# Global Issues in Digital Society and Technologies

## Final Report of the Venice Workshop On Collaborative Research

Supported by the National Science Foundation
and European Commission

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# DIGITAL SOCIETY AND TECHNOLOGIES

## INTRODUCTION

This is the final report of a one-day workshop between researchers supported by grants from the U.S. National Science Foundation (NSF) and the European Commission (EC). The workshop was the outgrowth of high-level discussions between officials of NSF and the EC concerning the possibilities and benefits of collaborative research between researchers in the United States and Europe. The workshop was held among currently active researchers in an effort to determine whether there were sufficient benefits, common interests and mechanisms by which collaborative research could be conducted. The workshop was followed by the e-2001 Conference and also attended by many of the participants.

A positive outcome of the workshop was that a number of possible collaborations were identified and preliminary work was begun towards implementation. This report details the objectives of the workshop, the activities, and the principal findings. Several appendices to the report list the participants and the major on-going projects. The purpose of including these materials in the report is to facilitate further collaborations, both among those who attended the workshop and conference and among those who had intended to but were ultimately unable to attend. For the latter in particular, it is recommended that interested researchers begin direct communication with one another based upon potential common interests. The contact and project information in Appendices A and B will facilitate such communication.

### Objectives of the Workshop

The workshop had three major objectives:

- To identify research issues that could be dealt with in parallel between EU and US researchers;
- To determine the benefits from such transatlantic cooperation on these issues; and
- To suggest how we might carry out such collaboration between existing and new projects.

The specific research issues that were planned to be dealt with included but were not limited to the following: (1) the global diffusion of ICT production and use; (2) new ways of work and e-business enabled by ICTs; (3) the demand dynamics of e-commerce, including the mobile Internet and e-commerce; (4) the socioeconomic and digital divide impacts; (5) the influence of national environments (financial, consumer, business) and governmental policies (e.g., privacy, security, IPR) on IT impacts; and (6) the impacts of ICTs on economic growth and employment. This initial set of issues was identified based upon the funded projects and interests of all the participants who were invited to attend the workshop (Appendix B). But some invited participants were unable to attend in the end and so some issues did not receive the discussion hoped for. In reality then, as indicated by the results of the group discussions below, the issues

ultimately discussed were determined somewhat by the interests and current/planned research of those who actually participated in the workshop.

## Activities of the workshop

### Preparation

Each participant was asked to prepare two short papers in advance of the workshop.

- 1-2 page summary of current research efforts.
- 1-2 page description of 1-2 global issues related to the social and economic aspects of IT that they would be interested in working on with others.

These papers were circulated in advance to all of the participants as a way of creating a common information base for the workshop. They are included in Appendix B below.

### Workshop meeting

Sixteen participants from the U.S. and 14 from Europe attended the one-day workshop (Appendix A). The workshop began with introductions to the work of the European Commission in the area of research on the social and economic impacts of ICTs. It then focused on the mutual objectives of the EC and NSF for the workshop as well as plans of these agencies for supporting future collaborative research. The workshop then turned to developing an agenda for research. It used small group discussions organized around research themes to pursue discussion of issues warranting collaborative work. It used plenary sessions for delivering group reports and reaching consensus on issues dealt with by the small groups. Plenary sessions were also used to discuss benefits of cooperation and mechanisms for collaboration.

### e-2001 conference

Beyond the workshop itself, the venue of the e-2001 Conference was used to hear reports from the EC projects and to engage in extended discussions regarding collaborative projects. There were reports of the research results from more than a dozen EC projects, which brought together additional EC researchers with U.S. counterparts. Several preliminary collaborations resulted from these meetings in addition to those from the workshop itself.

**Workshop schedule**

| | | |
|---|---|---|
| Tuesday, October 16 | Introduction | |
| 9:00 a.m. | Introduction and welcome, Rosalie Zobel, European Commission<br><br>Background and EU objectives for workshop, David Guedj, CEC, European Commission<br><br>NSF expectations, Susanne Iacono, Digital Society and Technologies, National Science Foundation<br><br>Plan of the day, expected outcomes, Kenneth Kraemer, Center for Research on Information Technology and Organizations, University of California, Irvine | |
| 10:00 a.m. | Research issues, data needs, benefits of collaboration | |
| | **Working groups** | |
| | Group 1 | Families, work life and ICTs |
| | Group 2 | E-business, e-commerce, electronic markets |
| | Group 3 | Cross cutting issues |
| 12:00 | Lunch | |
| 1:30 p.m. | Working group reports and discussion | |
| 3:00pm | Plenary session – Benefits of cooperation and mechanisms for cooperation | |
| 4:00pm | Follow-up actions to the workshop | |
| 4:30 p.m. | End of workshop | |
| 5:30pm | Meeting on EC projects dealing with social impacts of ICTs | |
| Wednesday, Thursday, Friday, October 17-19 | e-2001 Conference – attended by most participants as a means of learning about EC research projects and engaging in small group discussions to develop preliminary proposals for collaborative research | |

# FINDINGS OF THE WORKSHOP

## Need for Collaboration

The participants concluded that there was a clear need for international cooperation, especially on issues which are multinational or global in their occurrence and impacts. It is not only that many research issues cross national boundaries, but that fundamental research and understanding of these issues requires comparison and the creative use of naturally occurring experiments, such as when different countries take different approaches to common problems. Understanding other issues, such as the causes, consequences and solutions for the growing digital divide, cannot be resolved with only local research but require global research to match the scale of the problem. Finally, it was determined that the design of systems, whether large-scale telecommunications networks or corporate information systems linking global supply chains, involves problems of global scale which requires understanding of their global business, economic and information requirements on the one hand and the environments, policy and cultural aspects of individual countries on the other hand.

## Benefits of Collaboration

Increasingly, the big advances in scientific understanding are the result of long-term collaborations among scientists from different disciplinary and methodological perspectives. The participants identified a long list of potential benefits from international collaboration, but these can be summarized as primarily of two types: those resulting from having multiple perspectives brought to bear on a single phenomena, and those resulting from efficiencies that collaboration brings when studying cross-nationally. A few of the benefits that were identified are elaborated below.

- *Multiple perspectives*. Collaboration enables taking advantage of the fact that researchers from different countries approach issues differently, often taking for granted theoretical assumptions or common sense assumptions that are not necessarily so. Perhaps more importantly, they bring local knowledge of local conditions and the causes and consequences thereof in cross-country research. In addition, cross-country comparative research provides opportunities for achieving wide variance on institution structures as they both impact, and are impacted by, technological innovation, diffusion and absorption.

- *Natural experiments*. Collaboration enables taking advantage of natural experiments. Different countries are at different stages of technological development and therefore represent naturally occurring phenomena that are useful when trying to understand the causes and consequences of technology adoption and diffusion. In addition, countries at the same level of development often take different approaches to solving problems and present naturally occurring experiments whose effects can be more readily and inexpensively observed than in the case in creating new experiments. Finally, collaboration expands the possibilities for understanding phenomena than might be applicable to one country but cannot be found within that country such as research

focused on countries in transition especially those that involve transformation in their social, economic, political and technological character.

- *Exchanging expertise and knowledge*. Collaboration enables the exchange of expertise and knowledge, both in the conduct of research and in the training of the next generation of researchers in the field. It supports learning new perspectives, approaches and methods as well as developing hybrid approaches.

- *Economies of scope and scale in research*. Collaboration results in elimination of wasteful redundant data collection efforts while offering possibilities for massing research resources and thereby increasing the scope and scale of research.

- *Sustainability of research efforts*. Collaboration among multiple institutions and countries increases the prospect for long-term research that is able to unravel the causes and consequences of social and economic transformations brought about by information technologies.

## Areas for Collaboration

There undoubtedly are many areas for fruitful collaboration, but we focus here on those that evolved from the small group and plenary discussions. They can be grouped under three broad headings: the impact of new technologies on work and living, the impacts of new technologies on business and commerce, and cross-cutting issues.

### Impacts on work and living

The group that engaged in discussions on this theme included: Robert Kraut, Jonathan Grudin, Jeremy Millard, Malidon Byrir, Athanasios Tsaualidis, and Deborah Dunkle. They concluded that there were several main but overlapping themes that warrant collaborative research.[1]

- *Families and households*. How families react to ICT is often conditioned by family type, e.g. the composition of the family and its structure, degree of fragmentation, socialisation (especially of children), relationships between school, home and work, etc. Included here is the role of young people as gateways for, or bearers of, new technology, often as the source of necessary skills. Complex changes of roles and relationships often take place, at least partly conditioned by ICTs, which can, in circumstances resulting from the freeing up of family time and routines, enable roles to be both switched and strengthened. Similarly, relationships between, for example, the couple or between parents and children can be given new perspectives and twists. Issues of autonomy and power are also very important, especially as these may change, or become reinforced, through access to and the use of ICTs. Primary amongst these is typically gender where European research shows both change and reinforcement under different conditions. Gender also has a wider dimension, for example in relation to work brought into the home (e.g. through

[1] The group summary was prepared and presented by Jeremy Millard, Danish Technological Institute.

home-based eWork), or new forms of mobile work and other combinations of time and place flexibility which inevitably has both direct and indirect effects on families and family life. Embedded here is also the underlying issue of skills to use and control ICT, but also applied skills and lifestyles in relation to entertainment, leisure, education, work and commerce (e.g. personal and family on-line shopping – who does it and with what result?)

- *Country differences in families and households*. Understanding the differences among countries is extremely important in Europe (as indeed is the sub-national, regional, perspective). There are clear and documentable differences, for example, between north and south Europe as well as between European "cultural realms". Included in definitions of these are, of course, institutional structures, levels of financial and other forms of support for individuals and families, and differences in life style. Differences in access to and use of technology and other resources, both at national and regional levels, but also between different societal and economic groups, are crucial issues, not least in terms of social inclusion. Some factors affecting these include regulatory regimes, market structure, degree of market maturity and outside penetration (i.e. from European and multinational suppliers in a situation where each European country has had a different experience migrating from national monopoly PTTs). These factors affect present price, quality, scope and availability of ICTs, and inevitably affect take-up and use. An important question here is, do we treat the technology as an exogenous, independent variable? How much control do we have over it? (Who is "we"?).

- *Employment and new forms of work.* Employment and new forms of eWorking are perceived very differently in the U.S. as compared to Europe, even given the wide variations in Europe itself. There is some evidence, for example, that eWork in Europe is still very much the preserve of high skill, high income, high autonomy individuals (although this is changing), whereas the opposite seems to be the case in the U.S. -- at least in terms of perception, hence the need for comparative research in this area. Further, the very different institutional and employment regimes in the U.S. and Europe seem to give rise to separate development paths, even though these may be converging and merging to some extent. For example, the incidence of "free-agent" telework is much more prevalent in the U.S., whereas social partner (and especially trade union) involvement in eWork issues is much stronger in Europe.

- *Individuals and intelligent agents.* ICT products and the use of them is becoming much more customised down to the individual level, so that the individual is arising phoenix-like as the champion of the Information Society. The new visions of ambient, intelligent environments include the perspective where the technology is capable of individualisation both as a conscious effort on the part of the user but also unconsciously directed by the user's personal electronic agent. This will be programmable to react in certain ways to certain situations, but also to learn independently and take some "decisions" itself. Such individualisation can include interfaces, services accessed, skill levels required, degree of automation, or threshold triggers. The individual also, of course, has many roles ranging from citizen, consumer, learner, teacher, worker to socializer, each one requiring a different set of (admittedly overlapping) skills and

competencies. These reflect, to some extent, the different ways technology can be used by individuals in relation to both existing and new forms of interaction, such as: communication, transaction, collaboration, socialisation and work (including CSCW).

- *Social communities and technology*. We are seeing the technology also being used to good effect to develop new forms of social and economic community (ranging from interest groups to business clusters), not possible and often unimaginable before the advent of ICT. Both developments (and many more) are taking place simultaneously – apparently manifesting multiple outcomes where research is needed in order to understand, at the very least, the basic mechanisms involved. Collections of individuals are also, of course, a lot more than the sum of their parts, and there is a need to better understand new manifestations of community and organisational knowledge. Knowledge management at individual and meso level is a crucial area where joint research is needed. New comparative studies are urgently needed in all these areas.

**Impacts of e-business and e-commerce**

The group that engaged these issues included Annaflavia Bianchi, Jonathan Cave, Gabriella Cattaneo, H. Raghav Rao, M. Lynne Markus, Charles Steinfield, Roberta Lamb, Kenneth L. Kraemer, Rolf T. Wigand and David Guedj. The group identified the following areas for collaborative research.[2]

- *Business models and value chains*. With the increasing use of e-commerce in the U.S. and Europe, there are signs that it is having an impact on established industry structures and practices. Given that e-commerce use is increasingly global, there is a need for multinational and comparative research on emerging business models to better understand how it is influencing value chains in specific industries. How are industry structures changing? How is e-commerce changing the structure of firms within and across industries? Is e-commerce leading to a new model of governance in interorganizational transactions? Does the locus of decision-making change in firms? Does it lead to more outsourcing? Company interrelationships in value chains and supply chains are moving online as e-business and e-commerce adoption spreads. What are the main differences between these evolutions in the EU and US? Finally, what effects are these foregoing changes having on productivity, competitiveness and economic performance?

- *Environmental and policy factors influencing diffusion and impact of e-commerce.* There is some concern, particularly among European policy makers, that e-commerce developments are occurring at a different pace in Europe than in the U.S. due to country-specific environmental and policy factors. Some of these factors may be drivers whereas others may be barriers to adoption and diffusion. Of particular concern is a perception that in many European industries, both organizational and interorganizational relationships are somewhat more rigid and stable than in their U.S. counterparts. How

[2] The summary of the group discussions was prepared and presented by Charles Steinfield, Michigan State University

does the rigidity in business practices in Europe influence e-commerce adoption and use? How do other environmental and policy features influence e-commerce? Does e-commerce flourish in more flexible and dynamic value chains or is there a wider range of possibilities in which e-commerce can flourish? Are European venture capitalists more rigid than U.S. counterparts and how does that affect performance. Why do countries with small, personal markets like Italy show a downturn in the uptake of e-commerce and countries with large super market type markets show an uptake?

- *Impacts of e-commerce*. What are the emerging impacts of e-commerce at the level of the organization, industry and society? How do those impacts vary by industry sector? What are the differences in impacts among countries? Is there a digital divide in the level of e-commerce diffusion, and if so, what are the effects of that divide? Some argue that the gaps in physical access to the Internet between countries are closing, but differences in services and transactions are not. What are the implications of these developments?

- *Electronic marketplaces*. B2B electronic marketplaces take many forms, and there are some concerns that when dominated or managed by a small group of vendors or buyers, they may have a negative effect on competition. How are B2B marketplaces evolving in Europe and the US, and how do these industry collaborations influence competition? Are they collusive? Does policy make any difference? How do the different anti-trust and competition policy frameworks in Europe and the U.S. deal with B2B marketplaces? Are electronic marketplaces making industries operate more efficiently or are they resulting in collusion? Are these the same relationships that always existed or are e-markets bringing new partners or reducing the number of partners? Is what they are doing the same or different than before?

- *E-commerce indicators*. Given that e-commerce is a relatively new but rapidly growing phenomena that is poorly understood, there is a need for indicators that facilitate monitoring its development over time and across countries. What new indicators can be developed to better identify and monitor structural and other changes due to e-commerce. How can structural changes, governance changes, etc. be measured? What metrics would help policy makers ensure that e-commerce grows in a manner that contributes to economic and social welfare? What thresholds can be developed on these indicators that might provide a guide to policy and action?

- *Mobile e-commerce*. There are very different structures of the wireless communications industry in Europe and the U.S. that are expected to have an impact on how mobile commerce evolves in Europe and the U.S. Will the US Computer-oriented model of wireless communication building on WLAN technology attract demand faster than the new generation telecom-oriented GPRS on GSM and UMTS services? How will interoperability across different wireless environments affect demand dynamics? Will mobile commerce evolve under fundamentally different influences, in a different form, or at a different pace? Will innovation be hampered in either place due to the existing industry constraints? Will we see a telephone centric model for mobile commerce evolve in Europe, while a computer centric model evolves in the U.S.? Will Japan develop mobile commerce differently than the U.S. and Europe? Will mobile devices bring more

people on the Internet? Will this differ across continents? What complementarities are there between mobile and fixed access to the Internet?

- *Virtual and physical communities*. What is the relationship between virtual and geographic business communities? Will new virtual business clusters and communities replace existing, geographically defined ones? To what extent are cultural and regional specificities likely to shape the emergence of business communities on the Internet? Can cultural and regional specificities be maintained in an e-commerce environment?

