What Do I Do in a World of Artificial Intelligence? Investigating the Impact of Substitutive Decision-Making AI Systems on Employees' Professional Role Identity

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Abstract

Artificial intelligence (AI) systems in the workplace increasingly substitute for employees' tasks, responsibilities, and decision-making. Consequently, employees must relinquish core activities of their work processes without the ability to interact with the AI system (e.g., to influence decision-making processes or adapt or overrule decision-making outcomes). To deepen our understanding of how substitutive decision-making AI systems affect employees' professional role identity and how employees adapt their identity in response to the system, we conducted an in-depth case study of a company in the area of loan consulting. We qualitatively analyzed more than 60 interviews with employees and managers. Our research contributes to the literature on IS and identity by disclosing mechanisms through which employees strengthen and protect their professional role identity despite being unable to directly interact with the AI system. Further, we highlight the boundary conditions for introducing an AI system and contribute to the body of empirical research on the potential downsides of AI.

Keywords: Artificial Intelligence, Professional Role Identity, Substitutive Decision-Making, Future of Work

1 Introduction

"I myself, all on my own, was able to decide on one million euros." That's how you defined yourself as a loan consultant. You have to understand the psychological importance of this, because then a day came on which the bank decided from that day forward, the loan decisions would be made by this machine. ... Well, it was dramatic for the employees, giving rise to a logical question: "What is actually the sense of my being here? Up to now, I have defined myself based on my loan decision competence. Now it's being taken away from me. What is it all about?"
(Former CEO, AI Provider)

The above statement illustrates how introducing a substitutive decision-making AI system affects loan consultants' professional role identity. Professional role identity is defined in answering the questions "Who am I (as a member of a specific profession)?" and "What do I do?" (Chreim et al., 2007; Nelson & Irwin, 2014; Pratt et al., 2006; Reay et al., 2017). While consultants previously managed the entire loan process on their own, setting loan amounts and making loan decisions, loan consultants' core activities are now autonomously performed by the AI system, depriving them of any opportunity to influence the decision-making process or adapt or overrule the decision outcome. Therefore, introducing an AI system changes the way in which consultants do their work and how they perceive themselves as professionals,

consequently affecting their professional role identity (Acemoglu & Restrepo, 2018; Faraj et al., 2018; Manyika et al., 2017).

Existing literature on information systems (IS) and identity centers, first, on identities tied to material objects (Carter et al., 2020a, 2020b; Carter & Grover, 2015) and, second, on identities tied to work roles and social groups (Chreim et al., 2007; Nelson & Irwin, 2014; Pratt et al., 2006). Research on identities tied to material objects shows how users experience technological properties as personal resources and develop an IT identity (Carter et al., 2020b; Carter & Grover, 2015). Importantly, the literature on IT identity is based on employees' ability to interact with technology (e.g., to influence decision-making processes and to adapt or overrule decision-making outcomes). This enables employees to engage or even master technology, thereby integrating technology into the self (Carter & Grover, 2015). However, if a company introduces a substitutive decision-making AI system, it eliminates employees' ability to interact with the system because they can neither influence the decision-making process nor adapt or overrule the final outcome (Lindenbaum et al., 2020). Consequently, employees are restricted in their attempts to build an IT identity.

The literature covering work roles and social groups shows how employees seek to maintain their professional role identity when confronted with a newly introduced technology by adapting or restructuring themselves or their work processes (Craig et al., 2019; Mishra et al., 2012; Petriglieri, 2011). Thus far, it is unclear how introducing a substitutive decision-making AI system with its unique characteristics affects employees' professional role identity. AI systems not only substitute parts of employees' work processes, but many can also replace defining core activities that constitute the profession itself (Acemoglu & Restrepo, 2018; Anderson et al., 2018; Bughin et al., 2018; Harari, 2017). Such AI systems are able to evaluate new information and use their learning abilities to adapt their decisions and adjust their behavior (Agrawal et al., 2017; Anderson et al., 2018; Brynjolfsson & McAfee, 2017; Burrell, 2016; Manyika et al., 2017; Raisch & Krakowski, in press). However, in many cases, AI systems are nontransparent and employees often perceive them as inexplicable (Anderson et al., 2018; Dourish, 2016; Faraj et al., 2018). AI's potential to substitute for entire work processes, along with employees' inability to interact with the technology, forces employees to seek new answers to the questions "Who am I?" and "What do I do?" Substitutive decision-making AI systems therefore challenge professionals' identities in a novel way.

