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ICIS 2011 Panel Report: Are We on the Wrong Track and Do MIS Curricula Need to Be Reengineered?

David Gefen
Management Department, Drexel University, gefend@drexel.edu

Arik Ragowsky
Wayne State University

Ephraim R. McLean
Georgia State University

M. Lynne Markus
Bentley University and a Research Affiliate at MIT Sloan's Center for Information Systems Research

Suzanne Rivard
HEC Montréal

See next page for additional authors

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Authors

David Gefen, Arik Ragowsky, Ephraim R. McLean, M. Lynne Markus, Suzanne Rivard, and Matti Rossi

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David Gefen
Management Department, Drexel University
gefend@drexel.edu

Arik Ragowsky
Wayne State University

Ephraim R. McLean
Georgia State University

M. Lynne Markus
Bentley University and a Research Affiliate at MIT Sloan's Center for Information Systems Research

Suzanne Rivard
HEC Montréal

Matti Rossi
Aalto University School of Economics

Abstract:

The discipline of MIS has been going through extensive soul searching in recent years. Part of that soul searching deals with the question of whether we are teaching our students the right material considering the emerging apparent rift, caused in part by new technologies, between what the industry needs and what we teach. This article summarizes a panel on this topic held at the 32nd meeting of the International Conference on Information Systems (ICIS) in Shanghai 2011. The objective of the panel was to contrast what industry tells us they need and we do not give them, as presented by Gefen and Ragowsky based on several years of CIO roundtables and interviews, with a "balanced head" perspective presented by some of the most respected leaders in our field. The panel attracted an audience of approximately 160 attendees who took an active role in the discussion. Rather surprisingly, disagreements among the panelists were not as pronounced as might have been expected, and the audience mostly supported the antagonist position. We present this summary to our colleagues in MIS in the hope of eliciting a continued discussion on this crucial issue.

Keywords: MIS curriculum

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I. PROLOG

A basic tenet of reengineering, and indeed a good managerial practice in general, is to review current processes and objectives on an ongoing basis to verify that these still meet what the clientele wants rather than just serving the old ways in which business used to be done. The ICIS 2011 panel, as summarized and extended in this article, dealt with this precise question in the context of MIS curricula. Specifically, the question the panel dealt with was whether there is a need to drastically rethink what MIS professors are teaching in view of the apparent disconnect between what MIS as an academic discipline teaches and what the clientele of this practical discipline tell us they need, considering the change in the technologies they manage. These technology changes are many and revolutionary, such as cloud computing, the drastic increase in outsourcing, SCADA (supervisory control and data acquisition), and smartphones. These new technologies present new business and information systems opportunities. To clarify, this clientele are senior MIS managers, i.e., those who either employ our graduates or who outsource to other companies that employ our graduates.

This clientele view was brought by Gefen and Ragowsky who have been having roundtable discussions and private meetings with over sixty CIOs of various industries in the Detroit region between 2008 and 2011. Some of these insights have already been presented to the AIS community [Gefen et al., 2011]. The panel was set as a discussion between the antagonists, represented by Gefen and Ragowsky, who explicitly and deliberately set up a straw-man argument taking the position of these CIOs to the extreme, and the rest of the panel who presented a more balanced perspective as protagonists. Apparently, many in the audience and the protagonists themselves agreed with the antagonists and even suggested the antagonists had not gone far enough. In this article we present the antagonist and protagonist views in the hope of presenting the MIS community a balanced request to rethink, or even reengineer, the MIS curricula to match the curricula to the current needs of at least some of the potential employers of our students. In particular, the panel highlighted the need to address the growing outsourcing and cloud trends with more courses on outsourcing and contracting as well as bringing up to date courses on IS management, project management, and IS implementation training.

II. THE ANTAGONIST POSITION

In a nutshell, there is a need to reengineer the MIS discipline because of the apparent disconnect between what academia teaches and what industry tells us is needed, at least based on CIO roundtables and discussions between 2008 and 2011. Some of the next arguments were deliberately presented as a straw-man argument to get the conversation started and the audience's input.

