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## Artificial Intelligence Meets IS Researchers: Can It Replace Us?

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## Artificial Intelligence Meets IS Researchers: Can It Replace Us?

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## Artificial Intelligence Meets IS Researchers: Can It Replace Us?

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### Abstract:

Given we live in an era with accelerating digitization and rapid advances in artificial intelligence (AI), AI may eventually automate more job tasks. However, researchers have scarcely if at all critically analyzed how AI will automate such tasks and what professions it will automate more than others. Some studies suggest that AI cannot conduct highly creative and knowledge-intensive tasks. Yet, AI algorithms have generated creative art pieces that even art critics could not distinguish from human-drawn paintings. As IS (and most other) researchers, we pride ourselves on our work's scarcity, novelty, and creativity. In this context, we report on a panel at the 40th International Conference for Information Systems that debated whether AI can and will replace our major activity, IS research, or even IS researchers themselves.

**Keywords:** Artificial Intelligence (AI), Information Systems (IS) Research, Automation.

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## 1 Introduction

With the rapid advances in artificial intelligence (AI) technology, AI continues to automate more job tasks (Smith & Anderson, 2014). Indeed, many media outlets have made doomsday predictions that AI will replace jobs and allow computers to take over the world (Lewis, 2015). For example, Kai-Fu Lee, an AI expert, has predicted that AI will automate and potentially eliminate 40 percent of jobs in 15 years (Lee, 2017). He says that AI will surely replace “repetitive” jobs (e.g., those tasks that robots in factories automate). Further, he predicts that AI will potentially replace many “white-collar” tasks in fields such as accounting, healthcare, marketing, law, and hospitality. However, researchers have scarcely if at all critically analyzed how AI will automate such tasks (it at all) and to what professions it will affect more than others. In this regard, some researchers have researched the phenomenon (Fleming, 2019; Halal, Kolber, Davies, & Global, 2017; Makridakis, 2017) and produced, for example, AI automation scores for work activities in all major occupations. Many have suggested that AI cannot perform highly creative and knowledge-intensive tasks. Yet, AI algorithms have generated creative art pieces that even art critics could not distinguish from human-drawn paintings (Graham, 2018).

As AI becomes part of everyday life in a rapidly changing society, the debate about how AI will impact IS researchers targets the IS community, the wider research community at universities, and research-intensive organizations.

As impressive examples of AI developments and implementations gain ground, the disruptive effects will not spare those actors or even entire professions that underestimate their increasing momentum. At the peak of the social media wave in 2008, Shirky, Professor of Journalism at New York University, wrote:

*Sometimes, though, the professional outlook [here: by IS researchers on IS research] can become a disadvantage, preventing the very people who have the most at stake—the professionals themselves—from understanding major changes to the structure of their profession. In particular, when a profession has been created as a result of some scarcity,...the professionals are often the last ones to see it when that scarcity goes away. It is easier to understand that you face competition than obsolescence. (pp. 58-59)*

As IS (and most other) researchers, we pride ourselves on our work’s scarcity, novelty, and creativity. In this context, at the 40th International Conference for Information Systems (2019), Claudia Loebbecke (panel chair) organized a debate on whether AI can and will replace our major activity, IS research, or even IS researchers themselves. The panel included the following panelists (in alphabetical order):

- Omar El Sawy (University of Southern California, USA)
- Atreyi Kankanhalli (National University of Singapore, Singapore)
- M. Lynne Markus (Bentley University, USA)
- Dov Te’eni (Tel-Aviv University, Israel)
- Stefan Wrobel (University of Bonn and Fraunhofer Institute for Intelligent Analysis and Information Systems, Germany)

After briefly introducing topic and panelists, Claudia Loebbecke guided the panelists through three questions that the panelists addressed in turn:

- 1) To what degree and for which tasks or research subfields may (or may not) AI substitute or at least complement IS researchers and co-produce IS research insights?
- 2) Which specificities inherent to IS research (compared to other white collar, intellectual, or creative professional activities)—rather than which technologies—will further increase the AI-driven challenge to IS research?
- 3) How could IS researchers—starting from a position of strength and early awareness—prepare themselves and the field for whatever AI will bring to IS research as our profession?

Following the discussion, the panel held a question-and-answer (Q&A) session during which the panelists had a lively discussion with the audience and covered additional, insightful aspects, which we will present next.

## 2 Positions and Discussion

### 2.1 Question One

**Q1:** To what degree and for which tasks or research subfields may (or may not) AI substitute or at least complement IS researchers and co-produce IS research insights?