To investigate AI's disruptive influence on employees' professional role identity, we examine the following research questions: (1) How does the introduction of a substitutive decision-making AI system affect employees' professional role identity? and (2) How do employees adapt their professional role identity in response to these AI systems?

To answer these research questions, we chose to conduct an in-depth case study with a substitutive decision-making AI system of a large bank, which wishes to remain anonymous and is thus referred to as *Main Finance*. *Main Finance* introduced an AI system labeled *CleverLoan* (a pseudonym chosen for reasons of anonymity and simplicity). *CleverLoan* is an analytical and learning AI system that can autonomously substitute for humans in performing tasks involved in regular work processes— specifically, granting loans to private customers. Overall, we conducted interviews with 53 employees and managers working at *Main Finance*, as well as with 11 representatives working at the AI system's provider, referred to as *AI Provider* (for reasons of anonymity and simplicity).

Our research contributes to both theory and practice. In terms of theory, we contribute to the literature on IS and identity by explaining how a substitutive decision-making AI system affects employees' professional role identity. Our study discloses seven mechanisms that employees use to cope with a substitutive decision-making AI system in the attempt to strengthen or protect their identity. Finally, we contribute to the literature on the downsides of AI and emphasize the drawbacks of AI substituting for employees' work processes. In terms of practice, our study reveals the opportunities and challenges associated with introducing an AI system and offers suggestions on how to amplify the opportunities, address the challenges, and ensure a successful introduction.

2 Theoretical Background

2.1 Professional Role Identity

Professionals become strongly attached to their work through lengthy educational and socialization processes that enable them to define themselves with respect to the goals, values, norms, and interaction patterns associated with their work (Pratt et al., 2006; Reay et al., 2017; Stein et al., 2013). Thus, professionals not only define themselves in association with their own work but also in relation to the work of others (Abbott, 1988; Becker et al., 1961; Freidson, 2001; Reay et al., 2017). Therefore, professional role identity can be analyzed on both an individual and collective level (Chreim et al., 2007; Pratt et al., 2006; Reay et al., 2017; Sluss & Ashforth, 2007). Studies focusing on the individual level examine how, over time, individual employees develop their own identity through education, training, and experience (Ibarra,

1999; Pratt et al., 2006). Studies focusing on the collective level examine how professionals develop their role identity in relationship to others and to their work (Pouthier et al., 2013; Powell & DiMaggio, 1991). Specifically, the contrast between oneself others in similar settings shapes one's professional role identity (Chreim et al., 2007; Sluss & Ashforth, 2007; Vough et al., 2013).

Professions are associated with a professional role identity that is an important determinant in perceptions of change (Craig et al., 2019; Petriglieri, 2011). In an institutionalized context, professionals' role identity is highly valued and resilient to change (Becker et al., 1961; Pratt et al., 2006; Reay et al., 2017). Therefore, professionals may perceive changes to their work processes as a threat to their professional role identity (Craig et al., 2019; Kim & Kankanhalli, 2009; Lapointe & Rivard, 2005; Marakas & Hornik, 1996; Petriglieri, 2011). If they feel that their identity is threatened, they often respond by rejecting mechanisms, making it difficult for organizations to promote change (Lapointe & Rivard, 2005; Petriglieri, 2011). Thus, research that offers an in-depth understanding of professionals' role identity and provides insight into the effect of technologically induced changes on the professional working environment is critical.

2.2 Professional Role Identity in the Context of IS

The increasing introduction and use of IS challenges professionals' role identity by fundamentally altering professionals' work processes (Brynjolfsson & Mitchell, 2017; Faraj et al., 2018; Manyika et al., 2017). Studies that focus on the positive effect of IS on employees' identity highlight, in particular, how IS can enhance professionals' role identity (e.g., Kyratsis et al., 2017; Nelson & Irwin, 2014). For example, Stein et al. (2013) found that professionals rely on IT implementation events as landmarks in their identity development, while their self-understanding determines which features and functionalities of the technology they interact with. However, other studies have shown that introducing a new IS can also threaten professionals' identity (Craig et al., 2019; Kim & Kankanhalli, 2009; Lapointe & Rivard, 2005; Marakas & Hornik, 1996). These studies focus on professionals' role identity changes and on their response strategies. For instance, Nach (2015) found that doctors and nurses perceived their identities to be threatened when they were forced to deal with a newly implemented electronic health records system. They responded by adapting their identity in relation to the degree of control they had over that particular IS. In another study, Nelson and Irwin (2014) reported on the threat, adaptation, and redefinition of librarians' professional role identity after search engines reduced the need for

their specialized knowledge and attenuated the associated affirmation of their social value. They found that librarians initially disparaged internet searches and actively differentiated themselves from the new technology. Over time, however, librarians began to engage with the new technology and redefined their identity by taking advantage of internet search opportunities. Nelson and Irwin (2014) labeled this phenomenon the paradox of expertise. Overall, prior research shows that introducing IS does affect professional role identity.