**Cross-cutting issues**

This group discussed directions for research on economic development and what members of the group defined as information regimes' -- socially and technically institutionalized arrangements around the production, use, consumption and governance of information. These two research foci complemented one another since the role of IT in economic development often entails transformations in political, organizational and economic institutions, or information regimes. A variety of examples were discussed, leading to: (1) the identification of a set of constraints facing research on information and communication technologies (ICTs) and (2) the need for innovation in research on transformations tied to ICTs. The group that engaged cross-cutting issues included Barry Hughes, Annie Jacobs, Rob Kling, Mary Culnan, Colin Gray, William H. Dutton, Susan O'Donnell, Mark Ackerman, John King, Diane Bailey and Peter Johnston.[3]

**Constraints facing comparative social research on IT**

- *Cross-national equivalence*. One major constraint is the lack of cross-national or cross-regional equivalence of major terms and concepts. For example, concepts as central to research on economic development and productivity are defined differently across national contexts. Americans simply mean output per hour worked when discussing productivity. Europeans are more likely to mean increasing the number of workers per industry as a gain in productivity. Another example is the term "social inclusion". This term evokes concerns over gender and age differences in the use of IT in the minds of Europeans, referring to simply being employed in an information society. Americans are more likely to think of the lack of access to IT in distressed areas of inner cities.

- *IT in a social ecology*. A second constraint was the difficulty of conducting research on IT once our frameworks begin to envision technologies embedded within a broader ecology of social, political and economic change. Early conceptions of the impact of IT on economic development often failed to appreciate the degree to which social and technical change is inseparable. ICTs must be studied as one set among a larger number of factors driving social and technical change.

[3] The summary of the group discussion was prepared and presented by William Dutton, University of Southern California.

- *(Mis)conceptions of researchers and funding agencies*. A third constraint is common misconceptions of researchers and funding agencies. Statements such as: "Social scientists are not interested in research on x," or: "Funding agencies will not support you" are common in the field. It is clear that such conceptions shape the proposals that come forward (or do not come forward). Researchers can complain that they are dependent on what funders want to support, at the same time that funding agencies complain that they are dependent on what the research community proposes. Regular communication is required to overcome these misconceptions.

- *Time horizons*. A final constraint that arose from a number of examples is the different time horizons for research versus social change. Generally, the 1-3 year time frame of a research project is often too short to capture the movement of institutions, or information regimes. At the extreme, for example, some have argued that technological innovations can take decades before they enable dramatic changes in the economy, as in the case of the electric light, steam engine or computer.

**New directions and innovations in research**

The group moved beyond the discussion of constraints to suggest a number of directions for future research on IT.

- *Level of analysis*. Discussion of the problems with grand macro-level analysis of national economic development on the one hand and detailed micro-analyses of individuals on the other hand, suggested new levels of analysis between the micro and macro levels. Some thought it would be fruitful if more research focused on institutions or networks for example, as well as on individuals or nations or societies.

- *Time frames*. Several participants recommended more historical perspectives as one approach to grappling with the time horizon of social changes tied to ICTs. Others suggested longer time frames for more longitudinal research.

- *Comparative research*. All endorsed the value of more cross-national and cross-cultural comparative research as one means for identifying and resolving issues of cross-national equivalence of concepts and research.

- *The importance of motives and strategies*. An implicit case was made through a variety of examples for research that was more focused on the motives and strategies of various actors involved in different information regimes. Disappointment and lack of confidence for mere correlations and causal arguments generated by them, led a number of participants to focus on the motivations of actors, suggesting the need for research approaches capable of exploring such factors. For example, a discussion of the sharing of information (music, research, or data) led to a focus on the tactics of different actors (producers, users and viewers) in achieving their various motives. Shaping change in this network would therefore require an understanding of this ecology of motivations and strategies.

- *Multiple methods*. A final theme was the need for more qualitative case studies to complement more quantitative studies and analyses. For example, qualitative research can provide one approach to exploring the motives of actors and examining changes in IT within a broader social and economic ecology of institutional arrangements.

**Mechanisms for Cooperation**

The workshop also discussed mechanisms that might be used to encourage collaboration, including both short-term and the more important long-term collaboration. It was especially felt that the research issues identified by the workshop require large-scale, long-term collaboration if fundamental understanding and breakthroughs are to be achieved. The workshop recommends the following mechanisms to facilitate international collaborative research:

- Creation of national research centers where large-scale and long-term research can be conducted, where resources and capabilities can be amassed, and where centers, researchers and graduate students can engage in exchanges;

- Creation of a web site for sharing information about EC and NSF research projects, and collaborative projects that result from this and future workshops;

- Creation of a web-based resource center for sharing questionnaires, databases and web-based data collection efforts. Sharing of questionnaires and databases among researchers;

- Sharing of original data collection efforts using jointly developed questionnaires;

- Participation in meetings of the European Commission and of the research conferences/meetings supported by the EC;

- A continuing series of international workshops alternating between European and U.S. locations and held in conjunction with other significant conferences and meetings; and

- Smaller, focused workshops oriented around specific themes such as e-work, e-business, electronic markets, privacy, intellectual property protection, and so forth.

## CONCLUSIONS OF THE WORKSHOP

**Success of the Workshop**

Both the EC and the U.S. officials and participants felt that the Workshop was successful in achieving its objectives. Indeed, with the active encouragement of EC and NSF officials, the workshop stimulated the development of collaborative teams and work on preliminary proposals for research that will be submitted to the EC for the Eight Framework call. These EC proposals are expected to have counterpart proposals submitted to NSF.

## Principal Conclusions

In addition to the conclusions about substantive areas for collaborative research, the Workshop came to widespread agreement about five principal issues. These are as follows:

- There is a need for international cooperation in research on Global Issues in Digital Society and Technologies, and that the benefits of such cooperation for developing fundamental understanding of the social impacts and implications of ICTs would be substantial;

- There was interest in collaborating to carry out joint research. Most U.S. participants found one or more individuals and projects with which they could collaborate as a result of the workshop;

- There was agreement that research on the role of IT in organizations, networks, and nations often entails transformations in political, organizational and economic institutions, or information regimes, and that both of these phenomena need to be understood. Doing so requires new research approaches involving multiple methods, longer time horizons, multiple levels of analysis and comparative analysis;

- There was agreement that better communication is needed between researchers and funding agencies. As one means (but not the only) of facilitating such communication, future workshops between researchers and funding agencies should be held. There was also agreement that there should be smaller, focused workshops around specific issues such as e-work, e-commerce, privacy, intellectual property. As a further means of facilitating communication, there was agreement that a web site and virtual community should be developed for sharing information about on-going international collaborative research on digital society and technologies; and

- There was agreement that there is a critical need to encourage large-scale, long-term international collaboration through the creation of National Centers similar to the European Social Research Centers (ESRCs) program and the NSF Engineering Research Centers (ERCs) and the Science and Technology centers. There is a need for 2-3 such centers in both the U.S. and Europe with formal and informal linkages among them. It was felt that these centers must be multidisciplinary and interdisciplinary and that in Europe, they must be multi-country in their participation.

## A Key Question: Feasibility

Can these directions be supported? The Workshop clearly raised this question. The challenge to funding agencies to find ways to support new directions in social and economic research on IT, especially on global issues in digital society and technologies.

# APPENDIX A

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# APPENDIX B

## LIST OF ON-GOING RESEARCH PROJECTS

## American Projects

### GREGORY D. ABOWD, Georgia Tech

**RESEARCH PROGRAM IN SOCIO-LEGAL IMPLICATIONS OF EMERGING HOME TECHNOLOGIES**

**Project Overview.** This Research Program is directed to the creation of a new paradigm for exploring the intersection of two fundamental sets of social issues. On the one hand, we live in a world of quickly evolving and largely unpredictable technologies of data collection, sensing, and storage, and these are being promoted for use in domestic settings. On the other hand, traditional concepts of individual rights, not just privacy, but property, security, due process, and free speech, are being challenged. Although these are very broad topics, this project will study and evaluate them within a unique and focused context: the Aware Home Research Initiative (AHRI) at Georgia Tech. AHRI is particularly useful because it involves a range of new technologies that are all aimed at the core circumstance around which so much of the legal and ethical doctrines of privacy and personal security have developed – the home. From the perspective of the law, the goal of the research is to translate rights and duties developed in previous eras to the present one of remarkable information capture and storage capabilities being developed in the Aware Home. From the perspective of technology, the goal is to determine how these capabilities can be designed and used so that the full potential of each, both present and future, can be realized without distorting socio-legal foundations.

The audience for this work is a wide array of researchers and policy developers from both the technological and legal communities. On the technical side, researchers working directly in the Aware Home, as well as companies that are and will be building the sensing and application equipment, have direct and substantial interests in being prepared to address the social and legal implications of their efforts. Understanding these implications will enable them to see, early on, the relevance of different design choices. On the legal side, policy makers at both the state and federal levels will benefit from a thorough understanding of the relationships between the Aware Home's technological developments and contemporary legal and political issues. The goal should be to draft and enforce legislation that fosters technical advancement while safeguarding our nation's heritage of constitutional and moral values.

Although studies of technological innovation frequently note the various social and legal ramifications of such changes, they seldom discuss those implications with the kind of analytic rigor ordinarily associated with science. The paradigm to be developed will identify within normative discourse variables and interconnected factors that will make it possible to compare and assess various policy directions. The paradigm will not itself adopt or impose any particular normative perspective, but will instead describe the range of forms of "value thinking" most relevant to current policy debates.

This analytic structure starts by dividing normative reasoning along two very basic "dimensions." The first will divide ethical decision-making into two categories involving in effect the size of the audience to whom the decision-maker must apply his or her decision: "moral" philosophy (small group) and "political" philosophy (large, social scale). The second dimension will further divide these categories into two more on the basis of two different views of the foundational purpose of the decision maker's ethical responsibilities: "deontological" ethics, which posits that ethical decisions should be guided directly by abstract values, and "teleological" ethics, which focuses instead on long-range practical consequences. The range of alternatives can be mapped into a grid of four relatively distinct approaches to the foundations of any value system. The many legal and social issues implicated by the Aware Home's technology can each be approached from any of the four boxes of this matrix. This insight in turn helps explain why debates about these issues seem so disjointed and intractable. The disagreement runs deeper – and is more inevitable – than most discussants recognize.

The matrix does not, then, resolve this policy dissonance by privileging one perspective over any other. Its purpose is instead to identify the full range of normative disagreement underlying any issue so that researchers and policy makers associated with the Aware Home project will be better equipped to handle the disagreements that will arise, and correspondingly be better able to work toward practical solutions to questions of regulation of uses and extensions of particular technologies.

**MARK S. ACKERMAN, University of Michigan**

## CURRENT RESEARCH

**Field Studies of Organizational Memory and Information Reuse.** (Joint work with Christine Halverson, Tom Erickson, Wendy Kellogg). Organizational memory is an evocative term within Information Systems, Computer-Supported Cooperative Work (CSCW), and adjacent fields. It tells us that organizations remember information and implies that the retrieval and use of that information is, if not effortless, then very easy—as easy as an individual remembering a fact or event. The reality is more complicated and difficult than that. Surprisingly little is known about the details of such reuse, the very details required to better reuse the massive amounts of information that flood organizations. It is clear that organizations waste an enormous amount of their information and knowledge; yet, we lack the detailed, systematic insights necessary to understand how to effectively reuse information.

This work extends Ackerman and Halverson (1998, 1999, 2000) by (a) collecting appropriate data in field settings and (b) closely examining these important theoretical issues through micro-level distributed cognition analyses. The field sites are two technical support organizations. We believe that technical support activities provide a rich location for our observations and analyses.

**Augmenting Expertise Networks.** Expertise networks (sometimes now called knowledge networks) are the technical augmentation of the ad-hoc social networks by which people seek information, answer questions, and accomplish tasks. We have new possibilities for creating and maintaining very flexible networks of people, since the advent of widespread communication networks allows new forms of expertise networks. Within these networks, moreover, we have the flexibility to include information databases, documents, agents, and people together as resources.

Several important research issues remain if expertise networks are to be useful. It is often difficult to find the right person to answer a question, and thus, we need systems to find people with specific expertise. Finding an appropriate person (or group) is often difficult in existing social networks. Our approach also attempts to save some of the knowledge that is created through informal exchanges in the expertise network.

To construct socially appropriate systems, we needed to better understand how people find and use others' expertise now in their work practices, as well as why people chose to create knowledge artifacts as a result of their social exchanges. As such, the project combined system design with a nuanced understanding of the social interactions involved. Specifically, the work has had a dual attack. The research undertook case studies of expertise use in current organizational settings in order to more fully understand the social requirements in augmenting an expertise network (McDonald and Ackerman 1998). The proposed research also designs, implements, and evaluates mechanisms for finding and storing expertise (McDonald and Ackerman 2000). The emphasis is on finding new ways to augment people's expertise, rather than automating, and in providing usability through examining social requirements. We are currently creating a second generation of systems to find and store expertise in organizations, extending the previous work.

**Understanding Open Software Communities, Processes and Practices.** (Joint work with Walt Scacchi) "Open software", or more narrowly, *open source* software, represents a new approach for communities of like-minded participants to develop software that is intended to be shared freely, rather than offered as commercial products. While there is a growing popular literature attesting to the potential or apparent success of open software, there is little in the way of careful systematic empirical study that characterizes or informs: (a) how such communities produce software; (b) how they coordinate software development work across different settings; and (c) what social processes, work practices or organizational contexts constitute how open software is produced and sustained, and the like. Examining these from a socio-technical perspective is most appropriate. Such a study must concurrently examine the social arrangements, work processes and practices from which open software communities and artifacts arise, as well as the technical information infrastructure through which these communities and artifacts are articulated and shared.

The overall project compares and contrasts four communities. I am primarily examining software for the Chandra Observatory as well as other software for the astrophysics community. I am also examining game software as well as comparative interviews with software engineers and users from other scientific communities and commercial practices, as required for an understanding of the astrophysics community. The work employs field study methods -- largely semi-structured interviews, direct observation, examination of email and other forms of electronic discussions, and analysis of secondary, publicly-available texts -- to examine each community, and case study methods to examine and compare selected phenomena or conditions within and across communities.

## PROPOSED RESEARCH

**Examining European (or Asian) scientific communities and their production, and use of openly available software.** As above, I am especially interested in understanding what keeps software engineers within these communities and how the scientific mission of the community is interwoven with the means of software production.

As part of the open software project, I am examining metaphorical constructions in the popular literature around open source. This is, of course, shifting with the changing economic scene. However, it is still interesting to note how open source is seen to be a new economic and software engineering paradigm, rather than the reconstruction of existing (and long-standing) production arrangements.

**Privacy in next generation computational environments.** Privacy is likely to be a serious problem in ubiquitous, pervasive, and perceptually aware next-generation computational environments. It will be important to safeguard the multiple players in these environments - understanding societal and personal needs. It will also be important to understand the organizational requirements for and concerns with these environments. As a technical amelioration, I have in mind a set of cross-regulatory agents that allow people to construct (and thereby understand) the regulatory requirements of and assistance in their local environment. However, to properly construct prototype solutions it will be necessary to understand, perhaps through field-based interview studies, the requirement.

## DIANE BAILEY, Stanford University

### CURRENT RESEARCH

My research interests are in the interplay among technology, work and organization in high-technology fields, predominantly in engineering and manufacturing. Presently, I am exploring these interests via a study of technology and knowledge in engineering work. (See abstract below.) Currently under funding review (at the National Institute of Standards and Technology) is a three-year longitudinal study of the development and introduction of technological work aids (including some aspects of knowledge management systems) for defect reduction engineers, technicians, and operators in the semiconductor industry. I also have recently written on virtual teams (in work co-authored with Pamela Hinds and under review) and telecommuting (in work co-authored with Nancy Kurland and under review).

**Assessing the Role of Technology in the Work of Modern Engineers (NSF CSS Grant #0070468 - PI: Diane Bailey - Co-PIs: Stephen Barley, Ray Levitt, and Bruce Wooley).** As advances in technology have transformed industry, engineers have risen to key roles in the management of firms, and engineering design, as displayed for example in product development, has taken on a key role in their strategy. Previous scholars have contributed considerably to our understanding of the organizational environment in which engineers work, the rise of the engineering profession, and the alternating influences of university versus on-the-job engineering training. We know very little, however, about what engineers actually do all day, the tasks they perform, the ways in which they employ technology, how their knowledge and tasks have been and are being embodied in technologies, and what skills they are likely to require in the years ahead.

This proposal describes a three-year study in which we will assess the role of technology — from the traditional and mundane to the advanced and microelectronic — in the work of modern engineers. In the course of our research, we will document what an engineer does and what technologies an engineer employ. We will determine the extent to which, and manner in which, these technologies embody, augment, and alter engineering knowledge and tasks. Our final product will be an analysis that explains technology use in engineering work.

The answers to our research questions will inform the management of engineers, their education and training, and their broader study in the social sciences. Our results will also lend insight into the design of engineering workspaces, tools, and supporting technologies. They will further add to our understanding of how technologies are employed more generally in the workplace. To ensure that our project achieves its anticipated impact, we will disseminate our findings quite broadly. We intend to publish our results across a wide spectrum of academic conferences and journals that appeal to engineering and management audiences. In addition, we will present them locally to Silicon Valley firms that participate in several Stanford industry forums, and nationally through both symposia and electronic media.