**Atreyi Kankanhalli** outlined the key activities that IS researchers perform (i.e., formulating problems, reviewing the literature, conducting theoretical modeling, designing empirical studies, collecting and analyzing data, discussing results, discussing theoretical and practical contributions, and writing quality publications) and discussed to what extent state-of-the-art AI tools can automate each activity. To her, AI cannot replace humans in conducting almost all these tasks. While AI can help one search for references for a literature review and discover patterns from data, it fails considerably in identifying research problems and building theory since these activities require semantic understanding that AI lacks. While AI could help one analyze data, she argued that understanding work's contributions requires human interpretation. Similarly, for the writing process, AI solely provides tools for preparing an initial draft, which may prove beneficial in some science fields that have more structure than IS. Last, she argued that even future AI tools may not be able to replace our current activities because they lack semantic understanding, an area that has seen little technological progress.

**Omar El Sawy** argued that AI offers an opportunity, not a threat. To him, AI creates new critical research issues that need IS researchers' attention. With regard to the opportunities arising from AI in the context of digital business strategies, he pointed out that narrow views of AI are deceptive and may miss its nuances and broader implications. Instead, AI brings new research issues to the evolving context of digital platform ecosystems for human researchers to investigate newly arising and highly relevant topics more closely and from broader perspectives rather than making IS researchers redundant.

**Dov Te'eni** argued that we should not examine IS researchers' current practices in order to predict what impact and role AI will have as such things will surely change whether AI supports or replaces human IS researchers. Already, AI-supported research reverses the sequence of activities that researchers follow in traditional hypothesis-testing research. Thus, to conduct many works based on machine learning, researchers begin with selecting a data set and then discover an interesting finding that they can formulate as an answer to a hypothesis that some theory can explain. Eventually AI may be able to autonomously perform such actions more effectively than humans, although humans can still generate research questions and identify insights from textual information that goes beyond linguistically analyzing a corpus better than AI can. IS researchers should distinguish between research with human-augmented AI and research that AI alone conducts. To him, ethical concerns arise when moving to an autonomous AI research mode without a human understanding fully and accepting the AI's conduct.

**M. Lynne Markus** argued that, given certain assumptions about the nature and topics of IS research, AI can and will almost certainly replace IS researchers. AI has already been demonstrated the capability to generate empirically testable hypotheses from analyzing the scientific literature, and many organizations use AI to generate publishable news stories from press releases and wire service bulletins. In particular, AI has already demonstrated the capability to create research literature reviews. For example, the German publisher Springer recently published an AI-generated book that aggregates 150 other Springer books on a specific research topic (Springer, 2019). To her, it is not implausible to expect that AI will replace a large swathe of IS research (and those IS researchers who do it) across the full scope of theory generation, hypothesis testing, and research report writing. M. Lynne Markus referred to the research that the economists Frey and Osborne (2017) have conducted. These authors forecasted that AI could automate 47 percent of the U.S. workforce and pointed out that their own algorithm forecasted a high likelihood that AI would replace economists. To her, the real issue concerns not whether such automation can happen to IS researcher but how IS researchers should rethink their mission and value proposition now. Researchers initially need to consider their socioeconomic role and value proposition.

**Stefan Wrobel** believed that AI will have a significant impact on both the way IS researchers conduct research and on the topics at that research's core. Over time and across fields, research ultimately produces deep, original, and novel insights that require creativity, high intelligence, and social interaction with the scientific community. In the digital era, data-driven research has gained a more prominent role as AI systems excel at dealing with large volumes of data and filtering, aggregating, and generalizing them. To him, any successful application of AI technologies in practice will involve machine-analyzed data and human knowledge in combination. Here, he spoke about "hybrid AI". As organizations, and IS research,

embed such (hybrid) AI, they will also have to deal with such systems. When understanding research and IS research in particular as a social process, those issues will likely become exciting avenues for future (human) IS research.

**Claudia Loebbecke** commented that today's AI research works towards understanding the black box behind phenomena, although our society widely accepts many such black boxes. She questioned that more broadly understanding black boxes will be realistic or relevant except for those few agents who actually develop them (i.e., the AI). She claimed that hardly anybody ever tried to understand how and why the Beatles composed the Yellow Submarine the way they did or ever challenged the black box behind the weather app on one's smartphone. As it does not take a meteorologist to happily use and benefit from the weather forecast with its mistakes and lacking preciseness, it will not take a world-class composer to enjoy or market AI-composed music pieces. Similarly, not everybody who uses spreadsheet functionalities understands how the calculations work. Hardly anybody can explain the result list of their last Google search. Would it be nice to know and understand? Perhaps yes, but, perhaps, in most cases, the user could not care less. We are used to not knowing. Loebbecke favored increasing awareness among IS researchers and their audiences about how results and insights depend on input data and algorithms.