Reality testifies to the need to drastically rethink MIS curricula. This is evident in both the continuing drop in the position of MIS in academia and in the increasing trend in industry to reframe the position of the CIO from that of a VP to that of a subordinate of the CFO and no more than another COO-type manager who just happens to be in charge of information systems. This industry trend is in part because of a lack of appreciation of MIS by non-MIS managers [Ragowsky et al., 2012] We see this in academia in the dramatic drop in MIS enrollments throughout North America from 2002, and even if these numbers have started slowly picking up again in recent years, they are nowhere near the numbers we used to have. Consequently, the status of the MIS discipline in schools of business has declined. For example, MIS courses are no longer required by AACSB in the MBA. This trend may be blamed with some justice on increased offshoring of information systems services that results in exporting MIS jobs out of the developed world. Nonetheless, there still remains the unavoidable fact that students do not flock to MIS and Computer Science as they used to, and, at least in part, this may be because of the growing feeling in the industry, at least as presented in CIO roundtables and discussion conducted by Ragowsky et al., that academia is not preparing students adequately for what the industry needs out of MIS and other business graduates. The industry needs graduates with MIS skills, but employees who can also be project managers who have people skills, know-how to contract and manage vendors, and an ability to do business analytics—and can do all this in a business context.

Then there is the issue that over the years the adoption and use of information systems has been so successful and ubiquitous that MIS topics are now an integral part of other disciplines. We are no longer alone, but we still behave as if we are! Our research on electronic markets, as an example of a key research trend in MIS, is equally an issue for Marketing and Consumer Research. MIS research into organizational change through information systems, another key topic in MIS, is equally an issue for Management and Organizational Behavior, and even Psychology.

There is nothing wrong with an MIS topic being of interest to other disciplines; however, it is an issue in that these MIS topics are not unique anymore to MIS, but we still treat them as if there were. In addition, and maybe consequently, academics in other disciplines do not fully appreciate what MIS is all about, with the disappointing result that they want the MIS discipline to train students in Excel and equivalent tools rather than in what MIS as a discipline views as core MIS management issues. Business schools may be correct in expecting MIS to teach Excel and other such topics, but more than that is required of MIS, as the industry sees it. MIS might have been misunderstood even in its better days in the 1990s [Avgerou, 2000], but the result of this lack of appreciation today is that business graduates do not fully appreciate MIS management issues. This too may be contributing to the decline of the status of MIS in the industry.

Another problem MIS faces as a discipline is that we lost the lead we used to have. MIS departments used to be the trailblazers for organizational and societal change driven through information systems, advocating changing business practices through information systems [McFarlan, 1984], even business process reengineering [Hammer and Champy, 1993], and achieving new strategic advantages through information systems [Porter, 1979]. It used to be that issues of alliance with organizational strategy were key issues because MIS as a discipline pushed for new frontiers [Luftman, 2000; Luftman and Kempaiah, 2007], and therefore advocated and taught about information systems as a change agent, with all the politics this brings about [Markus, 1983]. This change-agent position of MIS, even without the exaggerated claims about it at the time, is not the case anymore. Rather, management of information systems in some industries has been degraded to a service-provider status, as epitomized by the "IT Doesn't Matter" paper by Carr [2003], and remained so ever since. Indeed, we typically no longer teach about the change-agent role of information systems or becoming industry leaders through information systems in the introduction-to-MIS courses. It comes as no surprise then that many non-IT business students think that MIS courses are only about ecommerce, smartphones, Excel, and PowerPoint. Can one blame these students for deciding to study more exciting topics when we do not excite them with the opportunities and wonders of MIS as we used to?

CIOs face the same kind of problem. CIOs used to see their job as a matter of pushing new IT at the users in their organization so they could achieve strategic advantage through information systems or at least facilitate drastic improvements in performance. Doing so used to be a key issue of joint interest to both academia and industry [DeLone and McLean, 1992, 2003]. Their current job, in contrast, is to hold back their users who now want more information systems than the CIOs can provide, especially in iPhone-type applications [Gefen et al., 2011], which are even harder to standardize and control than the old types of information systems were. The nature of managing information systems has changed drastically. There is no longer any doubt about the need for information systems, there are no doubts in user minds that information systems should be used, and users are not fearful of information systems as they used to be. On the contrary, the users want more than the CIOs can deliver. And yet, do our textbooks reflect this? If we teach about information systems and how to encourage users to use them, rather than teach users of the importance of integration among these systems and how to achieve business value through them, then we are presenting an inaccurate and unfaltering picture of what MIS is about. Can students be blamed then for thinking MIS is irrelevant when the key research questions we should now be asking are not being asked?