Using ethnographic techniques of observation and interviewing, we will study two types of engineers: structural engineers who design buildings and electrical engineers who design computer chips. Our research team unites individuals with expertise in the study of technical workers with experts from civil and electrical engineering, thus enhancing our ability to achieve

our goals. A pilot study we conducted in the summer and fall of 1999 sharpened our research framework, highlighting methodological difficulties and ways for overcoming them, and provided insights for project management and the development of our timeline.

## PROPOSED RESEARCH

**Professional Immigrant Communities.** There are numerous issues around immigrant professionals and their communities that are intertwined with the adoption and diffusion of IT. For example, over the past several decades, many Indian students came to the US for advanced technical degrees and subsequently took positions within US industry. Partly as a result of their aid, advice and efforts, and impossible without advanced communications technologies, a tremendous software development industry has arisen in India. The success of that industry has provided opportunities for new technical graduates to remain in India under economic conditions sufficient to diminish the attractiveness of a shift to the U.S. In some cases, these conditions have lured immigrant Indians back to homes and families that they miss and with whom IT could not provide ample richness in maintaining long-distance relationships. (Additionally, recent changes in Indian employment opportunities have dramatically increased the divide between rich and poor in many areas, a transformation that adds yet another component to the maze of socioeconomic changes fostered by IT.) Similar situations have developed across Asia and the rest of the world. Exploring such long-term cycles of immigration and emigration among professional communities would provide a fascinating understanding of population shifts and economic development across countries with respect to IT advances.

**Comparison of Changes in Work and Socioeconomic Status Related to the Adoption and Diffusion of New IT Technologies.** We already have evidence that the same work technology can be employed in a variety of ways in different organizational contexts. Similarly, local social and economic structures can be expected to shape (and subsequently, be shaped by) IT in unique ways. For example, cell phone use in rural villages in developing nations has been the impetus for new businesses, with individual entrepreneurs gaining prominence in ways less heard of in developed nations, where greater communication infrastructures already exist and where, as a result, the cell phone is but one of many alternatives available. Studies that focus on the differing impact and use of a specific set of technologies across nations and communities would sharpen our awareness of their potential and enrich our understanding of the interplay among work, technology, and society.

**Knowledge Communities.** IT makes it possible for communities to share and create knowledge in new ways. A global comparative study of how different communities employ IT for civic and other purposes would provide insights into the potential of IT to transform community life. While we envision a study of communities whose individual members within a single community share the same culture and geography, but are perhaps separated by short to medium distances, it seems that similar results might be found among communities whose members are more distant from one another, as for example in the case of global political movements. In the latter case, a study of IT might show how movements with few resources might become considerable social forces via their use of communication technologies to rapidly spread information and organize members.

## MARY J. CULNAN, Bentley College

### CURRENT RESEARCH

My current research addresses two aspects of information privacy (or data protection as it is known in Europe): consumer attitudes toward privacy, and implementation of fair information practices by organizations. I am particularly interested in the privacy issues raised by electronic marketing. Underlying much of this research is the concept of the "second exchange" that I developed with my colleague Sandra Milberg. Marketers have always understood that consumer transactions are based on an exchange: people exchange money for products and services that provide value. The second exchange involves the flows of personal information that accompany most purchases today. People will exchange their personal information for benefits, such as personalization or discounts, provided the benefits exceed the risk of disclosure.

Fair information practices (e.g. notice, choice, access, security and accountability) are global norms that make the second exchange fair as they balance legitimate organizational interests in collecting personal information with the individual's privacy interests. Fair information practices are the basis for European data protection laws, U.S. privacy laws and self-regulatory programs.

The first issue I have addressed is consumer attitudes toward privacy. Using survey data, my colleagues and I have investigated the factors that make consumers willing to participate in the second exchange, that is, to disclose their personal information to organizations. We found that trust in organization's information practices and experience are positively related to willingness to disclose while concern for privacy is negatively related. We also found that when organizations observe notice and choice, many people who were previously unwilling to disclose change their minds.

The second issue I have addressed relates to the implementation of fair information practices, primarily by Internet Web sites. In the United States there is an ongoing public policy debate about whether legislation is needed to protect privacy online or whether industry self-regulation will work. To assess the extent to which Web sites have voluntarily implemented fair information practices, in 1999, I conducted a random sample survey of the Top 5,000 Web sites, counted the number of Web sites that posted privacy notices and the extent to which these policies represented fair information practices. The U.S. Federal Trade Commission conducted similar studies in 1998 and 2000. Subsequently, my research has addressed methodological issues related to the design and conduct of similar web surveys.

My research addresses the issue of what constitutes a "good" privacy notice and how these notices factor into a consumer's decision to do business with a particular Web site. Privacy notices are roughly analogous to food labels and warning labels on other products. They should provide information to help consumers decide whether or not they want to do business with a company based on its information practices. This research draws on consumer information processing theory, particularly the work of Christine Moorman on consumer processing of nutrition labels, to see whether this theory is applicable to privacy notices. The first step in the research is to identify variables that explain an individual's motivation to read a privacy notice.

The next step will be to conduct experiments that assess how different notice formats promote comprehension.

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**PROPOSED RESEARCH**

Because e-commerce is global, privacy (data protection) is a global issue. I am interested in studying cross-cultural issues related to the implementation of fair information practices. For example:

**Consumer attitudes toward information disclosure and privacy: Europe vs. U.S.** I am interested in doing either surveys or experiments which assess the trade-offs consumers make in deciding whether or not to disclose personal information in exchange for some benefit, and the role privacy policies play in promoting disclosure.

*Readability of privacy disclosures: Europe's omnibus privacy laws mandate the organizations provide prior notice before collecting personal information. In the U.S., our recent experience with the Gramm-Leach-Bliley Act requiring financial institutions to provide written privacy notices to their customers has demonstrated that a legal requirement to provide notice does not necessarily result in notices that are meaningful to consumers. What is the European experience with online privacy notices?*

*Organizational best practices: How have European companies implemented fair information practices? Are there business models that are particularly effective? As the U.S. contemplates online privacy legislation, are there lessons from Europe that can inform our public policy?*

## JAMES N. DANZIGER, University of California, Irvine

### CURRENT RESEARCH

With UC Irvine Professors Hank Becker (Department of Education), Alladi Venkatesh (Graduate School of Management) and Alfred Kobsa (Department of Information and Computer Science), I am beginning a multiyear study that centers in the examination of two fundamental questions:

- To what extent and in what ways is information technology transforming people's lives, at home, at work, and in school; and
- Under what personal, contextual and technological conditions are IT changing individuals and their organizations?

The basic theoretical and empirical foci are the social impacts of information and communications technologies, especially the wired and wireless Internet, on individuals' social and work lives in four different institutional contexts—households, workplaces, governments, and schools – and on the four institutions themselves.

These analyses are integrated by an interest in the ways in which ITs create "information networks" which enable individuals and groups to engage in multiple functions from a particular contextual location and possibly to link these functions and these social institutions in novel ways.

This project is grounded in the analysis of data gathered in field studies and in longitudinal surveys of more than 4,000 individuals. These individuals are drawn from household, workplace and school samples in 16 selected neighborhoods, distributed across eight regionally diverse Metropolitan Statistical Areas in the United States. In each context, the research determines how IT is utilized and its effects, not only for functions associated with that context, but also for other core activities in the individual's life. Among the key intervening variables will be the technology-in-use, the functions performed, and the individual's IT skills. The linkages between individuals and the governments serving them will also be explored. These systematic, empirical analyses will advance our scientific understanding of how IT use affects individuals across multiple roles within these networked institutions and will inform explanatory theories of IT-related change and transformation at the individual and organizational level.

Other recent research of mine has centered in more intensive studies of the acquisition of IT skills by professional workers. The primary research sites were private sector, high-tech companies. The research explores a variety of issues regarding the employees' IT skills development: modes of training utilized; prevalent "bundles" (that is, combinations) of training modes; conditions under which certain training modes are assessed to be most effective; types of help and end user assistance with IT that are most useful; and so on. Among the most striking findings are the employees' clear preferences for peer-based assistance rather than print-based or technology-based support and for classroom-based learning rather than "e-learning" approaches.

## PROPOSED RESEARCH

There are several areas of ICT research issues that might be particularly interesting and important to study in different countries. I would be pleased to discuss possible collaboration in comparative research that would allow for: (1) cross-national analyses; and (2) between-individual analyses in which country is a contextual (intervening) variable. Among the issues that might be studied are:

**ICT skills development**:

- Are there specifiable (cross-national, between individual) variations in the effects of utilizing different approaches for an individuals' learning and skill enhancement in the use of ICTs?
- Are there differences in the processes of ICT skills development across the contexts of work, home, and school? Under what conditions do skills transfer across contexts?
- Under what conditions are particular modes of end user help/assistance with ICTs more effective?
- What (public and private sector) strategies are being utilized to produce sufficient numbers of employees with strong ICT skills?

**ICT impacts on work**:

- Are there (cross-national, between individual) differences in the effects of using ICTs on the work environment (e.g., job domain; job satisfaction; modes of communication; superordinate-subordinate relations; and patterns of employee interactions)?
- Under what conditions are continuing productivity gains associated with the applications of ICTs to certain kinds of work?

**Digital government**:

- Are there (cross-national, between individual) differences in the distribution of uses of ICTs that link the government and the citizens (e.g., government-to-citizen service delivery; citizen-to-government communication; citizen information-seeking about government activities)?
- Under what conditions are there different impacts from ICTs that link the government and the citizens?
- Are ICTs altering citizen engagement with government?
- Are the uses of ICTs altering the relationships between governmental units (intragovernmental, intergovernmental, cross-national)?

## WILLIAM H. DUTTON, University of Southern California

### CURRENT RESEARCH

I led a consultancy for the UK's Economic and Social Research Council (ESRC) that developed a new research program called "The e-Society: Understanding the Restructuring of Practices and Institutions in the Digital Age". (http://www.esrc.ac.uk/E-Society.htm). Information and communication technologies are widely seen as a key element tied to broadly-based changes in social structures and practices, such as in reconfiguring access to information, people, services and technologies. They are associated with the erosion of hierarchy and rise of networked organizations. The e-Society programme, currently recruiting a director, will be critically examining these claims. In the process of framing this program, I acquired it as a guide to my own research, organizing a set of case studies designed to critically look at the connections between ICTs and institutional structures and practices in a variety of different contexts, including elections, political campaigns, news, and higher education.

**Elections: The Democracy Network.** I am continuing a longitudinal case study of the Democracy Network (www.dnet.org) to examine the role that the Internet and Web will eventually play in fostering more democratically "responsible voting". My studies of DNet examine fundamental questions concerning the political implications of the Internet and Web. For instance: Will these information technologies be used in ways that will help stimulate a more issue-oriented debate, and thereby, foster voting on the basis of issues in a campaign? Or will they be deployed by information service providers, candidates and their handlers in ways that will further distance voters from the candidates and issues at stake in democratic elections?

**Political Campaigns: A Cyberadvocacy Campaign.** I am working with a graduate student, Wan-Ying Lin, on a case study of a Web-orchestrated campaign to stop a telephone area code overlay in Los Angeles. An early version will appear in a forthcoming book by Armitage, J. and Roberts, J. (forthcoming), *Living with Cyberspace: An Introduction to Technology and Society in the 21st Century* (London: The Athlone Press). This chapter examines a cyberadvocacy campaign that employed the Web effectively to impact public policy and regulatory change locally, and with implications for California and US telecommunications. The Web facilitated this not only by altering the costs of communication, but by reshaping access in ways that enabled the organizers to reconfigure the networks of communication among key political actors, changing the "ecology of games" shaping telecommunication policy.

**News: Connecting the Times and Tribune to the Future of News.** On Monday March 13, 2000, the Tribune Company, owner of the *Chicago Tribune*, acquired the Times Mirror Company, owner of the *Los Angeles Times*. I am working with colleagues on a case study of this acquisition and its aftermath, along with media coverage and related literature, to identify the implications of this merger on the news and the news media. Was this a blessing, a disaster, or non-event for Los Angeles and the larger world of the news media? It is closely tied with new ICTs as the online strategy of the Tribune and the Los Angeles Times were an important component of the ecology of games shaping this take-over.

**Higher Education: The Changing Geography of the Classroom.** I am working with Professor John Silvester, supported by a mini-grant from the USC Provost's Urban Initiative on "Information Technology, Society and Space" to examine whether ICTs are enabling fundamental transformations in educational practices, such as whether new media enable fundamental changes in the geography of the classroom, such as reconfiguring who does what, when, and where, with what effects? I am in the process of conducting an embedded case study of the use and impacts of a Web-based course management tool, Blackboard, which has diffused widely across institutions of higher education. The project is built around case studies of the role of Blackboard in 10-20 courses at the University of Southern California (USC). This is related to an edited book near completion: Dutton, W. H. and Loader, B. D. (2002, forthcoming) (eds), *Digital Academe: New Media in Higher Education and Learning* (London: Routledge).

**PROPOSED RESEARCH**

I would value international collaboration, mainly in the form of cross-national comparative case studies in any of the areas of my current research (1-4). I think it would be difficult but valuable to connect research in North America and across Europe with the new work being undertaken within the e-Society program. An additional, but closely related area I am discussing with others entails:

**Digital Cities.** Professor Emmanuel Eveno at the University of Toulouse is coordinating a research project on "digital cities and local democracy", which might involve comparative case studies across Europe and North America. Emmanuel and Thierry Vedel of CNRS in France may collaborate with others and me on comparing experiences in the US and Europe. It would be useful to have an idea from others who might wish to be involved. This relates to my early work on Wired Cities and later on Santa Monica's Public Electronic Network (PEN).

**Recent Publication:**

Dutton, W. H. (1999), *Society on the Line: Information Politics in the Digital Age* (Oxford University Press), which has been translated into Italian as "La societa online" published this year in Italy by Baldini & Castoldi. It is also forthcoming in Japanese.

## JONATHAN GRUDIN, Microsoft

### CURRENT RESEARCH

**Collaborative Information Retrieval (NSF).** The goal of this study is to obtain a better understanding of social aspects of information retrieval in a variety of workplace settings. Information retrieval has been viewed as an individual activity, and tools to support it can benefit from a more complete understanding of why and how it is carried out. Part of our plan is to develop a conceptual framework to guide research, design, and organizational behavior in the area of Collaborative Information Retrieval (CIR). CIR is defined as any activity that collectively resolves an information problem taken by members of a work-team regardless of the nature of the actual retrieval of information. To accomplish this goal, the study will investigate the manifestations of CIR in work settings when it occurs, and teamwork situations in which CIR does not occur. For this investigation, the researchers will use a work-centered conceptual framework that has been used in similar studies of individual information behavior. In this study, the framework will be extended to include collaborative information behavior.
The investigators are from the School of Library and Information Science at the University of Washington, The Boeing Company, Microsoft Research, and the Center for Human-Machine Interaction in Denmark. They bring together expertise in information seeking behavior, computer support for collaborative work, and information retrieval.

The study will progress in three distinct steps. In the first step, the researchers will employ a work-centered framework for the evaluation and design of information systems. Researchers will observe and analyze the information seeking and searching the behavior of the members of four work-teams as it takes place in natural work settings. This analysis will lead to a model of CIR that describes the behavior of the four teams. The second step will validate and generalize the results of the first step through a survey that may also provide additional insight into CIR. Once validated, the researchers will examine what technological innovations and organizational changes might support and enhance CIR during the third step. While essentially sequential, the study may see some iteration particularly when preliminary results are promising.
The results of the study will have both practical and theoretical implications. On the practical side, understanding how information is acquired, shared among team members, and used in work situations will greatly strengthen our ability to (a) address issues that relate to knowledge management in organizations, and (b) develop technologies that support, facilitate, and enhance teamwork. The study will also extend an existing work-centered conceptual framework to include teamwork. This framework will become a new analytical tool that will inform the methods used in other studies about CIR. In addition, this new framework could enrich other conceptual constructs both in information retrieval and in collaborative work.

**Asynchronous Collaboration Around Multimedia.** Multimedia content is a central component of on-demand training and education delivered over the World Wide Web. Supporting asynchronous collaboration around educational multimedia is potentially a significant tool for delivering online educational content effectively. A multimedia annotation system tightly integrated with email provides a powerful platform on which to base such functionality. We have conducted a series of studies of such a system. First, we built a prototype annotation system and refined it based on results of laboratory tests. We then extended the

system to support asynchronous collaboration for on-demand training and studied its effectiveness in two corporate training courses, assessing student experience, instructor experience, and user interface appropriateness. Having identified possibilities for enhancing engagement and collaboration with the tool, we conducted another set of laboratory studies. Through this iterative process we are creating a platform and identifying processes for its use that enable students and instructors to exploit the advantages of asynchronous education while compensating for the reduction in face to face interaction.

**PROPOSED RESEARCH**

My current research topics are directly relevant here. I will not repeat the descriptions of the research in detail, but will describe how their international aspects could be expanded through further research.

