Dec 1st, 12:00 AM

Digital Transformation and the Changing Role of IS in Business Education: Lessons from the AACSB MaCuDE Project

Kalle Lyytinen
Case Western Reserve University, kjl13@case.edu

Heikki Topi
Bentley University, htopi@bentley.edu

Helmut Krcmar
Technical University of Munich, helmut.krcmar@tum.de

Paul Leidig
Grand Valley State University, leidigp@gvsu.edu

Adriana Steyn
University of Pretoria, u04190025@up.ac.za

See next page for additional authors

Presenter Information
Kalle Lyytinen, Heikki Topi, Helmut Krcmar, Paul Leidig, Adriana Steyn, Bernard Tan, and Joseph Valacich

Digital Transformation and the Changing Role of IS in Business Education: Lessons from the AACSB MaCuDE Project

Panel

Kalle Lyytinen
Case Western Reserve University
Cleveland, OH, USA
kjl13@case.edu

Heikki Topi
Bentley University
Waltham, MA, USA
htopi@bentley.edu

Helmut Krcmar
Technical University of Munich
Munich, Germany
helmut.krcmar@tum.de

Paul Leidig
Grand Valley State University
Allendale, MI, USA
leidigp@gvsu.edu

Adriana Steyn
University of Pretoria
Pretoria, South Africa
u04190025@up.ac.za

Bernard C.Y. Tan
National University of Singapore
Singapore, Singapore
btan@comp.nus.edu.sg

Joseph S. Valacich
University of Arizona
Tucson, AZ, USA
valacich@arizona.edu

Abstract

This panel provides the Information Systems (IS) community with an update on and engages in a pivotal discussion regarding the impact of digital transformation and advanced information technologies—such as big data analytics and artificial intelligence—on the IS curricula of AACSB accredited business schools. The panel draws upon the work done by the IS task force of the AACSB MaCuDE project in collaboration with curriculum leaders of the IS community. The panel reflects on the role and identity of the IS discipline in the future based on the MaCuDE project findings, explores the role of IS as the natural boundary spanning leader in digital transformation, analyzes areas in which IS is most likely to continue to provide distinctive value, considers the resource implications of the emerging changes, and discusses the role of ethical implications of advanced information technologies in IS education.

Keywords: IS education, digital transformation, artificial intelligence, advanced analytics, IS implications

Introduction

The purpose of this panel is to give the Information Systems community an update on and engage in a pivotal discussion regarding the impact of digital transformation and advanced information technologies, such as big data analytics and artificial intelligence, on the IS curricula of AACSB accredited business schools. The conversation will evaluate the threats and opportunities for IS departments and programs caused by the increasing focus on digitalization by most, if not all, business school disciplines. The panel builds on the work done by the IS task force of the AACSB MaCuDE project in collaboration with curriculum leaders of the IS community.

AACSB Digital Transformation Affinity Group (DTAG) launched a major initiative in Fall 2019 under the title of Management Curriculum for the Digital Era (MaCuDE; macude.org). The purpose of the MaCuDE project is to explore, document, and specify the changes needed in business curricula at different levels based on the ongoing digital transformation of organizations and societies. The initiative established nine task forces, six of which were built around traditional academic disciplines (Accounting, Finance, Information Systems, Management, Marketing, and Strategy, Innovation, & Entrepreneurship) and three explored crosscutting themes (Analytics/Operations Research, Ethics and Cybersecurity, and The Future of Work). The project was divided into three phases: Phase I) Assessing the role of digital themes in the current business school curricula; Phase II) Analyzing the skills and knowledge requirements as identified by industry representatives; and Phase III) Developing curriculum recommendations for the future based on the findings of the first two phases. At the time of this writing, the task forces have submitted their reports for Phases I and II, and they are currently finalizing Phase III, which culminates their work.