Carr [2003] is a good example of this misconception and how we do not address it correctly. Carr was right about certain kinds of information systems becoming a utility, with no more frills about reengineering and drastic changes to light up the imagination of our students and the industry. Viewed this way as a utility, much as electric service is a utility, MIS would indeed seem to be boring and unimportant to business students, to our academic colleagues in other disciplines, and to non-IT managers in the industry. Who wants to learn about managing a boring standardized utility? We should teach about other types of more exciting information systems such as smartphones and SCADA. But even with utility type information systems applications, there are many interesting topics that the industry sorely needs us to teach, and we do not. As an example, even in the context of utility-type information systems, MIS as a discipline could teach about the exciting aspects of outsourcing, such as managing vendors and the contracting process, as well as systems integration. That is, after all, what many information systems managers partly do today. If we do not teach such interesting management topics, it is no wonder that the status of MIS in business and in some parts of academia has been demoted. These topics should be taught not only to students majoring in IT—all business majors could benefit from learning about these topics in an introduction level course so that they too can better understand and appreciate information systems.

Basically, the paradigm that we used to teach does not apply anymore. The ubiquitous computing world of the 2010s is a far call from what MIS used to be in the standalone batch mainframe era of the 1960s, the network connected mainframe age of the 1970s, the client server age of the 1980s, the Internet age of the 1990s, and the Web 2.0 world of the 2000s. It is time to realign our discipline with what our clients need. Like it or not, to our students and to the next generation, information systems means smartphones. Information systems are about constant user-friendly interconnected apps with all the info one can possibly need at the users' fingertips, with all the potential and risks

involved. We do not teach this. We should. That is what our clients need us to teach. Teaching the business application of iPhones could be one route to take.

Emphasizing Quotes

To drive home the message about how far the MIS curriculum has strayed from what the industry needs, here are some quotes from some of the CIO roundtables. The VP and CIO of a $150M real estate investment fund said, "I think if you look at the future of IT, our jobs will be very different twenty years from now than they are today, meaning a lot of things that we do today to keep the lights on are going to be taken care of by others, because they're not our core competency; they don't give us competitive advantage. We're just going to outsource that stuff." And yet, contracting, outsourcing, and managing vendors are not an integral part of MIS courses, which are still geared too much at teaching about in-house development.

Another problem, this time mentioned by a senior MIS manager at one of the largest automotive companies in the U.S. was that "… what I've found is you need the technology courses, you need the mathematical courses, you need the analytical capabilities, statistical capability, but you need to teach business as well. … in addition to all the calculus, in addition to learning the languages and the programming and the analytics, it would be learning business, right? So it would be taking some of those MBA courses or the enterprise and how companies run, etc., and bringing those into the computer science curriculum." And yet, solving business problems, while currently done in many courses, is not done enough as an integral part of what MIS can do.

Lastly, MIS is not only about information systems. It is about organizational integration through information systems. As the CIO and VP of a $6.5B mechanical engineering company put it: "Putting in an information system platform brings not just a piece of technology, but it brings your company culture into this company…. You're getting project management skills, global visibility of the organization, you understand something about the economics, you put it all together, and you are really in a wonderful position to grow not just in the information systems organization. … it's a stepping stone, because you have a better visibility of your company than most people do who grow functionally versus looking cross-functionally across an organization." And yet, crucially, what is missing in how we teach MIS is that managing information systems is really about managing integration through information systems. Information systems are the nervous systems of organizations [Matta and Ashenas, 2003], and yet one may ask if current MIS textbooks emphasize enough these integration aspects of MIS—and the project management skills needed to manage such nervous systems in our curricula.

So What Is Needed?

The question then is what does the industry need us to teach? The answers Gefen and Ragowsky presented based on the CIO roundtables were these topics, even if it means creating a new curriculum that ignores the past and start afresh.