The collaborative information retrieval project, which is already a joint U.S.-Danish effort, is focused on the practices of teams. These teams may be collocated, but they may also be distributed. The second site we have studied involves a team in a large aerospace company whose entire effort is devoted to working with a major supplier located a few thousand miles away. Collaborative retrieval and dissemination of information is complicated in distributed settings and will be much more complex when the teams span national or linguistic boundaries (which is not the case in the team just studied).

In fact, the planning of our research effort itself, drawing on a researcher a continent away, demonstrated on a small scale some of the challenges of collaboratively gathering information across cultural boundaries. These kinds of efforts are likely to become more prevalent and more significant.

The work on asynchronous collaboration around audio and video has primarily looked at its application to on-demand education, in university as well as corporate settings. The sources of audio and video around which people collaborate can be located anywhere on the Web, so this technology lends itself to international use. For example, MIT has recently announced plans to put virtually their entire curriculum content on-line, potentially including many videotaped lectures. Once this is in place, tools to allow people to make more effective use of on-line multimedia could be particularly useful. The collaboration systems we have been exploring would allow people to interact in groups of their own devising within or across various countries. However, it is inevitable that the optimal design of tools will differ from country to country, and if the platforms we are building are to be widely useful, we will need to understand requirements originating internationally, something we have not yet addressed.

## VIJAY GURBAXANI, University of California, Irvine

### CURRENT RESEARCH

A growing trend within the scope of B2B e-commerce is the emergence of numerous online Internet based marketplaces that create a community of trading partners, and provide the context and infrastructure for B2B commerce. These marketplaces have emerged in virtually every industry sector. They promise huge efficiencies in the conducting of marketplace transactions. Today, 28% of buyers and 18% of sellers are using Internet based marketplaces; 70% of buyers and sellers expect to be using these marketplaces in 2002.

One of the most prominent examples is Covisint launched by General Motors (GM), Ford Motor Company and DaimlerChrysler. In aerospace and defense, Boeing, Lockheed Martin, BAE and Raytheon and others have announced plans for a B2B exchange. The four lead partners in this venture currently do business with 37,000 suppliers, hundreds of airlines, and many governments, all of which will be invited to participate in the marketplace. In the retail sector, Sears Roebuck and Carrefour (France) are majority shareholders in a partnership with several other retailers to create a retail exchange, GlobalNetXchange. Similarly, eleven other retailers including K-Mart, Target, Albertson's, Safeway and others have partnered to create another such marketplace, Worldwide Retail Exchange. Interestingly, WalMart has said that it will not participate in an exchange, since they believe that their participation will benefit other retailers because of its scale, while it has little to gain given its existing electronic links with its suppliers.

In all of the above examples, the lead partners are large buyers. In many cases, they have partnered with technology firms to create these marketplaces. In other cases, suppliers have also created their own marketplaces. Grainger.com is an online B2B marketplace launched by a large distributor of maintenance, repair and operating (MRO) goods.

There are also examples of independent marketplaces that are managed by organizations that are neither selling nor buying goods and services on the exchange. Healtheon WebMD is one such example; Ventro is another. Some independent marketplaces favor buyers; Freemarket and FOB.com are supportive of the buying process. Others, such as Fairmarket favor sellers by hosting private label auctions for large computer manufacturers.

A key set of issues that arise in the context of online marketplaces relates to the benefits that the buyers and sellers accrue. Specifically, what are the impacts of participating in each category of online marketplace for buyers and sellers? Online marketplaces create value in numerous ways. They may introduce market transparency across industries. Market transparency should lead to more uniform pricing, and perhaps lower prices in the case of some goods and services. So for example, while buyers will get better information regarding pricing, suppliers will be able to plan production more efficiently, and perhaps have access to more customers. Also, as the costs of transacting reduce, how are these gains shared between customers and suppliers? Do these benefits depend on existing power relationships between customers and suppliers in the industry? Of critical importance, how do these benefits vary with the type of ownership of the marketplace? This will help predict the stable structure of marketplaces; those that will survive in the long term.

Another key dimension of marketplaces is the nature of products/services being traded on the exchange. Kaplan and Sawhney (2000) have categorized goods and services into operating inputs and manufacturing inputs. Manufacturing inputs are raw materials and components that go directly into a product or process. Given the specificity of manufacturing inputs to a given industry, these inputs are often traded in a vertical industry exchange. Operating inputs are not parts of finished goods; they include office supplies; spare parts, services etc. By contrast, these goods and services are usually traded in horizontal marketplaces servicing many industry sectors. Operating and manufacturing inputs include capacity; including manufacturing capacity, utilities, labor and others.

The nature of the good being traded and its use by the purchaser often determines whether the good is purchased in a transactional mode or in a relational mode. If the good can be acquired with low transaction costs, it is often acquired via the transactional mode. On the other hand, if the good requires a supplier to make a large transaction-specific investment, the transaction costs are likely to be high, and the good is usually acquired in a relational mode. Relational modes involve long-term agreements with qualified suppliers. In transactional mode, a buyer will purchase a good often focused on the price of the good. Kaplan and Sawhney label the former, systematic sourcing, and the latter, spot sourcing.

A company can therefore participate in numerous marketplaces. It can participate as a buyer in marketplaces for operating inputs and manufacturing inputs, in both relational and transactional modes. Depending on its own production resources, it can participate as a buyer or seller of production capacity. It can, of course, participate as a seller in any marketplace appropriate for the nature of the good that it is producing.

Moreover, as a company participates in these marketplaces, it may change the boundaries of the firm. For example, as a company finds it easier to acquire goods and services in the marketplace, it may choose to reduce its reliance on in-house suppliers for some goods and services.

## THE RESEARCH QUESTIONS

The above discussion highlights some key issues surrounding electronic marketplaces. The main research questions that will be examined in this study are the following:

- What are the different classes of electronic marketplaces that exist today, and that may emerge in the future;
- What is the optimal form of ownership for each class of marketplace; should sellers, buyers or a neutral party own it;
- How many marketplaces are viable in a single vertical market within each class of marketplace;
- What are the benefits of each class of electronic marketplaces for buyers? For sellers;
- What are the implications of electronic marketplaces for industry structure;
- What are the implications of electronic marketplaces for the organization structure of companies within an industry;

- Which marketplaces should a company participate in? What factors determine this choice? Can a company choose not to participate in electronic marketplaces? What determines the timing of entry into each marketplace; and
- How should companies participate in these marketplaces? What strategies should they deploy for buying and selling goods and services in these marketplaces?

**INTERNATIONAL ISSUES:**

Clearly, global companies have global supply chains. For companies to achieve the benefits of B2B exchanges, they must be global in scope. This leads to several interesting issues that must be addressed. These issues are primarily related to the level of use of IT in a variety of countries, technical issues such as communications infrastructure, cultural issues and legal issues. I would like to work with scholars from other countries who share my interests in B2B exchanges, and can bring expertise to bear on these issues.

**RELATED PUBLICATIONS:**

Vijay Gurbaxani and Seungjin Whang, "The Impact of Information Systems on Organizations and Markets," Communications *of the ACM*, January 1991.

Vijay Gurbaxani and Ashok Hegde, "E-Commerce and Healthcare: The Case of WebMD," CRITO working paper, September 2000.

## BRIAN KAHIN, University of Maryland

### CURRENT RESEARCH

**Conference on the economic and social Implications of information technology.** The conference on economic and social implications of IT is designed to give the policy community a useful understanding of the state of digital enterprise and society. As currently planned, the conference focuses on the theme of transformation – how and to what extent have different aspects of human enterprise been transformed: markets, sectors, business models, transactions, relationships, collaborations, etc. Although directed to the policy community, the program does not address policy issues as such. Instead it aims at conveying a background understanding of economic, social, and technological change that may be useful in making policy decisions across a range of issues. This is a new iteration of work that I did in the government chairing an interagency group and mounting a large public conference, "Understanding the Digital Economy" (see www.digitaleconomy.gov, and Erik Brynjolfsson and Brian Kahin, eds., *Understanding the Digital Economy*, Cambridge: MIT Press, 2000). It addresses the larger questions of how to make academic research accessible and useful to the public and how to develop channels of communication between policymakers and researchers.

**Intellectual property systems and policies in the digital environment.** Within the theme of intellectual property in the digital environment, I have been concentrating on software and business method patents. Drawing on past practical experience in the government and as trade association counsel, I have been examining the political economics of the patent system, including the problems of applying empirical research and economic analysis to policy development processes. I am currently looking at the divergence between U.S. and European processes and policies with support from the German Marshall Fund.

### PROPOSED RESEARCH

**Conference on the Economic and Social Implications of Information Technology**. See first item under current research. We would like to consider doing this as an annual event alternating between the U.S. and Europe.

**Information Standards: Practice, Value, and Policy Implications.** This is a conference and book project to assess the state of standards development processes and institutions, examine the value of IT standards as collective assets, evaluate the changing interaction of standards practice and intellectual property law and practice, and analyze the implications for the development of public policy with respect to standards, intellectual property, and competition. It is a follow-on project to Standards Policy for Information Infrastructure (Kahin and Abbate, eds., MIT Press, 1995) that would account for important changes over the past ten years, such as:

- The commercial success of the Internet and the World Wide Web as non-proprietary platforms;
- Broad recognition of the strategic value of standards for winning and maintaining control of markets for digital products and services;
- Development of sophisticated strategies to promote openness of a standard while maintaining proprietary advantage in its future evolution;

- Growth of both standards and patents for "non-technical" processes, including business practices and social protocols;
- The emergence of open source software as an advanced form of standards and standards process that redefines openness;
- Increased conflict between open standards and patents; and
- Expanded interest in measuring and managing intangible assets as a source of future economic value.

**Economics of Codification**. Information technology appears to promote codification of knowledge – by making it instantly and globally accessible, enabling aggregation and searching on a very large scale, and allowing for new ways of tagging and structuring. At the same time, "intellectual capital" is recognized as increasingly important to economic growth and appears amenable to leveraging through codification and the use of information technology.

Codified knowledge tends to get defined against tacit knowledge, but there are in fact many different forms and degrees of codification. Embedding knowledge in computer code is very different from verbal articulation of tacit knowledge. Standards, measurement, metadata, legal controls, etc., encode meaning, significance, and utility that is missing from flat expository text. Quantitative information is more codified than qualitative information in the sense that it can be more readily combined and manipulated. Codified knowledge is context-dependent, contingent on cognitive infrastructure and yet also serving as a framework for acquiring and using knowledge in the future.

While there are new technological dimensions to codification, codification is also a function of models and vocabulary for the particular subject matter. Models may depend on business strategies, laws, institutions, and other factors. Such models may be less concerned with generating new technical knowledge than in fulfilling obligations toward public authorities, customers, partners, or investors. Intellectual property affects decisions to codify information and introduces an overlay of controls, obligations, and liabilities. This overlay is enhanced and complicated by increasingly creative licensing schemes, including the varieties of open source licensing.

I would like to undertake a multidisciplinary exploration of the economics of knowledge that brings these diverse issues together to help address policy issues of investment priorities and market behavior, including intellectual property policies.

## JOHN LESLIE KING, University of Michigan

### CURRENT RESEARCH

My current research builds on the knowledge of management and impacts of information technology application and use, and channels that knowledge into the problems of development of information infrastructure used in complex organizational and institutional settings. This is an important challenge, given that more than half of all such system development efforts fail to achieve their objectives. I call this work "high-level requirements analysis," because it focuses on issues of organizational and institutional usability that are seldom considered by software engineers or system developers, because no good methods for considering them have been developed.

Rather than working on examples in a single application domain, I have chosen to investigate the problems of high-level requirements in a set of highly institutionalized production sectors. A highly institutionalized production sector is affected in dramatic ways by the regulatory and influential efforts of social institutions, both formal (e.g., governmental entities) and informal (e.g., professional associations and scientific societies). The intellectual groundwork for this understanding of institutionalized production is found in my 1994 paper titled "Institutional Factors in Information Technology Innovation" that appeared in a top research journal in the information systems field. Implementation of this research program in a highly institutionalized production involves the development of information infrastructure in support of other service and physical infrastructures. There are currently six infrastructural systems under investigation:

- **Global telephony**. The international telephone system is the largest networked information infrastructure on earth -- much larger and more penetrating than the Internet. It is also highly regulated and very institutionalized. Working with colleagues from the University of Jyvaskyla in Finland, I am studying the evolution two key institutional enablers that explain why the diffusion of cellular telephony occurred much faster in the Nordic countries than it did anywhere else on earth, including in the United States, where the technology was invented. This is largely a study in technical history, involving access to original source documentation related to three crucial institutional factors in design of the technological systems: signaling protocols, spectrum allocation, and addressing. A complementary assessment of source documentation on these issues is underway in the U.S. and Japan, the other primary actors in the spread of global cellular telephony. Preliminary analysis shows that the dominant factors influencing the speed of diffusion of these technologies were each region’s unique institutional regulatory structure that affected the speed with which signaling, spectrum, and addressing standards could be set. Our analysis will demonstrate the role of the establishment of the first wide-use analog standard (NMT-450/900) on the subsequent establishment of the GSM-900/1800 digital standard that now dominates the world. In addition, preliminary analysis suggests that the relatively slow start of cellular telephony in the US was due in large measure to the complexities of regulatory structures and policies at the FCC, in which competition for radio spectrum for cellular telephony put the telephone industry into direct conflict with the broadcasting industry, both of which were (and are) regulated by the FCC. A book on this research will appear in 2002.

- **Electronic Commerce in the United States.** This is part of a global study of electronic commerce activity and enablement headquartered at UCI, and being conducted by country experts from around the world. The United States study team includes myself, Professor Kalle Lyytinen of Case-Western Reserve University, and postdoctoral and graduate student researchers at Michigan and CWRU. The research analyzes primarily secondary data on electronic commerce in the US, focusing on a number of key sectors such as finance and high-technology manufacturing.
- **Logistics and transport**. This research focuses primarily on airfreight movement, because such movement is inherently intermodal (meaning freight must move on multiple modes such as ground and air transport), and is highly regulated by institutions at the global level. Freight transport is also increasingly dependent on information management. Of particular interest in this work is the problem of process coordination across non-integrated production chains (e.g., traditional forwarder carrier models) vs. integrated forwarding (e.g., Federal Express). Primarily Professor Paul Forster, a former doctoral student, at the Hong Kong University of Science and Technology, is doing this work.
- **Electric power generation and distribution**. Electric power is a critical network infrastructure that is highly institutionalized and regulated. It is also undergoing major institutional reform. The research in the electric power area concerns the requirements for systems that facilitate the market-based system of distribution currently being developed and deployed in California. Primarily Robb Klashner, a Ph.D. student at UCI, is doing this research.
- **Criminal courts.** The criminal justice system is a crucial element of service infrastructure. It is also highly institutionalized and regulated. The research in this sector focuses on computerized case management systems in felony courts, and in particular, the Superior Court of Los Angeles County -- the largest criminal court system in the US. Primarily Dr. Margaret Elliott, a former Ph.D. student, now a research scientist at UCI, is doing this work.
- **Health care.** Health care is one of the largest and most important service infrastructure activities in the US. The research in this area focuses on the problem of defining requirements of advanced patient record systems. The research program will establish the parameters for the design of patient record automation that will allow multiple uses of patient records for patient care, administration, and medical research without requiring the constant intervention of people in the records process. This research began at UCI, but is now re-starting at Michigan with cooperation from the School of Nursing.
- **Higher education.** This is the smallest component of the larger research program at this time, and focuses strictly on the institutional factors in the evolution of the California Virtual University's information systems support. Primarily Suzanne Schaefer, a Ph.D. student at UCI, is doing this research.

The key objectives of the work are to identify the ways in which major organizational and institutional constraints on system use arise, and how they can be addressed in design and development.

**ROB KLING, Indiana University**

## CURRENT RESEARCH

**The Scholarly Communication and Information Technology Project.** Systematic communication about methods, theories, findings, and the state of the disciplines is central to modern science. Patterns of communication between scientists have changed substantially, not only since the founding of the first journals and scientific societies in the 17th century, but even in the last few decades. Scientists' Knowledge Networks (KNs) are types of nodes (forums) that include meetings, data archives, and documents, such as journals. The structuring of KNs varies from one field to another: "working paper" collections play a much more important role in high energy physics than in molecular biology; conference proceedings are much more important in computer science than in most of the social sciences. The structure of KNs in a discipline changes over time, with the rise and fall in the importance of particular nodes, such as specific conferences or journals.

This era is marked by significant experimentation in the use of electronic media in creating and restructuring nodes of scientific KNs, with excitement about the expansion of scientific communications that these developments enable. Electronic journals, on-line conferences, and disciplinary corpora of shareable data are examples of new nodes. The nodes are not just technologies; they involve varied, but complex and subtle social practices for filtering and reviewing acceptable communications.