The IS discipline has been represented in the process by the Information Systems task force led by Kalle Lyytinen (Case Western Reserve University, IS task force chair), together with Heikki Topi (Bentley University, co-chair) and Jing Tang (Rochester Institute of Technology, project coordinator). The task force has worked closely with an active advisory board, which has provided feedback and novel ideas to the leadership team 5-6 times per year. Furthermore, the project has presented its findings and solicited comments from all members of the global IS community through several webinars and presentations at major conferences. Feedback from the community has had a substantial impact on all deliverables of the project. The Phase I report of the IS task force has been published in CAIS (Lyytinen et al., 2021), the Phase II report has been widely distributed and will be submitted to CAIS, and the Phase III report will be finalized in Fall 2022. The task force has collaborated closely with the leadership of the latest IS curriculum development initiatives, MSIS2016 (Topi et al., 2017) and IS2020 (Leidig & Salmela, 2021).

Issues

The following issues will form the core of the debate, modified as necessary based on the ongoing work of the MaCuDE project to finalize its recommendations:

1. What do the integrated findings of the MaCuDE project suggest regarding the role and identity of the Information Systems discipline in the future? Already the Phase I results of the MaCuDE project show that all other disciplinary task forces had identified an increased emphasis on curriculum areas that have traditionally been the specialty of IS (particularly in Finance, Accounting, and Marketing, but also within the Management disciplines). These emphasis areas include Marketing Analytics (Marketing), Data Analytics and Machine Learning, Programming, Algorithms and Algorithmic Trading, Blockchain and Crypto Currencies (Finance), Accounting and Business Analytics, Data management, Modeling, Software/Programming (Accounting), Managing Digital Transformation, Social Networks, Ethics of Digital Transformation (Management), Strategy in the Digital Age, Digitization and Innovation, Design/Digital Thinking, and Emerging Digital Technologies (Strategy/Innovation/Entrepreneurship). It is likely that this trend continues in the integrated reports of Phase II and Phase III. The panel will explore the impact of these developments on the IS develop and discuss effective ways for IS programs and departments to respond to them.

2. At least the first two of the three MaCuDE crosscutting themes (Analytics, Cybersecurity) are typically viewed as essential areas of the IS curriculum, and the Future of Work is also an area in

which IS scholars do leading work. At the same time, all are legitimately also areas of teaching and research for other disciplines (such as Statistics and Operations Research for Analytics; Computer Science, Software Engineering, and Law for Cybersecurity; and Management and Sociology for the Future of Work). How should business schools deal with these boundary spanning themes, and how will the information systems discipline ensure its central role that it deserves based on its long-term focus on key topics within these three themes?

3. The MaCuDE analysis of existing business school curricula identified five business school level themes "brought about by the evolution of digital technologies," which include Data Analytics and Machine Learning, Programming, Algorithms and Artificial Intelligence, Emerging Digital Technologies, and Managing Digital Operations. These themes closely resemble high-level topics or competency areas in recent IS undergraduate major or a master's program. How does our discipline address the opportunities and the threats that emerge from this substantial focus on our traditional areas of specialized expertise?

4. What are the distinctive areas of focus and foundations of valued professional competencies that form the core of the future value proposition of the IS discipline? Given the way in which the scopes of other business disciplines are broadening into areas that used to be IS domain, where will IS find a place that allows it to offer future students an opportunity to gain competencies that students will perceive to be not only valuable but more valuable than what other programs offer? Does this mean a stronger focus on advanced technical capabilities, enabling IS graduates not only to use new technologies as black box modules to be configured but also to participate in developing these modules. Could advanced design be an area of focus in which IS can serve as the lead discipline? What competencies should IS graduates have related to the analysis of ethical implications of advanced/emerging information systems solutions?

5. How do IS programs best address the potential tension between global expectations and requirements from key local stakeholders? One size certainly does not fit all, but what are the core competencies that all IS graduates need to have?

6. How demanding should the technical requirements in the IS courses be? Are our students (particularly in business school programs) capable of dealing with the increased technology demands? Do we have faculty capable of teaching courses at the leading edge of technology? Will this lead to an increasingly clear separation between faculty focusing on research and faculty focusing on (technical topic) teaching?