1. *Systems analysis at a business level*. CIOs need us to teach students to see the business problem and have a creative, imaginative information systems solution for it. Learning how to design a database or write an application for it in C++ are clearly necessary, but on top of that the students we train must know and understand the business problem that the database and C++ application are solving. CIOs do not need us to train CS students; we need to train Business majors who know the technology, and, importantly, understand where it fits in and how it serves the organization and its users.

2. *Manage outsourcing and the contracting process with vendors*. With the dramatic shift in the market to drastically increased outsourcing, especially in the context of cloud SaaS and IaaS (software as a service and infrastructure as a service), it is imperative to teach our students how to handle the contracting process with vendors and the subsequent relationship with them. It is noteworthy that a quick vote taken of the audience at this point in the panel presentation showed that among the approximately 160 academics present in the room, only three raised their hand to show that their school teaches outsourcing, contracting, or managing vendors. Including industry examples could be one way of doing so (e.g., Gefen et al., 2008).

3. Business Analytics. Data mining is becoming an ever increasingly important aspect of strategy, and yet we do not teach our students how to do this from a business-case perspective. Some MIS programs do include SQL and minimal statistics in their MIS program, but, at least from what the roundtable CIOs see, and apparently what the audience agreed with, more must be done to teach and train students about how to apply these tools to business case studies so the students can assist in solving business problems.

4. *Project Management*. This is a topic that should have always been an integral part of MIS. What the CIOs indicate that is especially needed, apart from the obvious understanding of the tools of the trade such as CSF, GANTT charts, and PERTs as they apply to information systems development and implementation management, is managing the people side of the implementation process. Knowing how to listen to, train, and

support users is crucial. In this context students should also be taught social relationship, leadership, and communication skills. Also important in this context is teaching students to analyze real case studies, not the souped-up textbook case studies where one might draw the ridiculous conclusion that information systems projects are mostly unmitigated success stories. Highlighting the truism that information systems projects fail mostly because of people issues, and not technology issues, might be harder to teach, but that is the truth [Matta and Ashenas, 2003]. Information systems management is about politics and people, as Markus [1983] showed long ago. Analyzing project post-mortems could be an integral part of such courses and a way to emphasize the people side of MIS.

And, since teaching the theory is seldom enough, the CIOs strongly recommended encouraging internships among MIS students so they can learn the real world side of MIS.

III. THE "BALANCED HEADS" RESPONSE

Having presented the straw-man position, the senior members of the panel presented their points of view of the traditional perspective in the U.S. combined with Northern European and Canadian perspectives.

McLean: Does MIS as a Discipline Need to Be Reengineered?

McLean began by paraphrasing Mark Twain's statement: "The reports of my death are greatly exaggerated," applying this to MIS: "The reports of the death of MIS are greatly exaggerated!" Using the City of Atlanta as an example, McLean provided these statistics: Greater Atlanta has a population of 5.5 million, about the size of Denmark, Finland, or New Zealand. Its overall unemployment rate is currently 10.2 percent, but it is only 4.3 percent among college graduates, and even less at 2.2 percent among IT-qualified people. Moreover, according to the U.S. Bureau of Labor Statistics, the highest job growth areas in the next decade are expected to be in information systems and in healthcare. The real question is then: Are we preparing our graduates for these jobs? However, the antagonists have a point. CIOs want people who know the technology *and* the business (i.e., domain knowledge). Computer Science programs prepare students for the former, we tend to prepare students for the latter. But we need to do both.

An example concerning information systems in healthcare can demonstrate how information systems are really not so badly off. In the last year, 95,000 *net new* jobs were created in the U.S. in health information technology (HIT)—over 10 percent of the total job growth in the entire U.S. economy! In Atlanta alone, local HIT firms currently have 9,750 job openings predicted for the next three years. But domain knowledge of the healthcare field is critical for these jobs. Such additional training is crucial. And, as other fields emerge, it will be critical to enhance and expand our MIS curriculum also to these new, emerging fields.