2.3 Artificial Intelligence and Professional Role Identity

Institutions are increasingly introducing AI systems in the workplace (Brynjolfsson & Mitchell, 2017; von Krogh, 2018). Although automating tasks has long been a major topic in IS research (Rai et al., 2019; Zuboff, 1988), AI systems have unique characteristics that go beyond automation. First, AI systems have the potential to substitute for entire work processes. Second, they can eliminate employees' interaction possibilities. Third, they can learn and thus may derive unpredictable work outcomes, and fourth, they are often not transparent to employees and therefore lack explainability. Consequently, these AI systems fundamentally challenge professionals' role identity, as explained in the following paragraphs.

First, unlike previous IS, AI systems are capable of autonomously taking over entire work processes rather than substituting for specific tasks (Acemoglu & Restrepo, 2018; Bailey et al., 2019; Stone et al., 2016; von Krogh, 2018). Moreover, these systems can even replace a profession's core work processes. Consequently, using an AI system potentially restricts professionals' ability to apply their skills, knowledge, and expertise to these substituted tasks (Craig et al., 2019; Petriglieri, 2011).

Second, substitutive decision-making AI systems offer employees no possibility of interacting with the system (Lindenbaum et al., 2020). Previously, employees could either eliminate or adapt an identity threat by altering, rejecting, or overruling a decision derived by the AI system (Lebovitz, 2019; Rai et al., 2019) or by relying on specific features introduced by the system as an extension of the self (Carter et al., 2020b; Carter & Grover, 2015). For substitutive decision-making AI systems, these options are no longer available, meaning that introducing such AI systems severely impedes professionals' ability to respond and thus represents a hitherto unprecedented challenge to their professional role identity.

Third, in contrast to previous IS, the AI system's ability to learn allows it to process new, structured information and derive decisions based on changing parameters (Faraj et al., 2018). Additionally, AI

systems have the potential to train themselves and autonomously adjust to new training data (Benbya et al., 2020). Therefore, AI systems are capable of performing tasks and work processes without any human involvement (Benbya et al., 2020). Again, while this sounds intriguing, it also means that professionals are less able to predict the decisions of such systems (Dourish, 2016; Rai et al., 2019). This unpredictability defies employees' formerly acquired and highly valued competence, expertise, and work-related knowledge, thus challenging their professional role identity.

Finally, because IS are programmed combinations of logical arguments, professionals could previously understand them, at least to some extent. AI systems, in contrast, are often fully nontransparent to users (Dourish, 2016; Faraj et al., 2018). The underlying algorithms have a level of complexity that most professionals find impossible to explain (Faraj et al., 2018; von Krogh, 2018). Thus, professionals find their role identity challenged because they cannot apply their own skills and competencies to fulfill their tasks.

Overall, substitutive decision-making AI systems do challenge professionals' role identity in ways that go beyond previous IS. However, to date, it remains unclear how AI systems alter professionals' role identity and how professionals are responding to this new situation. By examining AI systems' impact on professionals' role identity, we broaden our understanding of the changes that introducing AI systems bring to the work context and elaborate how professionals react to these changes.

3 Research Setting and Methodology

Methodologically, we chose an in-depth case approach for two reasons. First, there are few successful use cases of AI systems substituting for tasks in human work processes because introducing a broad spectrum of well-suited AI systems is still at an early stage. Second, because of the novelty and rarity of substitutive decision-making AI systems in the workplace and their impact on employees' work processes, it is important to reveal the mechanisms of human reactions to these changes. Using an in-depth case study allows us to shed light on novel phenomena (Eisenhardt, 1989), enabling observation and an understanding of underlying mechanisms and relationships at the individual level (Eisenhardt, 1989; Gioia et al., 2013). Access to both employees and managers at *Main Finance* and *AI Provider* enabled us to investigate the benefits and challenges that substitutive decision-making AI systems hold for human work processes and identify their effects on employees' professional role identity.