7. What do the MaCuDE project findings tell about possible future changes in the way business schools will be structured? Do the results indicate a future that includes the shifting of departmental boundaries and a movement towards degree programs built around broad organizational themes instead of disciplinary silos? What are the conditions under which it makes sense to accept a role in which an IS department serves the needs of a degree program for which another department is responsible? When does it make sense to focus on maintaining control of a program that requires contributions from multiple departments?

8. Will IS programs in business schools find a different development path from programs that are located elsewhere (such as a separate school of computing or information/informatics)?

Panelists

Helmut Krcmar, Technical University of Munich

Paul Leidig, Grand Valley State University

Kalle Lyytinen, Case Western Reserve University (co-chair)

Adriana Steyn, University of Pretoria

Bernard Tan, National University of Singapore

Heikki Topi, Bentley University (co-chair)

Joseph (Joe) S. Valacich, University of Arizona

Panel Structure

1) A review of the final recommendations of the MaCuDE IS Task force with commentary by two of the panelists and a Q&A with the audience
2) An overview of the available information regarding the general MaCuDE project findings with commentary by two of the panelists and Q&A with the audience
3) Moderated discussion on key questions raised by the MaCuDE project and its IS task force as specified above in the Issues section.
4) Summarization of the results of the panel and identification of paths forward.

Biographies

Helmut Krcmar is a German IS and Management scholar. Since 2020 he has led the Research Group Krcmar at the Faculty of Informatics, Technical University of Munich (TUM), Germany. He is Affiliate Member of the TUM School of Management. From 10/2010 to 09/2013 Helmut served as Dean, Faculty of Informatics. From 2016 to 2019 he was member of the TUM Senate and TUM Board of Trustees. From 07/2018 to 07/2020 he served as Vice Dean, TUM School of Management. Currently, he is Founding Dean and Delegate Officer of the president for TUM Campus Heilbronn. Since 2003 he is Academic Director of the SAP University Competence Center @ TUM and Member of the Board of the Center for Digital Technology and Management (CDTM). He is Co-founder and served until 2018 as Speaker of CeDoSIA, the interdisciplinary doctorate program of the Faculty of Informatics, TUM. From 2004-2007 he was Founding Director of TUM Executive Education and today is Academic Director of TUM EEC EMBA "Business and IT."

His research interests include Digital Transformation, Information and Knowledge Management, Platform-based Ecosystems, Management of IT-based Service Systems, Computer-Supported Cooperative Work, and Information Systems for Government. He has supervised more than 100 Ph.D. theses. He is a widely published author (h=70, i10=517) and is member of the editorial boards of ACM Transactions on Management Information Systems, BISE, Electronic Markets, ISeB, as well as the advisory board JIT, and the honorary board JSIS. Helmut co-authored a plethora of research papers published in major IS journals including MISQ, JMIS, JIT, JSIS, EJIS, ISJ, I&M, CAIS, TOCHI and BISE. In Germany, his book "Information Management" is now in a 6th edition (2015).

Helmut is a Senior Scholar and a Fellow of the Association for Information Systems (AIS). From 2014 to 2015, he was President of the AIS. Since the inception of the AIS in 1995 he has been actively involved in AIS activities.

Paul Leidig is Professor and Director of the School of Computing at Grand Valley State University. Dr. Leidig serves in leadership roles including the Computing Sciences Accreditation Board (CSAB), the Association of Computing Machinery (ACM) Education Board, and the Board of Delegates for ABET that provides accreditation for all computing programs. Leidig currently serves as chair of the CSAB Criteria Committee. He co-chaired the ACM/AIS Information Systems 2020 Curriculum Taskforce (IS2020), co-chaired the ACM Data Science Taskforce, and also the Computing Curricula 2020 task force. He is a past-president of the Association of Information Technology Professionals (AITP) Education Special Interest Group (EDSIG) and was named an EDSIG Fellow. He was named a Fellow of CSAB, recognizing his service revitalizing curricula for computer science, information systems, information technology, computer engineering, cybersecurity, and specifically helping lead the efforts for accreditation of data science programs. The later effort included bringing the American Statistical Association into the CSAB organization. He began his career over 40 years ago as the data processing director of a regional hospital. His academic career includes serving eight years on the business faculty of James Madison University prior to joining Grand Valley State University where he has served for over 30 years. He teaches courses on information systems management and information systems policy and has authored several textbooks. Each summer he leads a data science focused study-abroad program in Switzerland. Dr. Leidig received his Ph.D. in business from Virginia Commonwealth University, M.B.A from James Madison University, and B.S. from Eastern Mennonite University.