So, what should we be teaching? Discussing these issues with CIOs in the Atlanta region in 2010–2011, they tell us they want the same things that the CIOs in Detroit want. What is needed are the following:

- Problem-solving/analytical skills
  - Identifying user/business requirements
  - Specifying and installing information systems solutions
  - Managing information systems-driven organizational change
  - Delivering business value
- Communication skills
  - Effective relations with users, customers, vendors, suppliers, colleagues, C-suite executives, etc.
- Project management skills
- And, of course, technical skills
  - Social media
  - "Big" data
  - Business analytics
  - Mobile technologies
  - Enterprise systems
  - Security
  - BPM, among others

But Nicholas Carr [2003] tells us that, "IT Doesn't Matter." However, if you read this widely-cited paper carefully, he says that IT does matter, and crucially so; it is just *not strategic* anymore and thus should not be expected to be a source of differentiation, which is the essence of strategic advantage. According to Carr, IT is just a critically important *commodity*. Therefore, information systems managers should concentrate on spending less on information systems; should not waste money on trying to innovate, which can be quickly copied by others, and should concentrate on building and maintaining cost-effective, secure, and reliable systems.

To some extent, can these same arguments be applied to accounting? Is accounting a source of strategic advantage, a source of differentiation? Or is accounting, like MIS, merely a critically important commodity? Even so, accounting is an extremely successful discipline, and accounting majors are growing. Our enrollment numbers in MIS, on the other hand, are mixed at best. There is growth in some schools, many show stable enrollments, and some are still in decline. What can we learn from accounting about this?

The study of accounting is a complex set of rules—and so is MIS, i.e., the business systems that all companies rely on. These rules are common across companies within an industry; they are a commodity—and so is MIS. The accounting rules, by themselves, *cannot* be a source of competitive advantage—and the same goes for MIS. But, mastery of, and exploitation of, these rules can be a huge source of competitive advantage—as it can for MIS! But comparing MIS to accounting raises an interesting question. What do accounting programs produce? Graduates that can *do* accounting! The question for us is what do we produce? What can our MIS graduates *do*? Not what they *know*, but what can they *do* to make themselves valuable to an employer? This is the challenge facing our MIS programs if we want to regain our former appeal to students—and to employers.

Rivard—Rearranging the Deck Chairs on the Titanic?

A more pronounced disagreement with the antagonists was presented by Rivard. Starting from a blank slate and reengineering the MIS curriculum, with an emphasis on listening to the industry, may not be the right direction to take, Rivard argued. Indeed, doing so would be the equivalent of rearranging the deck chairs on the Titanic. The argument that the decline of MIS in academia—the problem we want to address—is solely due to our failure to listen to what the industry (here the CIOs) wants, paints an incomplete picture of the situation. In fact, the causes of the decline—defined by Gefen and Ragowsky as a drop in MIS enrollment, MIS programs being closed, or MIS groups in academia being dismantled—are multiple and intertwined. Programs are being closed and MIS groups dismantled because of the drop in the enrollment. From Gefen and Ragowsky's description of the situation of MIS in the industry—e.g., demotion of the CIO position, perception of information systems as a commodity—one could even argue that, in turn, the drop in the enrollment is due to the failure of the industry to be attractive for business students. In a nutshell, both parties have to repair their image. And they may indeed gain by engaging in this endeavor together.

Additionally, the definition of who the IT industry is as presented by Gefen and Ragowsky may in itself be a rather limited definition of the IT industry, one that excludes information systems service providers. Yet, large information systems consulting firms, system integrators, and outsourcing firms are also important employers of our graduates. Hence, it might be better to include these firms in our definition of "the industry," rather than exclude them.

A conversation with the industry is required, as Gefen and Ragowsky demand, with academia listening to what industry needs, but it is also necessary that industry listen to what academia has to offer, with a common goal of uprooting the causes of the problems and reviving the information systems domain. There is no denying that academia has not always been very attentive to industry, but this goes both ways. One example to note is that of information systems project risk management where research has provided methods that have been shown to contribute to project success. Yet, many sources indicate that industry project managers shy away from these academia-originated project risk management tools.

There are two approaches that can be taken to adjust to the revolutionary nature of information systems. The first is to constantly modify our curricula—adapt our course content, in Gefen and Ragowski's terms—so as not to fall behind. The second approach is to identify the skills that we should help our students develop to make sure that, no matter what the changes in the industry may be, our graduates will "stay on the crest of the wave." Environment scanning, boundary spanning, diagnosing, and problem solving are such skills.