3.1 Case Description

Main Finance is a large banking group in the financial industry with total assets of about one trillion USD. With about 900 institutions and more than 9000 branches, it currently employs approximately 135,000 people. The banking industry was among the first to introduce AI systems offering fully automated decision-making (Bahrammirzaee, 2010), which makes this industry particularly suitable for a case study. Professionals with specialized knowledge such as technicians, lawyers, nurses, or consultants are generally afforded higher levels of prestige and autonomy than nonprofessionals (Pratt et al., 2006). Consequently, loan consultants generally develop a strong professional role identity, which is confirmed and reinforced by the loan consultants themselves as well as their social environment. Therefore, researching loan consultants' responses is suitable for studying how AI systems can affect employees' professional role identity and for investigating how employees adapt their professional role identity in response to the introduction of such systems.

Main Finance recently introduced an AI system, *CleverLoan,* in its private small loan business because the company faced four major issues in this segment. They experienced (1) increasing competition from new market participants because of digitization, (2) a mismatch in their own personnel resources, (3) high loan default rates, and hence (4) declining profitability (Mayer et al., 2020). First, the increased competition came from online banks that not only offered less expensive terms but also processed loan applications more quickly. Many customers switched to online banks that could complete the process in a few days, compared to the few weeks it took at *Main Finance*. Second, automating more and more processes brought a surplus of low-skilled service employees (e.g., at the service front desk or reception) to *Main Finance*. However, as a sustainable employer and business partner in local communities, the company preferred to maintain existing contracts with potentially redundant employees. Simultaneously, the company faced a shortage of qualified loan consultants because of an internal demographic change and the difficulties related to appointing qualified new professionals. Third, *Main Finance* ascribed high default rates in the small loan business to consultants' individual decisions on loan approval and rejection, which often relied on inconsistent and subjective evaluations of customers' creditworthiness. Finally, these aspects combined led to a decline in the profitability of *Main Finance's* small loan business.

The company decided to introduce *CleverLoan* to overcome the challenges mentioned above. To implement the decision, *Main Finance* appointed the German IT service company *AI Provider* because of the trusted contractual relationship it has had with this

company since 2001. At the beginning of their cooperation, *AI Provider* supplied a tool to support *Main Finance's* employees in their decision-making. Consultants could use the tool to orient themselves in loan decisions based on predefined decision criteria. Initially, the system was only a decision-support tool that made recommendations that loan consultants could change, adapt, or ignore. Since then, because of progressing technological advancements, *AI Provider* has increasingly developed AI-based solutions to enhance the efficiency and profitability of specific business segments in the banking industry. One of these AI-based solutions is *CleverLoan* which is currently *AI Provider's* core product.

The latest version of *CleverLoan,* launched in 2017, became a fully automated loan-granting tool that completely substitutes for consultants' loan decisions and is able to learn. *CleverLoan* makes loan approval or denial decisions, determines the terms and conditions of loans, and autonomously alters lending criteria based on customer behavior and current market changes. Although consultants are neither involved in the decision-making process nor able to alter the outcome, they nevertheless have to work with the AI system by entering customers' data into the system and then communicating the AI-made decision to customers.

3.1.1 CleverLoan as an AI System

CleverLoan was specifically developed for small loans of up to USD 100,000. These are mainly unsecured loans, which customers use for home improvements, vacations, or new cars, for example. The AI system determines the terms and conditions of the loan based on a complex combination of dynamic and static characteristics such as age, marital status, income, place of residence, and assets, collected from both customers and external sources. *CleverLoan* automatically connects with external databases to verify information and evaluate customers' creditworthiness, collecting data on, for example, customers' account balances and SCHUFA.[1]

CleverLoan is an AI system that uses historical data to learn and to predict future decisions. As required by European law, *CleverLoan's* underlying decision algorithms are comprehensible and thus verifiable. However, they are known only to a small number of *AI Provider's* managers and employees and are shared with neither managers nor employees of *Main Finance*. Therefore, consultants have no insight into how *CleverLoan* makes its AI-based decisions. Moreover, *CleverLoan* is a learning AI system, which allows the

system to continuously optimize its lending criteria and its associated terms. Therefore, the AI system regularly adapts interest rates and adds or deletes specific lending criteria. One example is the addition of the lending criterion *length of stay in Germany* following the European refugee crisis in 2015. The system's constant evaluation of customers' repayment behavior indicated that applicants who had only recently moved to Germany were more likely than others to default on their loan repayments. Consequently, *CleverLoan* denied loans to any customers living in the country for less than six months. Although the system learned that this was an important criterion for loan decisions, adding it to the system had to be approved by *AI Provider's* management board.