Kalle Lyytinen is Distinguished University Professor of Management Design at Case Western Reserve University; chair and professor, design and innovation; and faculty director of the Doctor of Management program. Lyytinen's research helps define how rapidly changing digital innovations shape organizations. His work helps organizations know how to identify, absorb, manage, implement, and be transformed by digital innovations. His recent projects have focused on engineering practices, telecommunications, and software development organizations. Lyytinen studies the adoption of new technologies, new forms of collaboration, and new ways to determine system requirements.

Lyytinen joined the Weatherhead School of Management faculty in 2001. Since then, his teaching interests have focused on digital innovation theory, new business venturing, design theory and methods, research methods and theory. Lyytinen has an extensive list of over 400 publications in numerous prestigious journals including Information Systems Research, MIS Quarterly, Organization Science, and leading conferences. He is currently among the top five scholars in the information system field by citations (H-index 96). He has presented his work extensively in the U.S. and worked globally at numerous academic institutions.

Professionally, Lyytinen has served as vice president for the Association for Information Systems (AIS), senior editor for Information Systems Research and editor-in-chief for the Journal of the Association for Information Systems. He received an honorary doctorate from Copenhagen Business School in 2016 and from Umea University in 2008. Lyytinen also received the LEO Award from AIS in 2013 and he has numerous Best Paper Awards from AIS (ICIS), HICSS and AoM (OCIS). Lyytinen received his PhD from the University of Jyvaskyla, Finland.

Adriana (Riana) Steyn has been with the University of Pretoria for the last thirteen years after she returned to academia from industry. She is currently a full-time senior lecturer in the Department of Informatics. Throughout the years, Riana has engaged numerous students by presenting undergraduate and postgraduate modules. She has published various articles based on her teaching experiences over the last few years. She has also supervised many students and has advised three Ph.D. graduates. Her research focuses mainly on technology in education within the higher education space and improving student engagement while offering good-quality content. Her different approach to teaching was born from her passion for entrepreneurial research. Her Ph.D. explicitly focused on entrepreneurs. She developed a framework for SMEs to engage more effectively with technology and E-skills for Entrepreneurs course focusing on effective technology engagement to create sustainable businesses. She is still actively involved in entrepreneurial research in the South African context and has recently published work in 4IR for the entrepreneurial and education sectors. She has also been a National Research fund (NRF) y-Rated researcher since 2020. She is the IFIP TC-3 South African representative. She is actively involved in international research projects based on international teaching practices and exploring the viability of microcredentials for higher education. She is also a UP teaching excellence Laureates recipient (2019) as well as an Association of Information Systems (AIS) Award for Innovation in Teaching recipient (2018).

Bernard C.Y. Tan is Senior Vice Provost at the National University of Singapore (NUS). He chairs the NUS curriculum committee. He assists the Provost in setting educational directions and policies, and in assuring educational quality for NUS. His prior appointments include Executive Council Chair of the NUS Teaching Academy, Head of the Department of Information Systems, and Assistant Dean of the School of Computing. He has received research and teaching awards at NUS.

Prof. Tan was the 15th President of the Association for Information Systems (AIS). He is an AIS Fellow and a recipient of the AIS Sandra Slaughter Service Award. He has served on the editorial boards of MIS Quarterly (Senior Editor), Journal of the AIS (Senior Editor), IEEE Transactions on Engineering Management (Department Editor), Management Science (Associate Editor), ACM Transactions on Management Information Systems (Associate Editor), and Journal of Management Information Systems (Editorial Board Member). He has served as ICIS program co-chair, ICIS doctoral consortium co-chair, ICIS junior faculty consortium co-chair, and ICIS awards co-chair.