These developments are reshaping the KNs of various fields in ways that we do not effectively comprehend, and the viability of these new and altered forums has varied across the disciplines. Prior studies indicate that scientists' willingness to trust the value of specific nodes as sources of legitimate and reliable knowledge can be pivotal. We know too little about the ways that scientists come to trust and value new forums, to guide effective experimentation. A laissez-faire evolutionary approach risks needless failures in the development of new electronic forums or in the restructuring of existing forums, leading to wasted resources and knowledge losses. On the other hand, the "best practice" approach risks indiscriminate promotion of communications practices that fit only certain fields onto all. This multi-disciplinary study will provide an empirically grounded analytic understanding of why various disciplines structure their KNs as they do.

**Some key questions that this project attempts to grapple with include:**

- How can diverse scholarly communities enhance communication effectively and sustainably using new communications technologies;
- What are the costs and complexities associated with developing and maintaining a forum for scientific communication; and
- What kinds of communications regimes are most sustainable in different scientific communities? Does "one size fit all" or will different scholarly communities adopt different communications forum architectures?

**Publications:**

Kling, Rob and McKim, Geoffrey. 1999. "Scholarly Communication and the Continuum of Electronic Publishing". *Journal of the American Society for Information Science* 50(9): 890-906. http://www.slis.indiana.edu/SCIT/publications.html

Kling, Rob and Geoff McKim. 2000. "Not Just A Matter Of Time: Field Differences And The Shaping Of Electronic Media In Supporting Scientific Communication." *Journal of the American Society for Information Science* (Volume 51, Number 14): 1306-1320. http://www.slis.indiana.edu/SCIT/publications.html

Kling, Rob and McKim, Geoffrey. 2001. "A Bit More To IT: Scientific Multiple Media Communication Forums as Socio-Technical Interaction Networks". Working Paper #01-02 Center for Social Informatics, Indiana University. Bloomington, IN http://www.slis.indiana.edu/csi/wp01-02.html

***In preparation:***

Rob Kling, Joanna Fortuna, Adam King. . Virtual Publishing, Real Stakes: The Transformation of E-Biomed into PubMed Central."

Meyer, Eric and Rob Kling. Technology & Unequal Participation: Access to electronic working paper repositories and scholarly participation in elite scientific communities.

**KENNETH L. KRAEMER, University of California, Irvine**

## CURRENT RESEARCH

### Impacts of Electronic Commerce in the Global Networked Economy: A Multi-Country Study[4]

Collaborators: John King, University of Michigan, Co-principal investigator
Jason Dedrick and Deborah Dunkle, University of California, Irvine
Werner Korte, Empirica, Germany
Experts in each of 10 participating countries

The Internet and electronic commerce are bringing countries together to create a global networked economy. Internet technology is said to have no regard for national borders, but the people and companies that use the technology operate within very different national environments and, therefore, the use and impact of the technology should vary among countries, potentially producing winners and losers. This project examines the global diffusion of Internet-based e-commerce, how national environments and policies influence e-commerce use within countries, and the economic and social impacts of e-commerce. It addresses the following general issues:

- How do global trends such as technology innovation and economic liberalization influence international diffusion of the Internet and e-commerce?
- What national environmental factors and policies influence the diffusion of e-commerce use within individual countries?
- What are the social and economic impacts of e-commerce, and how are they affected by national environments and policies?

The project includes selected country case studies looking at the growth of e-commerce nationally, and also in more detail in three critical industry sectors: high technology, financial services, and retail. These studies serve as a basis for identifying key environmental and policy factors that influence the diffusion and impacts of e-commerce.

In addition, data is being collected on e-commerce globally in 42 countries on e-commerce revenues and on environmental factors, such as income, education, telecommunications infrastructure and others, that might have an impact on e-commerce use. This data is being used to identify trends and to analyze the relationship between environmental factors and use.

International Data Corporation is gathering more detailed data through telephone surveys of 250 firms in each country in the three industry sectors for use in both the country studies and in comparative cross-country analysis. The combination of qualitative and quantitative methodologies facilitates study of new, fast-changing e-commerce innovation in a very fluid market environment.

A team of researchers from around the world is carrying out the project. The effort is led by CRITO, but involves collaboration with experts from Brazil, Denmark, China, France, Germany,

[4] This research is supported by a grant from the U.S. National Science Foundation (CISE/ISS/CSS).

Japan, Mexico, Singapore, Taiwan, and the United States. Within the context of the EC-US Workshop, the project also involves collaboration with the EC's Project Star (ECATT and ECKMU Projects) and Statistical Indicators Benchmarking the Information Society (SIBIS) Project through Werner Korte of Empirica in Germany.

The potential outcomes of the research include: (1) scientific understanding of the relationship between national environments and the use and impacts of e-commerce (2) benchmarks for future studies of national and global trends, (3) business metrics for global e-commerce markets; and (4) insights for policymakers who seek to maximize the benefits of e-commerce.

This project is beginning the second year of a four-year effort. Selected papers from the first year country studies will be published in a special issue of the journal, *The Information Society*.

## PROPOSED RESEARCH

### Globalization of Computer Production: Trends and Implications for Companies and Countries

Collaborators: Jason Dedrick and Deborah Dunkle, University of California, Irvine

Economic globalization is a highly controversial issue in the U.S. and elsewhere. Debates over trade agreements such as the World Trade Organization and NAFTA have pitted free trade advocates in government and industry against organized labor, environmentalists, human rights organizations, and other interests. Most economists are lined up in favor of open markets and globalization, but some skeptics still raise questions about impacts on trade, employment and investment at the national level. There is clearly a pressing need for research that provides both empirical evidence as to the scale and characteristics of globalization, and clearer analysis of its impacts. The purpose of this research is to develop a fact-based picture of globalization and its impacts within the personal computer industry, which is one of the most global of all industries.

Over the past year, the business press has been replete with stories about the death of the PC industry, but both the PC and the industry continue to outlive these epitaphs. Mobile computing is expanding rapidly via wireless-enabled laptop PCs and new form factors such as PDAs and Internet phones. PC servers are increasingly becoming the hubs of corporate networks and the Internet. And in spite of the downturn in technology demand, there will still be 120 million PCs sold worldwide in 2001.

In addition, the PC industry has pioneered new organizational forms and continues to evolve in order to survive. Global production networks have replaced vertically integrated firms as the dominant organizational structure. Virtual organizations, as illustrated by Dell Computer, have shown such flexibility and success that they have forced traditional companies to adopt many of their characteristics. These include greater use of outsourcing of manufacturing and other functions, direct sales, build-to-order production, and extensive use of IT networks for internal and external coordination. The basis of competition in the industry has shifted from manufacturing and new product innovation to sales and distribution strategies and is increasingly moving toward service-oriented strategies.

These shifts are changing the structure of production networks and also the competitive position of national and global PC vendors. It is possible that the current global PC industry will become bifurcated in the future into a few global branded firms serving the Americas, most of Europe, and parts of the Asia-Pacific region, while local brands dominate selected national and regional markets such as Japan, Korea, and Greater China. It is these trends in production networks and the dynamics of competition that warrant continued study to understand the changing meaning of globalization in the PC industry and the implications for national policy, firm strategy and academic research.

This new research consists of two parts. First is analysis of trends in production, trade and employment in the global PC production network. The second is an analysis of changing competitive dynamics in the global PC industry. Each will be looked at in terms of their likely impacts on company strategy, government policy, and academic thought. Also, we will analyze the impacts of changing competitive dynamics on the structure of the global PC production network. The focus will be on trends and impacts that are relevant for the next 2-3 years, based on understanding the current situation and recent developments.

We want to determine the extent of these trends, and the impacts they are having on the global organization of the PC industry. To do so, we will analyze data on production, trade, employment and investment by country for the industry as a whole. We will also develop case studies of leading PC makers to gather more detailed data and to analyze in more depth the forces driving industry trends. The findings will help us to understand the implications that changes in the global organization of the industry might have for companies and for countries.

For further information, contact Kenneth L. Kraemer (kkraemer@uci.edu) or Jason Dedrick (jdedrick@uci.edu), or the web site www.crito.uci.edu.

**ROBERT E. KRAUT, Carnegie Mellon University**

## CURRENT RESEARCH

**Global issues in considering the impact of information technology in the home.** My research examines the way in which individuals use different computing and communication technologies in their personal and family-lives and the impact that these uses have on their social involvement, their connection to community, and their psychological well-being. The primary focus is on the way that these technologies influence the amount and quality of social interaction that their users engage in.

How people use information technologies and the impact they have will depend upon their social and technological contexts. To systematically understand how context influences the use and impact of technology requires variation in the contexts. Thus, I would be interested in collaborating with European scholars who are looking at these issues in contexts different from the US.

Here are some examples of relevant research questions:

1. Do age and gender influence the ways in which people use new technology to support social relationships similarly across cultures? Some prior research suggests cross-national similarities in the way men and women differentially use the telephone. In the US, Great Britain and Australia, women seem to invest more in personal relationships and to develop them though intimate talk, while men tend to build relationships by engaging in common activities. A consequence is that in all three countries women are heavier users of the phone than men and use it more effectively to build social relationships. Do similar trends exist with the newer technologies of electronic mail, text-messaging, and online groups?

2. How does the mix of available technologies influence the take-up of new ones? One can examine cross-elasticities in media use by studying the interplay between Internet communication and cell phone use in the US and the EU countries.

3. Putnam has documented the decline in social capital in the US since the 1950s, and places some of the blame on the influence of TV and privatization of entertainment. Is the Internet continuing this trend or counteracting it? Cross-national studies will help answer this question.

## ROBERTA LAMB, University of Hawaii

### CURRENT RESEARCH

**Using Intranets in Technical and Institutional Environments.** Information infrastructures have historically benefited some individuals and organizations more than others. With the emergence of new information and communication technologies (ICTs), the convergence of older forms, and the federally encouraged expansion of information infrastructures, many worry that the distribution of benefits will become more uneven as some organizations shape these technologies to serve their specific needs. We do not fully understand why some organizations find ICTs useful--even essential--while others do not. Researchers have tried to explain this divergence in terms of the technical potential of ICTs and task-technology fit. However, preliminary findings suggest that external environmental factors and interorganizational relationships strongly drive information investments and the use of ICTs.
This study examines empirically how new ICTs come to be shaped and deployed the way they are. Specifically, it focuses on characterizing the ways in which technical and institutional influences interact to shape the intranet implementations of midwest US firms in four different industries. A unique combination of qualitative methods has been designed to guide the research through three phases of data collection and analysis. The study takes a novel approach that could foster a new way of thinking about ICTs.

**Project Website:** http://lamb.cba.hawaii.edu/research/intranets.htm

**Examining the Roles of ICTs in Collaborative Networking between Academia and Industry.** Many analysts agree that information and communication technologies (ICTs) enable globalization, but disagree about the consequences of these trends. Some project rapid technological developments leading to widespread economic prosperity. Others caution that, as ICT use breaks down barriers of time and distance, globalization will increasingly favor some regions at the expense of others. Interestingly, ICTs often enable collaborative networks that span institutional boundaries, particularly as new socio-technical networks take shape.

To better understand how ICTs contribute to globalization, this study will examine the ways in which ICTs may enable the boundary-spanning collaborative activities of academic and industry scientists. This three year, four step, qualitative research project focuses on the associations of oceanographers, marine biologists and astronomers, and their use of ICTs. The methodology combines survey techniques with semi-structured interviewing, in-depth case study, and network analysis to effectively investigate the boundary spanning roles and capabilities of ICTs within complex socio-technical networks.

The research begins with scientists at the University of Hawaii, and then follows the ties that link them to their collaborators, expanding the study regionally, nationally and globally. This approach will identify the day-to-day dynamics of particular globalizing phenomena, and provide empirical support for better theorizing about globalization processes.

**Project Website:** http://lamb.cba.hawaii.edu/research/stn.htm

## PROPOSED RESEARCH

I am interested in understanding exactly which day-to-day interactions "globalize" particular practices, and how ICTs become embedded and shaped by these practices. I believe that our current study of UH scientists and their collaborators will identify some specific "globalizing" phenomena and a few "soon-to-be-global" practices that are currently taking shape in scientific collaborative networks – particularly in those networks that cross institutional boundaries. We can already see, for example, how commercial communication practices are becoming adopted by academic researchers who seek to collaborate with commercial partners. This (sometimes painfully slow) "organization-by-organization" standardization of communication practices, and the technologies that support them, is, we believe, one such "soon-to-be-global" practice. Just exactly how this is occurring (and at what apparent speed in which particular domains) could be more accurately described and analyzed if a companion study were conducted with European scientists. This study should interest those who wish to understand and perhaps to shape such practices, and to socio-technical researchers more generally.

Although I have been working with international companies, and with scientists who collaborate with others in many different nations, the research data strongly reflects a U.S.-centric perspective. Yet findings from these data have global implications. My most recent study, with Liz Davidson, suggests that the use of new ICTs is accelerated and intensified when collaborations cross-institutional boundaries, such as those between academia and industry, or between industry and government. Would we find something different if the nature of these institutional boundaries changed significantly? Would day-to-day interactions and ICT use change in ways that would affect globalizing phenomena?

If, as we speculate, ICTs play important roles in boundary spanning collaborations, particularly with respect to globalization, then examining the dynamics of EU collaborations could shed light on two aspects that we probably won't see in our US-based study:

1) Changes or variations in the fundamental nature of industry/government/academia institutional boundaries; and
2) Removal of political barriers to trade, travel, and intellectual and economic exchange

The European Union is altering and eliminating barriers between its members to facilitate, among other things, technology transfer, like the use of ICTs. But even without these changes, relationships between industry, government and academia may differ enough between the US and Europe to make an interesting study. The nature of "crossing institutional boundaries" should entail very different influences and possibly very different outcomes with respect to ICT use and related globalizing practices.

## M. LYNNE MARKUS, City University of Hong Kong

### CURRENT RESEARCH

**"The Future of Enterprise Systems" Funded by the Advanced Practices Council of SIM International (The Society for Information Management).** This research was an outgrowth of my earlier research on the implementation, use, and consequences of enterprise systems, such as enterprise resource planning (ERP) systems and data warehousing. The research addressed internal systems integration (e.g., ERP systems, data warehousing, and electronic commerce applications) and external systems integration (e.g., EDI, middleware, EAI, XML, and RosettaNet standards) in relation to business objectives. The research considered experiences with integration technology in several areas:

- Economic payoffs from internal systems integration;
- Benefits from external systems integration (e.g., business-to-business e-commerce);
- Organizational improvement and learning; and
- Strategic issues (competitive advantage and strategic flexibility).

The goal of the research was to suggest action strategies for executives. The project is finished, except for dissemination of findings.

### PROPOSED RESEARCH

**Strategic Issues in External Systems Integration.** The study described above raised my interest in electronic marketplaces, because they have the potential to change industry structure and because they offer a cost-effective "hub-and-spoke" alternative to dyadic system integration approaches such as EDI. For example, in the chemical industry, the marketplaces Elemica, Envera, and Omnexus enable one-to-many ERP-ERP system connections and hosting services provided by some of these companies even offer an alternative to in-house enterprise systems. However, companies may prefer the more expensive one-to-one approaches for several business related concerns (e.g., dedicated supply chains, marketplaces' lack of company-specific functionality and potential disclosure of sensitive information, fear of loss of competitive advantage). Therefore, I am interested in how and why companies make decisions about external systems integration. I would be interested in working on this research with others.

**The Role of IT in Industry Structure Change.** As mentioned above, electronic marketplaces have the potential to change industry structure (e.g., increased or decreased concentration, changes in industry strategic groups, etc.). I am interested in working with others on this topic.

## H. RAGHAV RAO, SUNY Buffalo

### CURRENT RESEARCH

**Building Competitive Advantages through IS Outsourcing: A Resource-Based View Approach. Authors:** Jahyun Goo, Rajiv Kishore, Kichan Nam, H. Raghav Rao, and Yongil Song. **Abstract:** This paper employs the lens of resource-based view (RBV) to investigate how firms create competitive advantages through IS outsourcing arrangements. The RBV framework is used to explore how a firm adds value and reaps benefits from IS outsourcing arrangements. In this revision, we incorporated Partial Least Squares method of the structural equation modeling. The primary finding is that in the process of value creation, the "absorption" of the managerial and technical capabilities of external vendors is critical. When the client firm is able to absorb and integrate the IT capabilities of outsourcing vendors, these absorbed capabilities in turn become the source of IT competence and competitive advantages vis-à-vis the competition.

**IS Outsourcing: A Content Analytic Investigation. Authors:** Jahyun Goo, Rajiv Kishore, and H. Raghav Rao. **Abstract:** This research-in-progress accepted at ICIS'00 addresses the question: What are the key drivers for ITS outsourcing? ITS outsourcing drivers are examined in this research in light of several underlying organizational and economic theories in order to generate a comprehensive and enduring ITS outsourcing drivers taxonomy. A preliminary taxonomy has been developed using qualitative content analysis of 46 articles, which have been triangulated using an internal/external driver's model developed from systems-theoretic notions. The quantitative content analysis technique will be used to analyze outsourcing reports (publicly available in the PR Newswire database published over the last 11 years) to further develop the ITS outsourcing drivers taxonomy, and to study the consequences of alternative operational procedures for content analysis using measurement and structural modeling. It employs measurement models in order to validate 14 categories identified as a qualitative content analysis and then applies factor analysis to the category counts in order to identify themes, referred to clusters of categories with different connotations that taken together to refer to some theme or issues. In addition, it tries to investigate the relationships between the evolution of outsourcing drivers and the advent of the Internet/E-commerce.

