (1984). "Statistical Considerations in Simulation: The State of the Art," *Journal of Statistical Computation and Simulation*, 19, 237-263.
- Fu, Michael C (2002). Optimization for simulation: Theory vs. practice. *INFORMS Journal on Computing*. 14, (3), 192-215.
- Haque, B and K S Pawar, R J Barson (2003). The application of business process modelling to organisational analysis of concurrent engineering environments, *Technovation*, 23 (2), 147
- Kelton, David, Randall Sadowski, and Deborah Sadowski (2002). *Simulation with Arena*. NY: McGraw-Hill.
- Kirkpatrick, Paul and Bell, Peter C. (1989). Visual Interactive Modeling in Industry: Results from a Survey of Visual Interactive Model Builders. *Interfaces* 19(5), 71-79.
- Law and Kelton (1991). *Simulation Modeling and Analysis*. NY: McGraw-Hill.
- Maria, Anu (1997) Introduction to Modeling and Simulation, *Proceedings of the Winter Simulation Conference*.
- Melamed, B. and Hill, J.R.(1995). A Survey of TES Modeling Applications. *Simulation*. 64 (6), 353-370.
- Singh, N., and J. K. Brar (1992). Modelling and Analysis of Just-in-Time Manufacturing Systems: A Review. *International Journal of Operations & Production Management*. 12 (2), 3 –15.
- Sinha, R., C. J. J. Paredis, V.-C. Liang, and P. K. Khosla (2001). "Modeling and Simulation Methods for Design of Engineering Systems," *ASME Journal of Computing and Information Science in Engineering*, 1, 8491.

REFERENCES FOR RESEARCH CAPSULE: USER PARTICIPATION

- Barki, H. and Hartwick, J. (1989). Rethinking the concept of user involvement. *MIS Quarterly*, 13(1).
- Barki, H., and Hartwick, J. (1994). Measuring User Participation, User Involvement, and User Attitude. *MIS Quarterly*, 18(1), 59-82.
- Baroudi, J. J., Olson M. H., and Ives, B. (1986). An Empirical Study of the Impact of User Involvement on System Usage and User Satisfaction," *Communications of the ACM* 29(1), 232-238.
- Briefs, Ulrich, C. Ciborra, and L. Schneider (eds, 1983). *Systems Design for, with, and by the Users*. Amsterdam, NY: Elsevier.
- Cavaye, A.L.M. (1995). User Participation in Systems Development Revisited. *Information & Management*, 28(5).
- Conger, S.A. (1993). *The New Software Engineering*. Belmont, CA: Wadsworth.
- Doll, W.J. & Deng, X. (2001). The Collaborative Use of Information Technology: End-user Participation and System Success. *Information Resources Management Journal*, 14(2).
- Doll, W. J., and Torkzadeh, G. (1989). A Discrepancy Model of End-User Computing Involvement. *Management Science*, 35(10), 1151-1171.
- Hwag, M.I. & Thorn, R.G. (1999). The Effect of User Engagement on System Success: A Meta-analytical Integration of Research Findings. *Information & Management*, 35(4).
- Ives, B. & Olson, M. (1994). User Involvement and MIS Success: A Review of Research. *Management Science*, 30(5).
- Lawrence, M., Goodwin, P. & Fildes, R. (2002). Influence of User Participation on DSS and Use and Decision Accuracy. *Omega*. 30(5).
- Mumford, E. (1981). Participative Systems Design: Structure and Method. *Systems, Objectives, Solutions* 1(1), 5-19.

REFERENCES FOR RESEARCH CAPSULE: VIRTUAL COMMUNITIES

- Brown, John Seely and Paul Duguid (1991). Organizational Learning and Communities of Practice: Toward a Unified View of Working, Learning, and Innovation, *Organization Science* 2 (1), 40-57.
- Fernback, Jan & Thompson, Brad. "Computer-Mediated Communication and the American Collectivity: The Dimensions of Community Within Cyberspace," *International Communication Association Annual Convention*, Albuquerque, New Mexico, May 1995.
- Horn, Stacy (1998). *Cyberville: Clicks, Culture, and the Creation of an Online Town*, Warner Books.
- Jones, Q. (1997). Virtual-communities, virtual-settlements & cyber-archaeology: A theoretical outline. *Journal of Computer Mediated Communication*, 3 (3).