Prof. Tan is Shaw Professor in the Department of Information Systems and Analytics. He has given invited talks and keynote addresses at international conferences. His research work has been published in major international journals and conference proceedings in the field of information systems.

Heikki Topi is Professor of Computer Information Systems at Bentley University. His Ph.D. in Management Information Systems is from Indiana University. His research focuses on systems

development methodologies, information systems education, and human factors and usability in the context of enterprise systems. His research has been published in journals such as *European Journal of Information* Systems, *JASIST*, *Information Processing & Management*, *International Journal of Human-Computer Studies*, *Journal of Database Management*, and others. He is co-author of *Modern Database Management*, *Essentials of Database Management*, and *Systems Analysis & Design in an Age of Option* and co-editor of *IS Management Handbook* and *Computing Handbook: Information Systems and Information Technology*. He has been actively involved in global computing curriculum development and evaluation efforts since early 2000s (including *IS2002*, *CC2005 Overview Report, CC2020* and as task force co-chair of *IS2010* and *MSIS2016*). He serves currently on ABET's Computing Accreditation Commission and served earlier on ACM's Education Board and Council, on CSAB's Board of Directors, and on AIS Council as Vice President of Education.

Joseph S. Valacich is a prolific scholar, successful tech entrepreneur, and an educational innovator. Regarding scholarship, his primary research focus is on human-computer interaction (HCI), cybersecurity, and e-business. Google Scholar lists his citation counts at more than 29,000, with an h-index of 77. Dr. Valacich has multiple issued and pending patents focused on analyzing fine-grained HCI data to infer user intent, confidence, bias, and emotional state. In 2014, he co-founded Neuro-ID, a company that delivers real-time behavioral analytics solutions that combat online fraud, increase conversion rates, and improve customer experiences. Neuro-ID helps ensure seamless digital customer experiences across a variety of industries and works with leading brands including TransUnion, FICO, VISA, Intuit, Square, Affirm, Alloy and Elephant Insurance among many others. In addition to his scholarship and entrepreneurial activities, Dr. Valacich is an award-winning teacher and a co-author on multiple leading computing textbooks. He has also served on multiple model curriculum and accreditation task forces for both undergraduate and graduate programs. Lastly, he has played key leadership roles in the creation of online education programs at both Washington State University and the University of Arizona. Dr. Valacich is a Senior Member of the National Academy of Inventors (2020), a Distinguished Alumnus of the University of Montana (2012), and a Fellow of the Association for Information Systems (2009). In 2021, he was awarded the Association for Information Systems (AIS) Impact Award, to recognize the impact of information systems research beyond academia. In 2020, Tech Launch Arizona (TLA), the University of Arizona technology transfer and commercialization group, named Neuro-ID the I-Squared (Innovation and Impact) Startup of the Year (out of more than 100 startups in their ecosystem). In 2016, TLA named Dr. Valacich the I-Squared Inventor of the Year for Information Technology.

Acknowledgements

The AACSB MaCuDE IS task force and its advisory board greatly appreciate the active participation of the members of the IS community in the public discussion that took place through various feedback channels, the contributions of AIS leadership and staff to providing an infrastructure for the conversations, and Jing Tang's tireless work as MaCuDE IS task force's project coordinator.

References

Leidig, P. and Salmela, H. 2021. *A Competency Model for Undergraduate Programs in Information Systems*. ACM and AIS. Accessed at https://www.acm.org/education/curricula-recommendations on May 3, 2022.

Lyytinen, K., Topi, H., and Tang, J. 2021. "Information Systems Curriculum Analysis for the MaCuDE Project," *Communications of the Association for Information Systems*, 49.

Topi, H., Karsten, H., Brown, S., Carvalho, J., Donnellan, B., Shen, J., Tan, B.C.Y, and Thouin, M.F. 2017. "MSIS 2016. Global Competency Model for Graduate Degree Programs in Information Systems," *Communications of the Association for Information Systems*, 40.