To summarize the first round, Kankanhalli and El Sawy began in the IS research comfort zone. To them, IS research differs from more structured research fields, which means AI will replace them to a lesser degree. Therefore, IS researchers should not waste the community's precious time with worrying too much about ourselves; rather, they should embrace AI and help it make a difference to the world. To them, the time has not yet come for research that AI tools conduct autonomously. Te'eni questioned if AI may or may not substitute or complement certain IS research tasks is the right question to pose and suggested that it may be more relevant and fruitful to look at the new human tasks that the AI revolution brings. Subsequently, Markus and Wrobel left the IS comfort zone and laid out what has occurred in the real world outside the wallet garden of IS departments and protected, tax-funded research institutes. The questions should be whether the products meet the expected quality demands and are actually interesting to read.

## 2.2 Question Two

**Q2:** Which specificities inherent to IS research (compared to other white collar, intellectual, or creative professional activities)—rather than which technologies—will further increase the AI-driven challenge to IS research?

**Atreyi Kankanhalli** pointed out that AI can help in business analytics and some industry tasks to “get something that works” without worrying about how it works. Indeed, the failures of IBM Watson show that the machine remains its infancy when performing complex tasks such as clinical diagnoses. However, IS researchers care about understanding how things work. AI can be more salient in research fields with more structure than IS. She argued that AI may still not be useful for creative tasks. To her, the media and IT companies have hyped claims that IT has generated art and music. As humans still design the algorithms for such music- or art-creation systems, she expressed skepticism about the potential for AI to execute creative and complex research tasks.

**Omar El Sawy** pointed out that IS research represents just another business sector or application field that could gain from reviewing and potentially reviving its digital business strategy, which includes AI-based components. He argued that AI would likely assist some IS research but that AI initially does not cover the “why” in research. To him, AI might serve as a research assistant that focuses on the technology rather human skills such as creating value or trust. Whereas IS researchers mainly want to build theory and formulate the “why”, AI networks only open up new possibilities and support for providing answers to the “why” and, thereby, contribute to testing and finalizing theories.

**Dov Te'eni** argued that IS research has its origins in human practices in managing, using, and being affected by IS. Therefore, practice should direct and validate IS research. As long as humans continue to participate in IS practice, they must participate in the research-practice loop. Human practitioners (i.e., designers, managers, users, and affected individuals) should also validate and direct research regardless of whether humans or AI perform it. In an extreme scenario where AI replaces IS researchers and practitioners, AI could study and evaluate itself without human IS researchers' knowing what moral decisions the AI took to evaluate itself—would we want that?

**M. Lynne Markus** pointed out that IS research has begun to exhibit fundamental changes in focus and methods. Earlier, IS research used to focus primarily on IS design, use, and management. Today, IS research covers increasingly remote topics; for instance, much IS research uses data analytics to understand IS-distant topics such as changes in physician behavior in response to changes in healthcare guidelines. The farther IS research moves into using analytics as a research method for non-IS topics, the more likely AI will eventually automate it because one can and many have automated data analytics, programming, and analysis. Overall, moving away from initial IS research roots makes it more likely for AI and other automating technologies to replace IS researchers.

**Stefan Wrobel** pointed to cases, such as in medicine and agriculture, where not using AI would be irresponsible. Here, AI supports individual solutions for highly specified medical research areas (Conner-Simons & Gordon, 2019). He wondered who would today feel comfortable to draw the line between more or less influenced or automated research applications and fields.

To summarize the second round, Kankanhalli and El Sawy agreed that vital tasks for IS researchers to conduct remain, such as developing new ideas and original thinking. The “why” remains a question for humans to answer, even though AI can augment the research process. Te’eni questioned humans’ ability (the human brain still cannot explain itself) and pondered about AI’s self-investigative potential. Markus and Wrobel emphasized the choices that IS researchers must make to stay relevant in the future and that they should not see AI solely as a competitor.

### 2.3 Question Three

**Q3:** How could IS researchers—starting from a position of strength and early awareness—prepare themselves and the field for whatever AI will bring to IS research as our profession?