- Kuo, Ying-Feng (2003). "A study on service quality of virtual community websites," *Total Quality Management & Business Excellence* 14 (4), 461-473.
- Maharg, Paul (2001). Negotiating the Web: Legal Skills Learning in a Virtual Community, *International Review of Law, Computers & Technology*, 15 (3), 345-360.
- Owens, David and Erick Thompson (2001). Fusing Learning & Knowledge At The St. Paul Companies, *Knowledge Management Review*, 4 (3), 24-29.
- Renninge, K. Ann and Wesley Shumar Wesley (Eds., 2002). *Building Virtual Communities: Learning and Change in Cyberspace*. Cambridge University Press.
- Rheingold, Howard (1993). *The Virtual Community: Homesteading on the Electronic Frontier*. Reading, MA: Addison-Wesley, 1993
- Rheingold, Howard (1994) . A Slice of Life in my Virtual Community. In L. Harasim (Ed.), *Computers and International Communication*. Cambridge, MA: MIT Press, 57-80.
- Smith, Roy (2003). Place and Chips: Virtual Communities, Governance and the Environment., *Global Environmental Politics*, 3 (2), 88-102. 2003

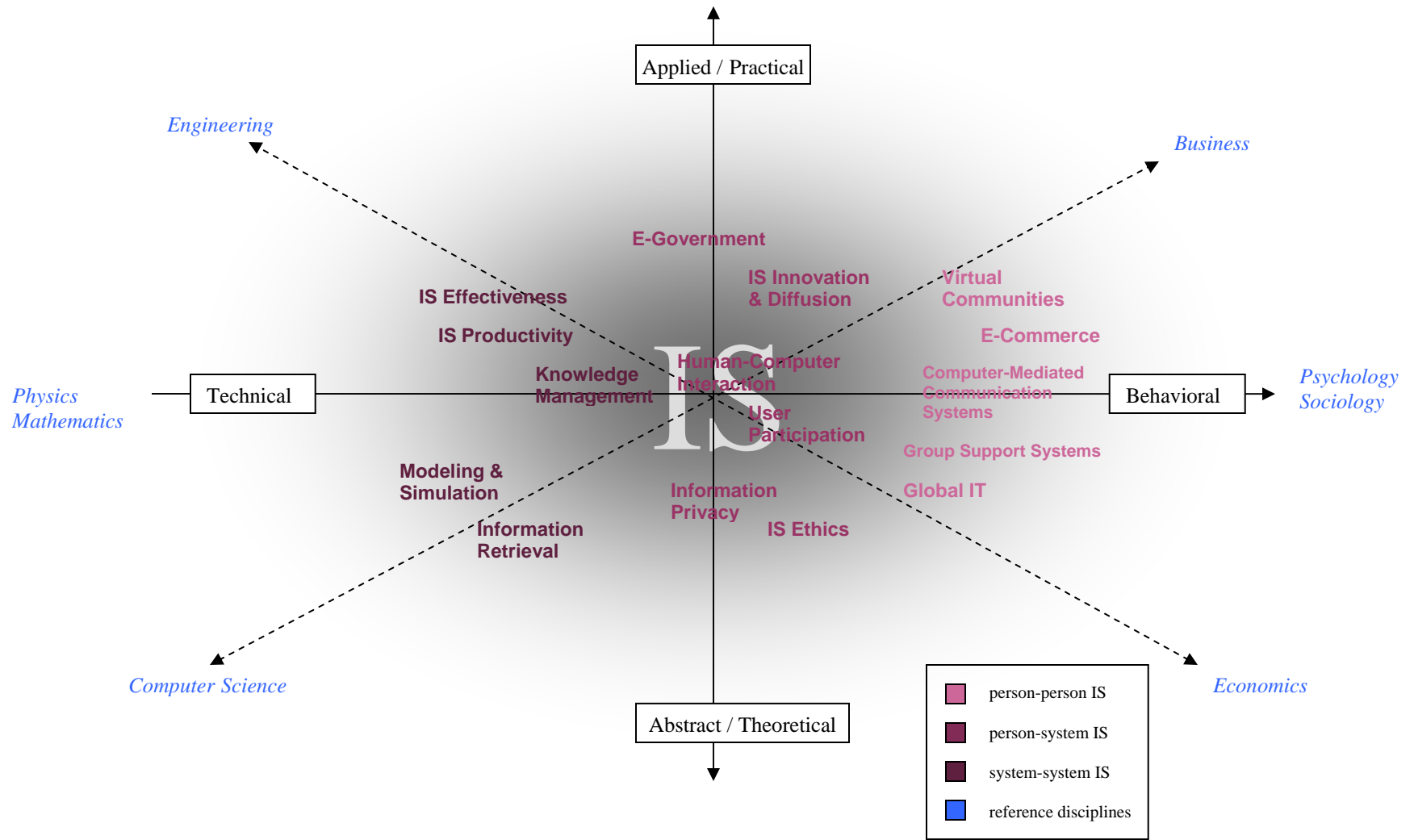


Figure 1
The ISR Universe: A Multidisciplinary Perspective