**A Study of the Impact of Vendor Capabilities on ASP Outsourcing Success. Authors:** Matt Swinarski, R. Kishore and H.R. Rao. **Abstract:** The growth of outsourcing as an Information Technology Systems (ITS) governance mechanism has dramatically increased during the 1990s and has recently evolved into a new kind of business model known as Application Service Providers (ASPs). A key area, which previous ITS outsourcing literature has failed to directly address, is vendor capabilities. This is surprising considering the literature often cites "access to the capabilities and experience" of the vendor as one of the main reasons why firms outsource (DiRomualdo and Gurbaxani, 1998; Gurbaxani, 1996; Khosrowpour, et al., 1996; Quinn, 1999). And that vendor capabilities are probably the most critical factor associated with successful ITS outsourcing relationships (DiRomualdo and Gurbaxani, 1998; McFarlan and Nolan, 1995). This research begins to address this void by investigating two assumptions about the impact of vendor's inherent capabilities in the ASP domain on delivering quality Information products and services: 1) the technical ability of the vendor's personnel and 2) the degree of formalized organizational processes. In order to do so, this research draws on the Capability Maturity Model (CMM) stream of research to identify key organizational process capabilities influencing system

information and service quality. The Capability Maturity Model (CMM) area is well known in software engineering but has not hitherto been used in ITS outsourcing research.

**Intermediaries in e-commerce Sourcing. Authors:** Manish Agrawal, R. Kishore and H.R. Rao. **Abstract:** Transaction cost economics suggests that services should be outsourced when there are a large number of vendors available to provide a service, since this eliminates possibilities of opportunism. However, clients face search costs when there are a large number of vendors to choose from. This paper develops a simulation tested to analyse the role of intermediaries in reducing search costs for clients.

## PROPOSED RESEARCH

Identifying Successful IS/IT Sourcing Prototypes: An Evolutionary Path Model. IS sourcing deals have evolved from simple outsourcing through co-sourcing to strategic partnership and most recently to virtual corporations that have started to appear in the market. Based on 52 extensive case studies, the current research endeavor identifies 5 preliminary prototypes: cost-center, profit-center, corporate spin-off, modular sourcing, and alliance network types. These types are found to be effective, but very different in many key dimensions of IS sourcing such as breadth, technological requirements, and contract complexity. In this proposal, we first briefly describe the successful prototypes of IS sourcing and then combine the prototypes into a normative framework which can be used to identify sourcing needs and requirements. Then, we move our attention into the evolutionary aspect of IS sourcing prototypes, by adding the time dimension to the framework. A cross-cultural study framework is suggested in order to compare and contrast the sourcing prototypes and evolutionary paths across different sourcing environments.

## CHARLES STEINFIELD, Michigan State University

### CURRENT RESEARCH

My recent research falls into two broad areas:

**Electronic commerce.** In the area of electronic commerce, my recent research has focused on how a firm's physical location and presence in a particular place can be used in combination with online applications to increase the gains from e-commerce. I initiated a project called PLACE (Physical presence and Location Aspects of e-Commerce Environments) while on sabbatical in the Netherlands. The project was supported by the Telematica Institut in the Netherlands, and began with a series of case studies of nineteen firms with both a physical and virtual presence in the Dutch market. It was extended, with continuing support from the Telematica Institut, to the U.S. market with an additional ten case studies. We explored the ways in which a combined channel approach yielded synergistic applications that would not be possible when the two channels operated separately (as with separate subsidiary approaches). We also examined organizational and management strategies that appeared to facilitate cross-channel cooperation and avoid conflicts.

**Computer supported collaborative work.** In the area of computer supported cooperative work, we are just completing a three-year NSF-supported project examining globally distributed engineering design teams. Our research has explored the information distribution and communication challenges faced by such teams. We have focused some attention on the problem of improving team members' awareness of the actions of remote teammates. We designed a prototype Web-based collaborative system that supplied a number of types of awareness information that we could track based upon accesses to a shared file space on a Web server. This included any actions related to team files, posting of any comments, calendar entries, etc. Novel information provided by this system included displaying to all team members who had actually read a particular posting, in order to deal with the problem of lack of awareness of whether a remote colleague has actually seen information that has been placed on a system. Research on the use of this system, as well as other communication technologies such as desktop video conferencing, email, and online chat was done using international teams of engineering students working over a three to four month period on design tasks.

### PROPOSED RESEARCH

I would be interested in cooperative research in a number of areas, including the following three topics that I hope to move into in the coming year or so:

1. The relationship between physical and virtual communities in e-commerce. Our earlier research has illustrated the various ways that firms can leverage physical location when developing online channels. On the other hand there is much discussion about the role of virtual communities (including those comprised of individuals and those comprised of businesses). Is there some advantage to having a physical/geographical basis to communities in e-commerce value chains? (e.g., in B2B marketplaces, customer communities, etc.). What is the influence of different formative logics (individuals/firms in the same

geographical location vs. those sharing a common interest or industry, etc.) on such factors as trust in e-commerce markets, relationship formation, etc?

2. How will the advent of mobile commerce influence e-commerce business models and strategy? In particular, will it now be possible to make services and applications that can respond differently based upon knowledge of the buyers' location and context. Work on context-aware computing, combined with wireless technology, raises many questions about the usefulness and potential applications of context and location-aware online commerce.

3. Related to collaborative work, I am interested in the nexus between CSCW and e-commerce. How can we improve communication and collaboration among firms that are involved in an electronic marketplace? What types of information are needed to enhance firm's abilities to form and gain benefit from alliances? Can collaborative tools be used to improve their likelihood of success?

**ROLF WIGAND, Syracuse University**

## CURRENT RESEARCH

**Overview.** My recent research on electronic commerce focuses on the transformation of firms and markets through electronic commerce. Specifically, I am interested in the evolution of disintermediation (and subsequent reintermediation) in the electronic commerce context and within market hierarchies, i.e., how the middle person within a market hierarchy chain (e.g, manufacturer, wholesaler, retailer, buyer) may be by-passed or his/her roles transformed through electronic information and communication technology (ICT). Several industries are prominently affected by these developments (e.g., real estate, stock brokerages, financial services, insurance agencies, travel agencies). My research explores the emergence of electronic markets and businesses that take advantage of these developments and see opportunities in them. Issues such as communication channel conflict, single-source channel domination, privacy and data protection are central concerns. Moreover, this research may be seen within a framework of novel forms of organization and coordination, including: electronic markets, modularization, virtual organization, peer-to-peer networking, telecooperation, mass customization, personalization and interactivity. Following this line of thinking, four types (domains) of exchange relationships can be identified (Wigand et al., 1997): (1) Information and communication systems in the hierarchical form of task accomplishment (hierarchy); (2) for the market form of coordination (market); (3) for group-oriented task accomplishment (clan); and (4) for interorganizational information processing and electronic data exchange (strategic networks).

**NSF-Funded Research:**
**Towards Friction-Free Work: A Multi-Method Study of the Use of Information Technology in the Real Estate Industry.** This study examines the pervasive use of ICT in the real estate industry and how people and organizations in it work. Real estate professionals are rapidly adopting new ICT. Since agents act as transactional intermediaries, this industry may be affected by the shift to electronic transactions and the potential disintermediation this implies. Since we know that about 3 million homes are advertised on the WWW, might there be a point in time at which buyers and sellers of homes find each other on the WWW while by-passing the real estate agent? Since many industries are shifting towards more information/knowledge-based structures, understanding how ICT use is changing this industry will provide empirical evidence about potential changes to be expected in other industries with the increased use of ICT.

**The study has three objectives:**
1. Describe how the use of ICT changes the ways individual knowledge workers conduct their work;
2. Describe organizational and industrial changes related to the use of ICT; and
3. Describe how changes in individual work relate to changes in organizational and industrial structures and processes.

At the individual level, we focus on changes in work design and social capital. At the organization and industry levels, ideas from transaction cost and coordination theory are applied. This work will provide new scientific insight and practical knowledge in several areas. Examples include the relationship among ICT use, process change and individual structure, as well as that the findings will shed new light on the fast growing field of Electronic Commerce that is rapidly reshaping many transaction-intensive aspects of business worldwide. Lessons

learned and knowledge gained may be applied to other information and ICT-intensive industries and to the increasingly prevalent "organizations of one". This research will provide a deeper scientific understanding of how work and ICT are interrelated and how organizations may view ICT as enablers of business goals and success. In turn, these findings should provide useful insights and know-how shaping the design of ICT.

**Other Research:**

- Another project focuses on electronic supply chain management for Corning, Inc., the optical fiber and glass products manufacturer in Corning, NY. It addresses the development of a global joint electronic supply chain strategy among all 14 firms worldwide comprising the Corning holding company.
- An examination of the nationwide EDI practices of 150 EDI managers within the retail grocery industry for the Uniform Code Council is another recent project. Of particular interest is the extent to which this industry is planning to shift its VAN-based EDI services to the WWW.
- For the Automotive Industry Action Group (AIAG), the not-for-profit trade association of North American vehicle manufacturers and suppliers, I conducted a project on EDI and supply chain optimization. The project contributed to the association's mission to achieve global productivity for the North American automobile industry.

**PROPOSED RESEARCH**

**Here are two areas on which I would like to work with others:**

1. **A theoretical and paradigmatic delineation of (global) electronic commerce.** Much has been written about electronic commerce, but few have provided solid and well-researched theoretical exploration of electronic commerce. Various paradigms have been advanced under which electronic commerce thrives. It seems that such paradigms ought to be derived from theoretical recognitions of behaviors of firms and people within markets and what we know about ICT and their use. Moreover, we might find considerable differences from one country to another and from one culture to another. Little has been researched about these differences, yet recognizing and understanding them seems imperative to comprehending the impact of global electronic commerce. In summary, this research interest would address three areas: (1) theories underlying electronic commerce, (2) models of electronic commerce, and (3) global, national and cultural differences in electronic commerce.

2. **Electronic commerce industry comparisons across nations.** It would be of great interest to analyze electronic commerce in certain industries and examine its social and economic impact. I suspect that considerable differences will be found from one industry to another. Why are there such differences? Why can impacts from, e.g., the steel industry, not necessarily be compared to impacts found in the chemical industry, even though both are manufacturing industries? Moreover, I would be interested in collaborating with colleagues to compare such observations with findings from other nations. My colleagues and I have studied the impact of electronic commerce and ICT on the real estate industry in the U.S. for over three years now. It would be a natural next step to compare our findings with real estate settings in other nations. Lastly, it would be important to understand truly global efforts (vis-á-vis just national) efforts by electronic commerce firms and their social and economic impact.

## European Projects

**IST-2000-26224** **BEEP**

**Best eEurope Practices**

### Project Summary

The BEEP project is concerned with analysing and exploiting socio-economic best practice in four main domains of the eEurope initiative: employment and skills, digital SME, social inclusion and regional cohesion, and in the important cross themes between them. Extant data sources from both Commission-supported and other high quality initiatives will be used, most of which are not widely used and few are interlinked, though there is a great need for understanding and exploiting available knowledge at a European level. BEEP will also update this best practice knowledge in line with on-going developments, especially by closely supporting RTD projects and taking up their results. Data will be analyzed qualitatively and quantitatively to draw out socio-economic best practice and provide benchmarking standards. Results will be widely disseminated in the programme and produce three fully developed services: socio-economic best practice, benchmarking, and linked knowledge (data) bases. These services will comprise a comprehensive set of tools available interactively on a user-friendly web site which organisations and individuals will be able to easily exploit.

### Contact point



| | |
|---|---|
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| Martech International | Martech | Belgium | P |
| Telefonica Investigacion y Desarrollo S.A. | TID | Spain | P |
| Nomisma | Nomisma | Italy | P |
| Empirica Gesellschaft für Kommunikations- und Technologieforschung mbH | Empirica | Germany | P |
| Steppingstones (Europe) Ltd. | SSL | UK | P |

**Start date:** January 2001 **Duration:** 30 months

**IST-2000-28606** **DEESD**

**Digital Europe: e-Business and Sustainable Development**

## Project Summary

DEESD aims to identify the crucial role that e-commerce and e-work can play in creating an information society that is user-friendlier, socially inclusive and environmentally sustainable. The project will build a convincing "business case" for the contribution that can be made by e-commerce and e-work to sustainable development, including a policy framework for "sustainable electronic markets" and make further recommendations to the EC, EU member states, local authorities, businesses and NGOs. The specific objectives of the project are:

- To quantify the potential contribution of e-business to dematerialization, resource productivity and transport efficiency;
- To investigate the relationship between e-business and corporate social responsibility; and
- To assess the impact of e-business on sustainable regional development

The consortium will undertake a state-of-the-art review that will summarise the latest thinking and research about e-business and sustainable development from around the world, and provide an overview of related projects and initiatives. A dedicated public website will be launched as a communication tool for project partners and other stakeholders. A leaflet will also be produced and circulated to key decision makers in business, government and NGOs, as a way of raising awareness and building interest in the project. The primary research phase of the project will include in-depth interviews with senior managers in companies, desk-based research and policy analysis, and an in-depth survey of corporate attitudes, results and policies relating to e-business and sustainable development. Case studies will be a central component of the research. Eight sectors have been selected to explore in detail under each research themes: financial services; music; food retailing; paper and pulp; auto-manufacturing; books; PCs; and second-hand goods. The findings of the research will be disseminated through a summary report, a full report published as a book, and a major European conference.

**Contact point**


| | |
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| Fondazione Eni Enrico Mattei | FEEM | Italy | P |
| Wuppertal Institut für Klima, Umwelt, Energie | WI- | Germany | P |

**Start date:** 1 July 2001 **Duration:** 24 months

**DOMINO**

**Dynamic Organizational Management for Interfirm Network Orchestrations**

## Project Summary

DOMINO addresses the issue of management in dynamic organizational forms. The primary objective of the project is to maximize the current understanding in this field and thus to set the basis of common reference. To this end, the project will pursue the development of an organizational and business taxonomy, presenting the types and characteristics of dynamic organizations, the analysis and explanation of the evolution of strategy, organization (i.e., coordination & governance) and technology across firm boundaries, and eventually the development of an organizational and business roadmap for firms adopting new business models. The success of the project lies, as much on the innovative research character as on the awareness efforts required for maximizing its business and academic impact. Therefore, the project will establish a Knowledge Portal and will pay a lot of attention in the ways project results are disseminated and exploited.

DOMINO aims at the provision of management- and policy-level guidelines for e-Business development in Europe. In this context, two comprehensible frameworks will be produced to facilitate business transformations from single firms to inter-firm constellations. Additionally, a number of complementary issues within management field will be assessed, with emphasis in new skills development, research & development, and innovation diffusion. The frameworks and the results produced by the project will be exploited during the lifespan of the project through several channels, like workshops, seminars, conferences, publications and finally through the use of the Knowledge Portal that will be used as communication and networking tool for stakeholders acting in corporate and academic community. Their main services include, consensus building among business and research stakeholders, information dissemination activities and clustering of relevant initiatives in the European market. This will facilitate the evolution of e-Business, as the participants will be actively involved and aware of the current developments from the early stages. DOMINO's work is anchored on two basic frameworks, the exploratory and the explanatory. These frameworks serve two basic purposes. The first is to develop a consensus and understanding for the issues of dynamic organizational forms and the other is to provide those guidelines and instructions needed for organizations to deal with these issues effectively and efficiently.

## Contact point


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**Project Coordinator**

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| Greece | Athens University of Economics and Business | EXODUS S.A. | Project On Line S.A. |
| Switzerland | University of St. Gallen | | ECR Switzerland |
| Denmark | Copenhagen Business School | DIOS | New World Multimedia Aps |
| Germany | University of Muenster | NAMICS | NAMICS |

**DOMINO URL:** www.ist-domino.net

## Project Overview

A large amount of work within current IST projects is concerned with, or is contributing to the creation of new e-business-based models for work and business. To this end, numerous e-business models have been developed while carrying out these projects. A common theme underlying the aforementioned projects is the existence of approaches experiences on implementing e-business models. At the same time, however, there is a common limitation across most of these IST projects: The emerging knowledge on e-business models development only exists within these projects and despite the dissemination efforts remains fragmented. Some projects are concentrated in their specific market, while others are concentrated in a specific industry sector, type of product, or technology stream. However, as these models represent value which extend beyond this specific context, there is an unprecedented need for a deeper understanding and some specific actionable directions in boosting research and market potential of new models for business and work. In particular there is an opportunity to create synergies amongst project partners.