**Atreyi Kankanhalli** argued that IS researchers should prepare for the AI onslaught by embracing a more abductive process to leverage AI as we move to a more data-driven paradigm whether we like it or not. She believes that using AI will allow one to inductively reveal data patterns that will inform deductive research approaches and vice versa. Overall, she advocated for a switch from viewing AI as a substitute to seeing AI as a complement and suggests thinking how IS researchers can work symbiotically with AI.

**Omar El Sawy** referred to the likely arising focus in the AI world on abductive research with continuous interplay between data and theory. In particular, he claimed that data provides insights and options regarding sequences and patterns in research. Furthermore, to him, IS researchers have a responsibility to comprehend the black box of AI, to make it more transparent with explainability, and understand the facets at the interface of the AI-human domains.

**Dov Te’eni** emphasized that as AI still has grey marks for IS researchers, which, for now, makes it hard to trust. To maintain control and autonomy, he claimed that: “if we can’t beat them, join them”. He suggests that IS researchers should actively participate in developing AI to tackle its current limitations such as problematic communication and simultaneously maintain trusted research communities. He wishes to see human activity in research that involves people’s feelings and desires (e.g., having fun), colleagues’ dialog, criticism and judgement, and cultural and societal norms of thinking and behaving.

**M. Lynne Markus** stated that IS researchers do not have the main responsibility and decision power over how to use AI in research and teaching. Institutional actors such as funding agencies, universities, and accreditors may have a bigger say in whether and to what extent AI automates IS researchers. It remains to IS researchers to use what autonomy we have to benefit IS research.

**Stefan Wrobel** emphasized the importance of considering AI in a macroscopic perspective. He specifically questioned how larger ecosystems should be run and how we can design organizations that resist disruption and change with regard to AI. So far, technological advancements have driven organizations. IS researchers should look at things they cannot yet do with current technology (i.e., where AI could come in). In this regard, he claimed that even music compositions often use AI applications, such as for creating death metal music (Winkie, 2019).

**Claudia Loebbecke** again questioned the claim that IS researchers need to understand the black box. She explained that, in many cases, it is simply not relevant to open the black box of AI (i.e., knowing how it works does not provide any value to its users). What is important to know is that it works. For example, she wondered whether it makes sense for laymen or IS researchers to understand the detailed data of a blood sample report targeted for medical experts. She believed that people trust a lot of data-driven results, products, and decision supports—maybe not the first time they see them but once they see that

they produce better results than what human experts could provide. Remember grandpa who looked into the clouds to tell when the next rain would fall? To her, IS researchers should not insist that technology, here AI, is of good use only if they fully understand it. Instead, IS researchers should raise and spread awareness of potentially good and bad ways to use AI.

To summarize the final round, Kankanhalli, El Sawy, and Markus mentioned how we need to take responsibility for important tasks ahead such as maintaining a critical view. Te'eni recapped the social values of doing research and emphasized the process rather than the outcome. Wrobel and Loebbecke invited the audience to zoom out and see AI from a larger perspective and take to a historical perspective on factual research's value and wisdom.

### 3 Q&A with the Audience

After the panel addressed the three questions, the audience challenged the panelists and offered insightful arguments to dig deeper mainly into three aspects of the topic at hand. In Sections 3.1 to 3.3, we present each topic and present the main reactions that the panelists provided to it.

#### 3.1 The Social Grounding for Debating AI's Impact on IS Research

How can we consider that the body—as center of human intuition—can guide research that humans perform in a way that AI cannot?

During the discussion, the audience pointed to the importance of considering the human beings' foundation according to Bourdieu (1986) and Dewey (1930) and emphasized the embodied cognition (i.e., people's ability to understand through the body) (Dreyfus, 1972). One risks taking an overly narrow approach to knowledge creation, intelligence, and research as being solely based on the individual. Social constructionism provides alternative explanations to understand the future impact that AI may have on IS researchers and their community. In response, Wrobel granted that the human body constitutes an important factor that distinguishes people from AI. Markus agreed that the human body can be an advantage in decision making considering the quality of intuition that machines currently lack. However, she also stressed that human decision making suffers from fatigue, illness, and bad moods as behavioral economics shows. Consequently, we cannot rely on comforting claims to human uniqueness to save us from external pressures toward automation.

#### 3.2 The Future Contribution of IS Research on a Continuum from Generating to Regenerating Knowledge

What will characterize IS research in the future? Do we expect that IS research may turn into mainly regenerating knowledge originally presented as massively collected data “massaged” for human digestion and regeneration? What will IS researchers do and disseminate their insights if AI produces and skims text and a good part of learning moves towards real time?