> There are many, many different sources of information the system uses to make a decision. For example, it evaluates customers' past behavior and uses this data for its decision. All these different bits of data go into a so-called scorecard that is the foundation of the final decision. This scorecard is validated by the management. (CEO, AI Provider)

Introducing *CleverLoan* at *Main Finance* has contributed to (1) increased competitiveness because the system is able to generate a decision immediately, (2) resolution of the mismatch in personnel resources because the system takes over loan consultants' core activities so that employees from other departments (e.g., the service area) can be redeployed, and (3) decreased loan default rates because the system generates more reliable decisions. Hence, introducing *CleverLoan* to *Main Finance's* small loan business has also contributed to (4) increased profitability overall. Based on these positive experiences with the AI-based consulting system, *Main Finance* intends to extend its use of AI-enabled processes into other areas such as commercial loans, construction financing, and the securities business.

3.1.2 The Changing Consulting Process Through the AI System

The introduction of the AI system has significantly affected the nature of consultants' daily work. Prior to introducing *CleverLoan*, consultants autonomously advised and granted loans to customers. Both the final decision of whether or not to approve a loan to a customer and the respective terms were dependent on consultants' personal assessment. Since introducing *CleverLoan*, the AI system has taken over the entire loan

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[1] SCHUFA (Schutzgemeinschaft für allgemeine Kreditsicherung), the General Credit Protection Association in Germany is a private nation-wide database holding credit information that indicates lenders' history of meeting financial obligations. Creditors can use the holistic database

of the SCHUFA to verify a person's creditworthiness. A comparable approach in the US is the credit history which creates credit scores for people to check their creditworthiness.

decision, autonomously determining which terms to apply. Thus, consultants no longer influence the decision-making process, nor can they adapt or overrule the outcome. Nevertheless, they are still responsible for communicating the AI-generated decision to the customer. Whereas, previously, consultants independently determined the structure of their consultations, the AI system now strictly prestructures the consultant-customer interaction. To illustrate the major changes in the consulting process before and after introducing the AI system, we provide an example (please see Figure 1 for an overview of how the AI system affected the consulting process).

To renovate his house, Tim needs a loan of USD 80,000. Tim is a long-standing customer of *Main Finance* who has known Sarah privately and in the role of consultant for many years. To apply for the new loan, Tim makes an appointment with Sarah. Before *CleverLoan* was introduced, Tim would have had to come to Sarah's office and verbally make a loan request, explaining the need for the loan and his personal situation and also

disclosing any other obligations (if applicable). Then, it would be up to Sarah to decide whether or not to grant Tim the loan. Her decision would be based partly on nonsubjective criteria (such as income and liabilities) but also on her personal assessment of Tim. Having known Tim for many years, she would decide to grant the loan, and ensure that Tim received a list of all documents required for the application (e.g., account statements, overview of current debts, etc.). Two weeks later, they would meet again and Sarah would personally check Tim's documents. She would notice that, from time to time, Tim's bank account is overdrawn and that he still has a pending loan from another bank. Nevertheless, because of their personal relationship, she would still approve the loan request and determine the applicable terms. Sarah would prepare the necessary paperwork and send the contract to an internal department to verify all information. Finally, Tim and Sarah would meet again the following week for Tim to sign the contract. He could expect to receive the USD 80,000 five days later.
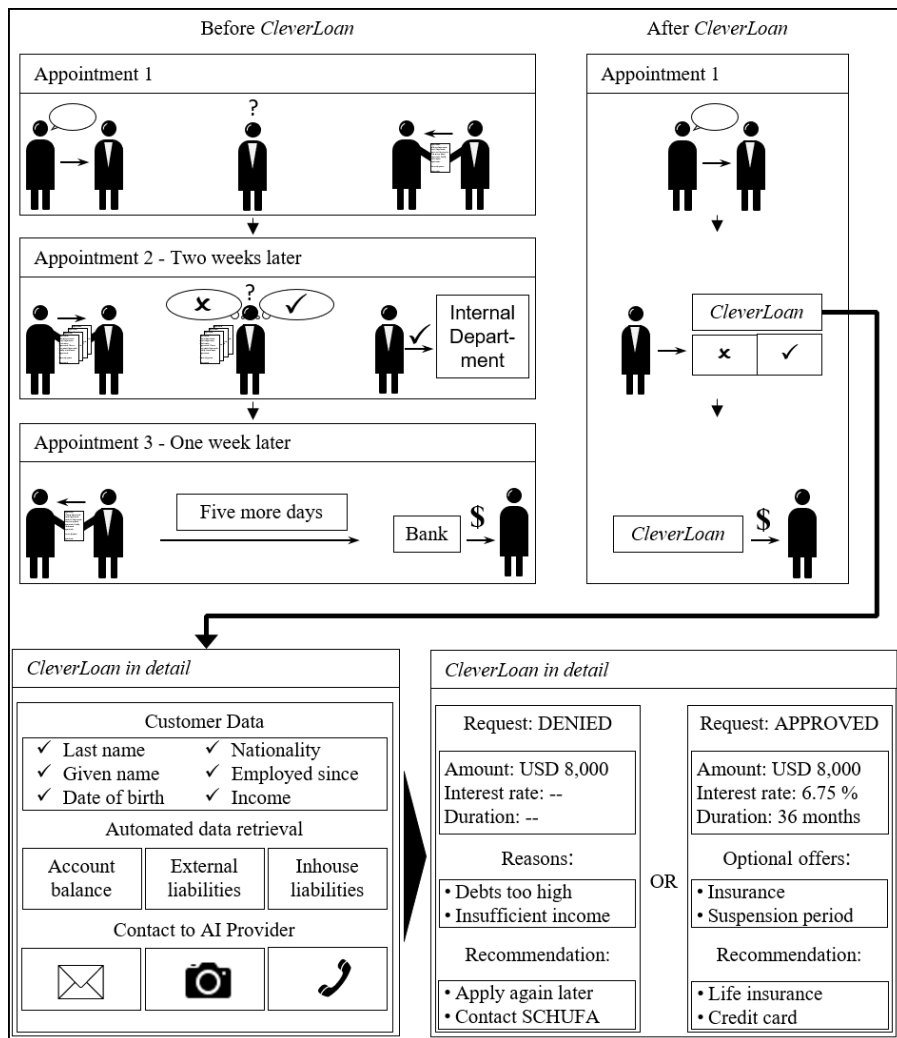