The E-factors project aims to set up a thematic network dedicated to bringing together industry, users, universities, and research centers with a common objective: To determine factors of broad and sustainable adoption of new business models based on e-Business practices and technologies across Europe. The e-Factors network will actively seek to transfer skills and expertise with a view to generating new state-of-the-art knowledge in the implementation of e-business models and to disseminating this knowledge across Europe.

This aim will be realized through the combined pursuit of the following project objectives:

- To collect, organise and disseminate experiences gained in individual projects on market opportunities, constraints, and dysfunctionalities.
- To account for the needs of organizational, societal, individual and technical change drivers related to e-business adopted by exploiting current IST projects experiences and other research initiatives introducing new e-business models.
- To develop a list of common issues and ideas as to how individual project results (both in terms of findings and in terms of methods of research work adopted) can be combined and further developed to produce complementary results.
- To develop means, these are the organisation of workshops and the exploitation E-commerce education programmes to support the transfer of new e-business models emerging from IST project work across market and industry sectors that deal with implications for organizations, individuals, technical considerations and society.
- To promote and guide further research and development in the area of e-business model adoption through the collaboration of academe and industry.
- To promote awareness and dissemination of approaches to implementation of new – business models.

The network will set up mechanisms to facilitate the exchange of ideas and the pursuit of innovative research avenues in the identification and study of e-factors. It will also create a pan-European forum for carrying out collaborative work and disseminating the results of this work across Europe.

The ultimate scientific and technological outcomes of the project will, amongst others, include:

1. The identification of existing and emerging e-business models, which can be used as 'role models' for businesses to aspire to. Such models might include e-shop, third-party marketplace, information broker, value chain service provider, virtual community or as yet unknown business models.
2. The classification of factors associated with e-business model adoption that will underpin the framework. Such factors will emerge from detailed study of current e-business models as well as organizational culture, technology infrastructure, staff attitudes and motivation, current business model and management aspirations.
3. Selection of Best Business Cases on the implementation of e-business models in a structure manner. Best Business Practice Cases represent current IST projects that have developed e-bushiness models within their defined context of use. This selection will be achieved through the examination of in different contexts and application areas that add value at the organizational, societal, and individual, levels in various e–business practices.
4. An Internet-based infrastructure that will operate both as a collaborative environment to facilitate joint work between network participants and as a repository of project work-in-progress and outcomes accessible by the public.
5. The expansion of the network membership during the project duration and the establishment of self-sustained continued collaboration between the network participants beyond the end of the EC funding period aiming at establishing excellence in e-business in Europe.
6. Contributions to highly publicized events (including a European Conference and a number of regional workshops) to raise awareness and foster the widest possible dissemination of project outcomes.

Ultimately the success of any RDT project is decided by its market success. Market success however requires more than technology. Individual behaviour often is changing (e.g. buying on the Internet), organizations change (e.g. virtual organizations) or the rules of who is paying for what (e.g. for free content on the Internet) change. E-business can be described as the new business logic that operates in a world without boundaries. Sanctioned by Internet technology it is about speed, change, interactivity and connectivity. It must also be emphasized that developing e-business models for conducting e-business is not simply about the adoption of new technologies. It also concerns changes in work practices, changes in customer/supplier relationships, changes in the way products are delivered to consumers, changes in marketing practices changes and changes in staff skills needed to support the e-business. Accordingly, e-business models signify new opportunities for re-organizing the way businesses are currently practiced. However, knowledge about e-business models that is developed in current IST projects is fragmented and often only can operate within the narrow boundaries of their defined context. The consortium of E-Factors brings together partners that have participated in such projects, have experienced the challenges of implementing new business models. It is the goal of this thematic network initiative to achieve horizontal learning from each other.

Although e-business has been widely acknowledged as the new business logic, to the best of our knowledge no other forum for collaborative and coordinated research exist throughout Europe. Because of this lack of business model implementation knowledge so many good technical results fail in the early commercialization phase that "crossing the chasm" has become a

generally accepted label for this challenge. The lack of co-ordinated research underlines the importance of defining a broad methodology to provide a framework of factors, within which themes that are important to E-business model adoption can be identified for application in the (new) specific context. Later in this proposal (see Section Emerging Themes from E-business Model Adoption) these themes emerging from current IST projects as well as new ones emerging from research currently conducted by the consortium will be described in more detail. This broad methodology needs to be defined based upon current experience of users, and the academic expertise within the consortium. Finally, this approach will make it possible to assist in the sustainable adoption of current e-business models.

**Project Participants**

- eLTRUN, AUEB (GR)
- Brunel University (UK)
- CBS (DK)
- ALBA (GR)
- Cologne University (D)
- ERASMUS (NL)
- NHH (NO)
- INSEAD (FR)
- UMIST (UK)
- Univ. of Jyvaskyla (FI)
- INTRACOM (GR)
- FHG-FOKUS
- IBERINCO (ES)
- VEA (NL)
- WIT (IRL)

**EICSTES – IST-1999-20350**

**European Indicators, Cyberspace and the Science-Technology-Economy System**

## Project Summary

The project intends to offer statistics and to derive indicators about the European Science-Technology-Economy System on the Internet. This requires the development of agents to recover data from the net in an automatic way and the application of new models and concepts to uncover relationships between the actors of the New Economy, using advanced tools as graph theory, complexity and chaos theories and social network analysis. To test some of the models proposed, a series of case studies involving different and complementary aspects especially relevant to the European scenario will be analyzed. The indicators will be disseminated in an open user-friendly graphical environment using new web visualization techniques, in order to show the impact of the information technologies in the Society as a whole and on the citizens and their quality of living.

**Contact point**



| | |
|---|---|
| Isidro F. Aguillo, Project Coordination<br>National Documentation Centre (CINDOC-CSIC)<br>Joaquin Costa, 22. Madrid 28002. Spain | Tel: 34-91-563 54 82<br>Fax: 34-91-564 26 44<br>e-mail: isidro@cindoc.csic.es<br>website: http://www.eictes.org<br>http://hyperion.math.upatras.gr/weborg |



**Participants**

| *Participant name* | *Part. short name* | *Country* | *Status** |
|---|---|---|---|
| National Research Council<br>National Documentation Centre (CINDOC) | CSIC | Spain | C |
| Australian Research Centre Seibersdorf. | ARCS | Australia | P |
| National Centre for Scientific Research., Institute of Scientific and Technical Information (INIST) | CNRS | FRANCE | P |
| Computer Technology Institute of Patras | CTI | Greece | P |
| University of Amsterdam | UvA | Netherlands | P |
| University of Surrey, Digital World Research Centre | UNIS | United Kingdom | P |
| Statistics Institute of Catalonia | IDESCAT | Spain | P |

**Start Date:** September 2001 **Duration:** 36 months

**IST-2000-25409** **E-LIVING**

**e-Living: Life in a Digital Europe**

**Project Summary**

This project will create a coordinated set of pan-European longitudinal household panel studies to generate quantitative data on time-use, uptake of ISTs, IST competencies, environmental impact and perceived quality of life. It will conduct analysis of this data to describe, explain and model relationships between the uptake and usage of ISTs and changes in citizen's lives, and to understand how these patterns contribute to changes in lifestyles and/or quality of life. The results will be made available as a resource for future analysis or for use in subsequent projects via a website, in publications, and through a managed programme of workshops to engage key public and commercial policy makers. Finally the consortium will work towards an ongoing pan-European household panel study aimed at measuring and testing the hypothesized benefits of ISTs.

The project will review best practice in longitudinal panel study methods together with best advice on suitable parameters for measuring the information society which match the project's analytic aims; implement a set of data collection instruments and recruiting a stratified sample of European households from a range of member and associated states; collect a first wave of data on the time use, uptake of ISTs, IST competencies, environmental impact and perceived quality of life of individuals within these households and conducting analysis on the cross-sectional patterns of distribution of these parameters across contrasting socio-economic groups and contexts; and then collect a second wave of identical data on the same individuals after 12 months and conducting causal analysis to describe, explain and model trends in these critical parameters and to relate these trends to changes in the uptake and usage of information society technologies.

**Contact point**



| | |
|---|---|
| Dr. B. Anderson<br>BtexaCT - Adastral Park<br>UK - IP5 3RE Ipswich Suffolk<br>United Kingdom | Tel. 44-1473-606465<br>Fax: 44-1473-606759<br><br>E-mail: ben.anderson@bt.com |



**Participants**

| *Participant Name* | *Part. Short Name* | *Country* | *Status** |
|---|---|---|---|
| BTexaCT | BtexaCT | UK | CO |
| Institute for Social and Economic Research | ISER | UK | AC |
| Interdisciplinary Center for Technological Analysis and Forecasting | ICTAF | Israel | AC |
| Legambiente | Legambiente | Italy | AC |
| VirTech Ltd | Virtech | Bulgaria | CO |
| 14.6 Centre d'Etudes de Populations, de Pauvreté et de Politique socio-économiques / International Networks for Studies in Technology, Environment, Alternatives, Development | CEPS/INSTEAD | Lux | AC |
| IDEC Ltd, | IDEC | Greece | CO |
| Deutches Institut für Wirtschaftsforschung | DIW | Germany | AC |
| Telenor | Telenor | Norway | CO |

**Start Date:** 1st January 2001 **Duration:** 36 months

**IST-1999-13420** **EMERGENCE**

## Estimation and Mapping of Employment Relocation in a Global Economy in the New Communications Environment

### Project Summary

The EMERGENCE project aims to provide reliable information both qualitative and quantitative, on delocalised telemediated work. An interdisciplinary team (plus associates in North America and Australasia) will carry out a statistical overview, develop analytical models, conduct an international survey and carry out comparative case studies to map, quantify and forecast the new international division of labour in information processing. It will make recommendations to official statistical bodies. It willdisseminate information interactively, for use as a resource for research, benchmarking against global comparators, regional development, employment creation, equal opportunities and other policies.

The work includes a critical overview of the changing division of labour; an international survey of about 8,000 employers in 15 EU countries and 3 EU applicant countries, (with a further approx. 2,000 in North America and Australasian); development of research instruments for comparative analysis of case studies in an international context; 60 case studies of relocated telemediated employment, both in "source" areas and "destination" ones; analysis of results, including their implications for social exclusion and marginalisation, for gender equality, for supply and demand for skills and for regional development; development of analytical models; development of economic development toolkit for use at a regional level; development of an interrogable database and web-site for dissemination of results to researchers, social partners and policy makers, and a variety of other dissemination activities including seminars, workshops and presentations.

### Contact point



| | |
|---|---|
| Ms. Ursula Huws<br>Institute for Employment Studies<br>Mantel Building, University of Sussex<br>BN1 9RF- Brighton - United Kingdom | Tel.: (44) 1273 686751<br>Fax: (44) 1273 690430<br><br>E-mail: analytica@dial.pipex.com |



### Participants

| *Participant name* | *Part. short name* | *Country* | *Status** |
|---|---|---|---|
| Institute for Employment Studies | IES | UK | C |
| Danish Technology Institute | DTI | DK | P |
| Forschungs- und Beratungsstelle Arbeitswelt | FORBA | AT | P |
| Hoger Instituut voor de Arbeid | HIVA | BE | P |
| Institute of Sociology, Hungarian Academy of Science | ISB | HU | P |
| Instituto di Ricerche Economiche e Sociali | IRES | IT | P |
| Institute of Management and Information Technology | IMIT | SW | P |
| NOP Business Research | NOP | UK | P |
| Edith Cowan University | ECU | AUS | P |
| Simon Fraser University | SFU | CAN | P |

**Start date:** January 2000 **Duration:** 36 months

**IST-99-20847** **STING**

**Evaluation of Scientific and Technological Innovation and Progress in Europe, through Patents**

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## Project Summary

Now that the New Economy is under rapid development, measurement and assessment of technological innovation is a very specific subject, that is extremely important for many actors. In order to face the new situation it has now become urgent to analyze the related available information in a more suitable way. The new approach should have a transnational dimension. The experts need to have access to high-quality data on an international level. Furthermore, the production and measurement of new indicators that will provide a clear view of the S&T progress and the new economy is of high importance. The main objectives of the project are:

- Development of enhanced methodologies for the analysis and processing of patents data.
- Development of a reliable, accurate way to measure technological innovation and to produce indicators on a regular basis.
- Improvement of the produced indicators' quality and timeliness.
- Exploitation of latest developments in IT in order to gain fast access to databases.

## Contact point

| **Scientific Coordinator** | **Project Manager** |
|---|---|
| Prof. Athanasios Tsakalidis<br>Computer Technology Institute,<br>61 Riga Feraiou Str., 262 21 Patras,<br>Greece<br>Tel.: (+30610) 997 894,<br>Fax: (+30610) 960 322,<br>e-mail: tsak@cti.gr,<br>URL: http://www.ru5.cti.gr | Dr. Spiros Sirmakessis<br>Computer Technology Institute,<br>61 Riga Feraiou Str., 262 21 Patras,<br>Greece<br>Tel.: (+30610) 997 807,<br>Fax: (+30610) 960 322,<br>e-mail: syrma@cti.gr<br>URL: http://www.ru5.cti.gr |

## Participants

| *Participant Name* | *Part. Short Name* | *Country* | *Status** |
|---|---|---|---|
| Computer Technology Institute | CTI | EL | C |
| QUANTOS SARL | QUANTOS | FR | P |
| Ecole Polytechnique Federale di Lausame | EPFL | CH | P |
| National Statistical Service of Greece | NSSG | EL | P |
| Industrial Property Organisation | OBI | EL | P |
| Istituto Nazionale di Statistica | ISTAT | IT | P |

**Start Date:** November 1, 2000 **Duration:** 24 months

STING Web Server http://sting.cti.gr

**IST-1999-14115** **FAMILIES**

**Families, Work and IST: A Study of the Interactions Between Family Trends and New Work Methods in the Information Society**

## Project Summary

Families are central to the adoption of new ICT-based work methods and, conversely, the new work methods can impact on families for better or worse. The FAMILIES study will provide the first comprehensive and focused investigation of this area. It will analyse the key interactions between families and the new ICT-based work methods, empirically investigate these interactions as they arise for real families, define the policy and RTD implications, and disseminate the results inside and outside the programme. The results will help the RTD programme and projects to address the requirements for "family-friendly" systems and services, and contribute to the achievement of EC policy objectives in employment, equal opportunities, information society and other fields.

## Contact point



| | |
|---|---|
| Mr. Kevin Cullen<br>Work Research Centre Ltd.<br>Greenlea Drive 1<br>IRL-6W Dublin<br>Ireland | Tel. (353-1) 492 70 42<br>Fax (353-1) 492 70 46<br><br><br>E-mail: k.cullen@wrc-research.ie |



## Participants

| *Participant name* | *Part. Short name* | *Country* | *Status** |
|---|---|---|---|
| Work Research Centre Ltd. | WRC | Ireland | C |
| Empirica Gesellschaft für Kommunikations-und Technologieforschung mbH | Empirica | Germany | P |
| Danish Technological Institute | DTI | Denmark | P |
| Databank Consulting | DBC | Italy | P |

**Start date:** September 2000 **Duration:** 18 months

**IST-2000-31070** **INDIC@TOR**

## Project Summary

In an ever changing, global, technologically demanding business environment, sourcing and retaining talent becomes the competitive battleground. One way to adapt the activities of firms to the exigencies of the fast changing demands in their environment is to increase the employability of personnel. This involves (both at the level of the individual as well as the organisation) the enhancement of job-related expertise and professional growth. In this project, seven European countries will provide psychometrically sound survey and interview data on ICT-professionals working in SMEs in the ICT sector. Recommendations and a selection of the practical results to enhance employability will be communicated to SMEs, IST projects, policy makers and other related stakeholders. Moreover, best employability practices will be identified and disseminated widely across Europe.

## Contact point



| | |
|---|---|
| Dr. Beatrice I.J.M. van der Heijden<br>Associate Professor<br>University of Twente<br>Faculty of Technology and Management<br>Department Human Resource Management<br>P.O. Box 217<br>7500 AE Enschede<br>The Netherlands | Tel.: +31 53 4894227<br>Fax: +31 53 4892159<br><br><br><br>E-mail: B.I.J.M.vanderHeijden@sms.utwente.nl<br>URL: in preparation |



## Participants

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|---|---|---|---|
| University of Twente | UT.FTM | NL | C |
| University of Strathclyde | Ustrat | UK | P |
| Universitaet Karlsruhe | UNIKARL | D | P |
| RF-Rogaland Research | RF-Rogaland Research | NO | P |
| The Athens Laboratory of Business Administration | ALBA | EL | P |
| Centro Formazione Professionale Cividale S.C.A.R.L. | CFP Dividale | I | P |
| Gdansk Managers Training Foundation | GMTF | PL | P |
| Eidos Sistemi di Formazione S.r.l. | EIDOS | I | P |
| Twice it Training | TWICE | NL | P |
| Trefz und Partner Gesellschaft für Computer-Schulung mbH | Trefzund Partners | D | P |
| Ajourit | Ajourit | NO | P |
| Con7 Human Resource Instruments | CON7 | NL | P |
| Innova S.p.A | INNOVA | I | P |

**Start date:** Subject to contract **Duration:** 36 months

**IST-2000-28333** **KISEIS**

**Title of the project: Key Interventions for Sustainable Employment in the Information Society for Disadvantaged Groups**

**Project Summary**
The study will analyse solutions for the socio-economic dimensions of the transition to sustainable employment in the information society for disadvantaged groups. The research will develop a framework of interventions, building on lessons from the EU EMPLOYMENT Initiative projects with sustainable IS employment and mainstreaming outcomes. The research will study indicators of success in interventions in four EU countries. Research will include interviews with former EMPLOYMENT participants currently in sustainable employment, and with employers, and case studies of mainstreaming initiatives. The project will develop guidelines and models of best practice for interventions addressing socio-economic aspects of sustainable IS employment. It will also identify and analyse ways to strengthen future EU policy and IST Programme research on an inclusive information society.