The audience also suggested that emphasizing the importance for IS researchers to understand how AI works and how AI influences the value of knowledge. IS researchers should put more effort into making such information accessible and comprehensible to laypersons. Original research—which humans supposedly offer—drives value, whereas common or trivial insights—which machines will likely generate—usually do not drive value. Machines rather speed up the research process and ease the IS researchers doing their work.

Since industry 1.0, when electricity emerged, technology has replaced people. Resistance towards new technology that we do not fully understand and, therefore, perceive as potentially threatening to the status quo does not represent a new phenomenon and typically leads to emotional reactions. We need to better understand the contextual influence of AI and detect when AI poses a problem or when we need to address human attitudes towards change in general.

#### 3.3 The Role and Impact of Human Irrationality Compared to “Rational” Machines in the (IS) Research Context

To what degree will IS (and other) researchers base their predictions on what they know about technology or on what they know about the broader domains under investigation? How should they deal with the assumption that machines are rational and people are irrational?



Referring to human irrationality compared to machines, the audience questioned whether we base our predictions on what we know about technology in particular or on what we know about more broad domains. Moreover, we also need to debate AI knowledge's level and scope in a socio-political context. Knowledge is power, so what do we need to know about AI and for whom? Should IS researchers advocate for efforts to democratize AI skills (i.e., that every layperson understands the technology and processes behind AI in depth) or should we black box AI knowledge and label it "IS researchers only"? Some argued that the former is neither valuable nor possible due to the high complexity of the processes, which even specialists find hard to understand.

## 4 Takeaways

The panelists agreed that AI is here and will increasingly become a human companion. However, paying tribute to the panel structure, they did not reach consensus on the impact that AI will have on IS research and IS researchers. While the general notion was that AI would *likely* make the life of IS researchers easier, some believed AI may also help identify and perhaps even solve future problems.

Concerning the issue of human-AI interaction (and substitution), it remained open for future discussion to what extent IS researchers should they meet AI as a friend or foe and whether they should embrace AI or try to keep it at distance. The discussion tapped into deeper concerns about professional roles, identity, and working culture due to the shift in jobs and skills in the future if AI taking over existing competences.

Although the panelists had several answers to the questions posed in the panel, more questions actually emerged from the debate. Altogether, the panel offered seven sets of questions for future research:

- **Digging deeper in the IS field:** for which IS research tasks or research subfields may AI substitute or at least complement IS researchers and co-produce IS research insights? Which parts of IS research will ongoing AI developments least and most impact? And why?
- **Comparing the IS field to other intellectual fields:** which specificities inherent to IS research (compared to other white collar, intellectual, or creative professional activities) will further increase the AI-driven challenge to IS research and demand the field to pro-actively take a position?
- **Preparing the IS field to the advent of AI:** how could IS researchers contribute to preparing the IS field to take advantage of AI development? How could IS researchers think about this issue beyond technology and focus on AI's management aspects?
- **Operationalizing the human contribution to IS research:** which human (body) characteristics will ensure human research differs from AI-based investigations? How can we operationalize and perhaps even quantify the role and impact of researchers' intuition in IS research projects—in designing research projects, collecting and analyzing data, and in assessing and interpreting research findings? How should IS researchers deal with the interconnectedness of AI—especially with AI starting to "socialize" in digital networks?
- **Assessing the value of (human) IS domain knowledge:** what role will (human) domain knowledge—here knowledge of the IS field—have in future IS research projects? How can we better understand which domain knowledge humans will continue to contribute to impactful IS research?
- **Improving our understanding of and trust in the AI contribution:** what will it take to understand the AI black box? How can we organize the research field so that IS researchers can all benefit from AI as we now all benefit from various tools for data input that have followed last millennium's punch cards.
- **Benefitting from human irrationality:** how could we turn the negative connotation of human irrationality (compared to rational machine outputs) into the opportunity to differentiate for success? As rational machines do and suggest the same all the time, economic and social success requires being different.

Overall, the panel left IS researches with important food for thought and choices to make in order to stay relevant in the future and take joint responsibility in the future development with AI.

Loebbecke summarized with a small common denominator among panelists: AI is here and it will not go away. Neither teaching, nor consulting, nor researching on IS and AI will protect IS researchers from

being impacted. Nevertheless, all of the above allows IS researchers to make educated choices from a position of strength:

*Sometimes, though, the professional outlook can become a disadvantage, preventing the very people who have the most at stake—the professionals themselves—from understanding major changes to the structure of their profession. (Shirky, 2008, p. 58)*

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## About the Authors

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