If this conversation leads to the diagnosis that a dramatic change in the curriculum is actually required, we will have to be aware that no matter what the quality of this curriculum, it will not be sufficient to attract students and increase enrollment. The curriculum will have to be packaged and marketed in such a way that students will be pulled toward our courses. The experience reported by universities who have been successful in increasing their MIS enrollment [Koch and Kayworth, 2009] shows that a vast array of efforts have to be made to attract, retain, and place MIS

students. As one of the CIO quotes said: "you need to teach business as well. … in addition to all the calculus, in addition to learning the languages and the programming and the analytics, it would be learning business, right?"

Rossi: A European View

Next Rossi presented a European view of things. In Europe the decline in information systems majors has been less dramatic than in the U.S., and there has been some growth in several parts of the continent in the past ten years. Programs in Scandinavia, Britain, and Germany are generally healthy and growing or at least remaining stable in their enrollments. The need for business consultants with information systems expertise is strong, and the starting salaries of students are comparable to those of students of finance.

However, it is clear that we need to rethink how and what we teach our students. Students used to go to work in large MIS departments within large organizations, but now they go to either consulting companies or smaller technology service units within companies. This means that just like the CIO panelists mentioned above, instead of more technology skills, we need to train people also in communication, project management, and consulting skills.

In the MIS program at Aalto University, as an example, students are trained in Information and Service Management. Students are given general business background and in-depth knowledge in information systems, consulting and analytics. The main product of this training is a solution- and innovation-oriented service consultant who has good general command of the business and skills needed to develop businesses applying information and communication technologies (ICT). The alumni of this program and employer surveys show that this kind of program gives a realistic picture of consulting and business process development, but still needs improvement in developing people and leadership skills. Continuing to develop connections with industry and giving students real-world problems to deal with can address this issue. The leadership skills we strive to develop obviously need some actual exposure to real-world problems and projects. The way this is addressed in Scandinavian programs has traditionally been through engaged scholarship, where, in an ideal world, students take part in industry-academia research projects and work with real clients and problems there.

On a more technical side, companies, such as Nokia, seek quantitative marketing and business intelligence experts. To a certain degree this demand can be satisfied by giving the students a solid understanding of database and data warehouse basics and augmenting with strong statistical and quantitative modeling skills.

One clearly emerging trend is the need to insource some skills, especially business architecture, business modeling, and systems procurement skills. In the future workplace, there will be less need for green-field solutions. Most information systems and IT solutions will be combinations of cloud-based services and legacy systems. As such we should train students in buying and applying existing solutions rather than building from scratch. To this end some of the Scandinavian programs have added to the curricula a course on information systems and IT procurement. Successful procurement and project management are key future skills. This has become evident especially in public sector procurement in Europe. Partly this is because of the very strict European public procurement laws, but it is also because there has not been enough emphasis on outsourcing as a process of managing risk, projects, and change, rather than dealing only with the information systems and IT side of things. This lack of emphasis on managing risk, projects, and change has led to delays, budget overruns, and performance problems in many outsourced projects. Possibly, and this may be related to the suggested need for change in the MIS curricula, these problems were caused in large part because companies and public agencies lost their internal IT and information systems knowledge having gotten rid of their IT departments. It may be time now to insource some of the skills needed to manage existing resources and efficiently develop new innovative information systems-based solutions. This would mean the reinvention of the CIO's office as a strategic development facility instead of operational legacy department.

Rethinking MIS curricula would be necessary to achieve these goals. These demands can be met by replacing some information systems development and network courses with consulting, service architecture, and information systems procurement classes. Students majoring in business may not value project management, but alumni surveys indicate these are among the most valuable parts of MIS education.

IV. CONCLUSION

Reviewing whether an organization is on the right track with its information systems policy is a fundamental principle of MIS management. We have been advocating it in the guise of reengineering for decades. It might be time we took a bit of our own medicine. It is time to listen yet again to what the industry, on a broad level, needs and, within reason, to try and meet those needs. Whether this is reengineering or tweaking is an open question. But it is time to do so.