**Contact point**


| | |
|---|---|
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**Participants**

| ***Participant name*** | ***Part. short name*** | ***Country*** | ***Status**** |
|---|---|---|---|
| Models Research Ltd. | MRL | IRL | CO |
| WRC Social and Economic Consultants Ltd. | WRC | IRL | Sub |
| | | | |
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**Start date:** July 2001 **Duration:** 20 months

**IST-2000-33356** **LAW**

## Labour Market Changes and Welfare Perspectives in Europe

### Project Summary

Labour market trends and welfare systems are currently among the most important issues debated in the European Union due to the deep social and economic changes that are taking place. So far, these subjects have been analysed separately, generally neglecting the mutual connections. This project aims at filling in this gap and scrutinising the effects of the emerging atypical working profiles (self-employment, temporary work, tele-work) on the welfare systems in several EU countries. The data gathered from heterogeneous sources, and structured by means of standardised indicators, will be collected in a central database for a comparative prospect of the current situation and a projection of the expected trends. The final results will be presented at an International Conference to be organised at this purpose.

The project outcome will be addressed to the institutions involved in the preparation and actuation of policies supporting employment and social protection, both at national and European level.

### Contact point



| | |
|---|---|
| Prof. Marco Zanotelli<br>INPS - Information Technology Area<br>Via Gonzaga, 6<br>20123 Milano<br>Italy | Tel.: (+39-02) 8893201<br>Fax: (+39-02) 8893200<br><br><br>E-mail: marco.zanotelli@inps.it |



### Participants

| *Participant name* | *Part. short name* | *Country* | *Status** |
|---|---|---|---|
| Istituto Nazionale della Previdenza Sociale | INPS | Italy | C |
| Centro Internazionale di Studi Sociali | CISS | Italy | P |
| Sozialforschung und Gesellschaftspolitik GmbH | ISG | Germany | P |
| Institut de Recherches Economiques et Sociales | IRES | France | P |
| Zaklad Ubezpieczen Spolecznych | ZUS | Poland | P |

**Start date:** Subject to contract **Duration:** 24 months

**MODEL**

**Multimedia for Open and Dynamic Executives Learning**

## Project Summary

Knowledge economy highlights knowledge as the only resource of strategic value, warranting sustainable and long-term competitive advantage. Several organizations consider seriously the benefits of knowledge management. Despite the ambiguities surrounding Knowledge Management more and more organizations have started to realize its strategic potential for coping with the turbulence of the new corporate environment. It has become widely recognized that the intangible assets of an organization will be key to both its ability to create competitive advantage, and to grow at an accelerated pace. Thus, more and more organizations are showing increased attention to the creation of value through leveraging knowledge.

The capacity to acquire and generate knowledge in all its forms has come lately to the foreground of corporate and strategic management as a critical aspect of the organizational development process. The fast growing business environment requires changing both the knowledge base within a firm and the way the firm uses its existing knowledge to compete more effectively. Recently, a fundamental change can be observed in the modalities of knowledge production in organizations, which is likely to lead to a reorientation of a wide range of business practices as well as organizational arrangements. In this respect, major transformations are occurring across organizations that play a key role in enabling people to develop new capabilities.

The European Community funded IST project M.O.D.E.L (Multimedia for Open and Dynamic Executives Learning) comprises an innovative approach to Knowledge Management and Learning field. The rationale of MODEL project is to develop a knowledge management system, which enhances the organizational ability to capture, structure and transfer knowledge as it is derived from corporate business processes across the organization's members.

The aim of MODEL project is to create a learning platform that utilizes business process knowledge to provide continuous learning to employees. Business processes comprise the anchoring point for the knowledge and learning services supported by the system. At the core of the MODEL system, lies its potential ability to capture and transfer both explicit and tacit knowledge. MODEL employs a number of mechanisms to capture the tacit knowledge that resides within the heads of individuals. It has incorporated the concept of Case Studies as the knowledge and learning medium for packaging the business process knowledge and the corresponding learning services applied on that knowledge. Moreover, Case Studies are used to teach the employees how daily work is being performed.

In summary, the MODEL tool-set serves a dual purpose. It is both a **Knowledge Management** and a **Learning** system. At the core of the KM system lies its ability to manage information and thus, by providing context to it, knowledge, both tacit and explicit. Much of the content as the context are organized around the notion of **Business processes**. The learning system deals with organizing views of the content and its delivery to the users. The system addresses the issue of action learning by delivering learning on everyday work processes. Employees are provided with a learning system, they get trained, can consult for problem solving, improve their work performance and eventually contribute to the strategic goals of their company. Along with the

system, there is a methodology that supports its introduction, adoption, usage, and value-added contribution to the organization. The methodology deals with issues that cannot be addressed by the system, due to the existence of the human factor and the cognitive constraints observed in its behavior.

The aim of this initiative is not to produce just another Knowledge Management Tool but also to focus on the development of an appropriate methodology, which is supported by an optimal adjusted tool-set. This methodology will carefully describe all procedures and activities for the knowledge preparation and dissemination within the application context and will consider all factors which have impact on the successful deployment of the methodology and tool-set. The KM and learning methodology to be implemented in this proposition will use new approaches on user interaction, the tracing of organizational practices across processes, activities, norms and standards, and the provision of learning material. Special roles and skills and perhaps special technologies are needed for facilitating these procedures. MODEL suggests a shift from the informational retrieval approach of learning efforts in business organizations, to the development of methodological capabilities that enables individuals and organizations to put their knowledge into practice.

The scope of MODEL methodology is to comprise a "holistic" approach that addresses issues of:

1. Capture and diffusion of knowledge anchored on organizational work practices, manifested through "Business Processes", taking into account organizational realities affecting the motivation of knowledge providers, knowledge flows, tool-set usability, etc.; and
2. Professional development, the learning aspect of the methodology that is a systematic activity focusing specifically on the personal development of the practitioners that are involved in the Business Process.

The MODEL products and services comprise:

**(i)** the MODEL "Tool-set" (s/w system),
**(ii)** the MODEL Consulting Services (the "Core Package"), and
**(iii)** the MODEL advanced Consulting Services ("Integrated Solutions"), all based on MODEL's innovative knowledge-sharing platform, which:

- Captures tacit knowledge based on practitioners' daily work experience;
- Structures individual and organizational knowledge in the form of case studies; and
- Enhances communication and collaboration, enabling "communities of practice".

The competitive advantages of the MODEL product and services can be summarized in the following:

- MODEL Tool-set extends the functionality of a good document management system;
- MODEL's experience and understanding of the both the KM and the learning/e-learning market; contacts and associations with client companies and organizations, interest groups and professional and institutional networks; and competence in European project co-ordination and network management provides the foundation for the MODEL to succeed;
- MODEL's employed review and evaluation methodologies, which are state-of-the-art, updated and elaborated, and which underlie the offered services;

- MODEL partners are transferring a long-standing experience and competencies in analyzing organizational processes and needs, making the MODEL capable of achieving maximum policy and organizational impact, employee population penetration and uptake of ICT and KM use in the enterprise environment, thus achieving maximum financial gain; and
- MODEL's methodology, product, and services have been successfully tested in 6 European test-bed organizations, providing best practice and "successful stories" for the efficient promotion of the product and services.

**Contact point**

| | |
|---|---|
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**Participants**

**GREECE**

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- Athens Laboratory of Business Administration - www.alba.gr
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**UK**

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**GERMANY**

- University of Cologne - www.uni-koeln.de
- University of Erlangen – FIM - http://www.fim.uni-erlangen.de
- City of Cologne - http://www.stadt-koeln.de/
- RWE Energy AG - http://www.rwe-energy-trading.de

**ITALY**

- SCIENTER - www.scienter.org
- Oracle Italia - www.oracle.it
- Banca Intesa Spa - http://www.bancaintesa.it

**BELGIUM**

- College of Europe - www.coleurop.be

**MODEL URL:** www.model2learn.org

**NewKInd – [1999-20782]**

**New Indicators for the Knowledge Based Economy**

## Project Summary

This proposal takes up the challenge of developing indicators for assessing the significance of changes in the knowledge-base underlying economic, industrial and firm performance. This project will develop new knowledge-related indicators of economic activity to assess: The accumulation of intangible capital across European economies; the emergence of the new "information infrastructure" of electronic commerce; and the changing structure of the knowledge-base of firms. These measures will be compared to indicators of country and firm-level performance to assess the extent to which knowledge-related measures can be translated into effective differences in performance in national economies, in specific industries, or among specific firms. The results will be disseminated to the policymaking community, who will be primarily interested in what the indicators suggest about the sources of performance; and to the statistical community who will be primarily interested in the methodological issues underlying the derivation of the specific indicators of this study.

## Contact point



| | |
|---|---|
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## Participants

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| MERIT, University of Maastricht | MERIT | The Netherlands | CR |
| OST | OST | France | CR |

**Start date:** July 2001 **Duration:** 18 months

**IST-2000-29568** **NEWTIME**

**New E-work Techniques in Micro-enterprises**

## Project Summary

NEWTIME's aim is to determine the success factors and typical problems for migration of micro-business IST networks from first generation low bandwidth, telework-enabled, networks towards networks with broadband IST at their core. Objectives include: identifying the tools and techniques most valuable in new generation networks; identifying the individual technical and social skills as well as organisational needs emerging from first encounters between micro-businesses and high bandwidth access (ISDN, ADSL, SDSL, UMTS); and reviewing the place of facilitation/mentoring; and linking to economic development and SME facilitation activities. Development guidelines and case studies exemplifying best practice synthesised from NEWTIME results will be widely disseminated in the IST and product design communities, business schools, SME advisors/trainers, and to early adopting micro-businesses.

## Contact point



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|---|---|
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## Participants

| *Participant name* | *Part. short name* | *Country* | *Status** |
|---|---|---|---|
| Open University Business School | OUBS | UK | CO |
| Addico Cornix Ltd | Cornix | UK | CR |
| Alfamicro Sistemas de Computerdores LDA | Alfamicro | P | CR |
| Centro per la Ricerca Elettronica in Sicilia | CRES | I | CR |
| Danish Technology Institute | DTI | DK | CR |
| Asociacion Foro Europeo de Telematica y Teletrabajo - European Telework/ Telematics Forum | ECTF | E | CR |
| Edu Euro i Skelleftea Aktiebolag | Edu Euro AB | S | CR |

**Start Date:** September 1, 2001 **Duration:** 24 months

**IST-1999-14122** **STAR**

**Socio-Economic Trends Assessment for the Digital Revolution**

## Project Summary

The main goal of the STAR project is to examine the **socio-economic impacts** of new technologies and services on the nature of work and business enterprise in the next decade, with a specific focus on the identification of new opportunities for economic and employment growth and their drivers and barriers. The project will:

- Analyse emerging patterns in the development of the **digital economy** in Europe and the application of the new technologies to advanced ("second-generation") services;
- Assess their contribution to the competitiveness of European industry and service providers;
- Study the conditions leading to sustainable social and economic growth patterns.

The project published 19 Issue Reports in July 2001, on issues ranging from E-commerce evolution, to the growth of the Virtual Labour Market, to the evolution of the Mobile 3rd Generation market, to Macroeconomic scenarios of employment growth in the digital economy. They are available for downloading on the project's web site. Every year the project will publish a new series of Issue reports and an Annual Report planned for early fall, summarising key results. STAR reports will be distributed to the project main target of policy makers, industry managers and research experts, who are interested in understanding the overall impacts and implications at the macro level of main social, economic and technical trends.

## Contact point


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|---|---|
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## Participants

| *Participant names* | *Part. short names* | *Country* | *Status** |
|---|---|---|---|
| Databank Consulting | DBC | I | C |
| SPRU - Science Policy Research Centre of the University of Sussex in cooperation with Prof. Robin Mansell of Media-London School of economics | USUSS | UK | P |
| Department of Economics, Management and Social Sciences of the Ecole Nationale Supérieure des Télécommunications Paris | GET - ENST | F | P |
| Empirica Gesellschaft für Kommunikations- und Technologieforschung GmbH | Empirica | D | P |
| LIEE Laboratory of industrial and energy economics of the National Technical University of Athens | NTUA | GR | P |

**Start date:** September 1, 2000 **Duration:** 36 months

**Research Issues for Cooperation**
*By Gabriella Cattaneo, Databank Consulting, STAR project manager, FAMILIES project partner*

**Original research has been or will be carried out in the following issues and the authors would be interested to compare methodologies and results with similar efforts in the US.**

**e-business-related changes in value and supply chains**. Companies' interrelationships in value chains and supply chains are moving online as e-business and e-commerce adoption spreads. Which are the main differences between these evolutions in the EU and the US? **STAR project** will carry out in 2001-early 2002 a research on a sample of 100 European large companies to analyse the main emerging business models.

**Mobile markets towards a wireless multinetwork environment.** Which are the main different trends of evolution of mobile services between the EU and the US? Will the US IT-oriented model of wireless communication (building on WLAN technology) attract demand faster than the new generation telecom-oriented GPRS on GSM and UMTS services? How will interoperability across different wireless environments affect demand dynamics? **STAR project** has carried out some research in this field and would be interested to carry it further.

The **FAMILIES project** carried out an in-depth study of 100 families in four countries (Denmark, Germany, Ireland and Italy) to study the **implications of new methods of IST-based work (eWork) for work-family balance** in Europe. The approach is a heuristic one to identify relevant issues and provide guidance for policy considerations. Impacts identified include time and space control, labour market and career issues, pros and cons of working from home, gender equality, the balance between working and caring for children or other dependent individuals in the family. Again, it would be interesting to see similar research carried out in the US and compare results.

**IST-2000-26276** **SIBIS**

**Statistical Indicators for Benchmarking the Information Society**

## Project Summary

SIBIS is a methodology and statistical indicator development project for the definition and Piloting of indicators to be used for measuring and benchmarking of relevant domains and issues of the Information Society (IS). These will be developed for benchmarking progress on the development of e-Europe, and will be based on real life, be rich in information, and can be easily used for informing policy and practice. SIBIS will document the current state of European society, with regard to a range of relevant IS variables, pilot a number of new indicators which take account of the rapidly changing nature of e-Europe, provide continuous data on these using results from a large number of surveys of the population and establishments/enterprises carried out in the project on an annual/biannual basis, thereby enabling inferences to be drawn about the rate of change of these indicators, and strongly contribute to the development of policy in the area.

## Contact point



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## Participants

| *Participant Name* | *Part. Short Name* | *Country* | *Status** |
|---|---|---|---|
| Empirica Gesellschaft für Kommunikations- und Technologieforschung mbH | EMPIRICA | DE | |
| Work Research Centre Ltd. | WRC | IE | |
| Danish Technological Institute | DTI | DK | |
| Technopolis Limited | TECHNOPOLIS | UK | |
| Databank Consulting | DBC | IT | |
| Stichting Rand Europe | RAND EUROPE | NL | |
| Fachhochschule Solothurn Nordwestschweiz | FHSO | CH | |

**Start Date:** January 1, 2001 **Duration:** 30 months

**IST-2000-26329** **SIGIS**

**Strategies of Inclusion: Gender and the Information Society**

## Project Summary

The project addresses the concern that women tend to be excluded from design as well as use of information and communication technologies. To rectify this, public and private actors are implementing strategies of inclusion. Also, the transformation of computers into multimedia and communication technology seems to support this inclusion. We aim to analyse the variety of inclusion strategies and efforts to clarify their assumptions and dimensions, and to assess their potential and efficiency. In the analysis, we will draw on recent theoretical developments in the field of gender and ICT studies, with particular emphasis on the concept of co-construction of gender and ICT. Methodologically, the work will be organised as a series of case studies that will be based mainly on a combination of documentary analysis and in-depth interviews. The case studies will cover governmental and public efforts, commercial and other private efforts, design of software and female user experiences.

## Contact point



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|---|---|
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## Participants

| *Participant name* | *Part. short name* | *Country* | *Status** |
|---|---|---|---|
| The University of Edinburgh | UEDIN | UK | CO |
| Norwegian University of Science and Technology | NTNU | N | P |
| Dublin City University | DCU | IRL | P |
| Studio Metis | METIS | I | P |
| University of Twente | U. TWENTE | NL | P |

**Start date:** August, 2001 **Duration:** 30 months