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ABOUT THE AUTHORS

David Gefen is a Professor of MIS at Drexel University, Philadelphia, where he teaches IS Outsourcing, Strategic Management of Information Systems, Database Analysis and Design, and VB.NET programming. David has authored some of the most cited papers in MIS about trust and about gender in the context of IS adoption and management. His research focuses on information systems implementation as well as informatics analyses of transactional data as these apply to the psychological and rational processes involved in the management of many types of information systems. Before becoming an academic David was a programmer and systems analyst, and then senior manager of a large logistics information system. His research findings have been published in some of the leading journals, including *MISQ, ISR, IEEE TEM, JMIS, Omega, and Journal of the Association for Information Systems.* David is an author of a textbook on *Advanced VB.NET Programming Web and Desktop Applications in ADO.NET and ASP.NET* in 2004 and a book on the *Art of IS Outsourcing* in 2011. David is on the Editorial Board of *MISQ*. Previously he was on the editorial boards of *JMIS* and *DATABASE*.

Arik Ragowsky is an Associate Professor and Director, Manufacturing Information Systems Center School of Business Administration Wayne State University. Arik is the director of a center that specializes in the IS connection between industry and academia and has organized and sponsored many CIO roundtable discussions. Before joining the academia, Arik worked for twenty years as a programmer, systems analyst, project manager, CIO, and consultant. After joining the academic world in 1992, Arik has continuously been involved with consulting and interaction with IT in the business world. His current research interests are in the value of information systems, strategic information systems, alignment between the IT, and the organization, implementation, and use of IT for the benefits of the organization, and cloud computing.

Ephraim R. McLean is a Regents' Professor, George E. Smith Eminent Scholar's Chair in Information Systems, Chair of the Computer Information Systems Department, and Director of the Center for Research in Information Systems, all in the Robinson College of Business, Georgia State University, Atlanta, Georgia. Dr. McLean is among the most published and influential professors in the MIS field. He has worked in the computer field for fifty years and been a faculty member for forty-four years. He is the co-author or co-editor of nine books and has published over 135 papers in leading business and academic journals. He is one of the founders of both ICIS and AIS, and for nine years was the Executive Director of AIS. In 1999, he was named as one of the first Fellows of AIS and in 2007 was recognized with the LEO Award for Lifetime Achievement in Information Systems.

M. Lynne Markus is the John W. Poduska, Sr. Professor of Information and Process Management at Bentley University and a Research Affiliate at MIT Sloan's Center for Information Systems Research. Professor Markus's teaching, research, and consulting interests including enterprise and inter-enterprise systems and IT-enabled organization change. She is the author/editor of five books and over one hundred articles; her research has been supported by numerous government and industry grants. She was named Fellow of the Association for Information Systems in 2004 and received the AIS LEO award for Exceptional Lifetime Achievement in Information Systems in 2008.

Suzanne Rivard is the HEC Montréal Endowed Chair in Strategic Management of Information Technology and a Fellow of the Royal Society of Canada. Her research is in the areas of enterprise systems implementation, outsourcing of information systems services, software project risk management, and strategic alignment. She has received several awards for her published work, including the 2005 MIS Quarterly Best Paper award. She currently serves as the Senior Editor of the Theory and Review Department of the MIS Quarterly. Suzanne Rivard has also served as advisor to several organizations, mainly in the domains of IT outsourcing, IS planning and risk management. She was a member of the Board of Directors of the CIO Association of Canada. In 2009, she received an award from the Réseau Action-TI (an association of IT professionals) in acknowledgement of her contribution to the IT domain in Quebec.

Matti Rossi is a professor of information systems at Aalto University School of Economics, Finland. He has worked as research fellow at Erasmus University Rotterdam, visiting assistant professor at Georgia State University, Atlanta and visiting researcher at Claremont Graduate University. He has been the principal investigator in several major research projects funded by the technological development center of Finland and Academy of Finland. His research papers have appeared in journals such as *MIS Quarterly*, *Journal of the Association for Information Systems*, *Information and Management,* and *Information Systems*. He has been a senior editor of *Journal of the Association for Information Systems* and *Database for Advances of Information Systems* and is the incoming editor of *Communications of the Association for Information Systems.* Matti Rossi is a member of IEEE, ACM, and AIS.