Figure 1. Loan Process Before and After Introducing CleverLoan

Table 1. Demographics of Interviewees

	Position	No. interviewed	Gender	Age (years)	Employment
Main Finance	Loan consultant	39	21 female; 18 male	20-59	1984-2019
	Management	14	2 female; 12 male	40-67	1973-2014
AI Provider	Management	3	3 male	52-55	2000-2011
	HR	2	1 female; 1 male	32; 34	Since 1999; 2015
	Sales	1	1 male	49	Since 2014
	Product management	3	1 female; 2 male	29-51	1995-2010
	Data analytics	2	1 female; 1 male	29; 31	Since 2017; 2018
Overall sum		64			

Since *CleverLoan* was introduced, the consulting structure and process have fundamentally changed. Tim and Sarah meet and Tim explains his request. Sarah immediately enters Tim's identity card information into *CleverLoan* and completes the given fields regarding name, age, profession, nationality, and marital status. She clicks on "make request" and within a few minutes the system displays the decision: loan rejected. The system automatically generates a guideline that Sarah follows in explaining the decision and recommending further action. In Tim's case, *CleverLoan* has indicated that his current debt load is too high, and Sarah thus recommends that he reapply for a loan once he has fully repaid the existing loans. Tim might try to convince Sarah to grant the loan, offering in return to pay an even higher than recommended interest rate. However, because Sarah cannot intervene in the decision-making process or alter the decision, she is obligated to refuse Tim's request. If his situation had been different and *CleverLoan* had approved the loan, he would have received the money on the same day. Further, the system would have provided additional offers and recommended services for Sarah to discuss with Tim, each of these being accompanied by detailed illustrations and guidelines directing Sarah throughout the consultation.

3.2 Data Collection

We collected data from multiple sources over a period of 12 months. We conducted semistructured interviews between January and December 2019 with consultants and managers at *Main Finance* and *AI Provider*, and obtained access to secondary data such as internal reports and evaluations. In addition, we were allowed to attend meetings and presentations and make observations during multiple on-site visits. These actions enabled us to gain an in-depth understanding of the AI system *CleverLoan,* and its impact on consultants' professional role identity.

In all, we conducted face-to-face and telephone interviews with 39 consultants working with *CleverLoan,* 14 managers at *Main Finance*, and 11 representatives working in the *AI Provider* departments of HR, sales, product management, data analytics, and top management. The interviews with consultants using

CleverLoan centered on questions about how the AI system had changed their work processes, the benefits and losses they perceived, how the perception of their work and profession had changed, and thus how the new system affected their professional role identity.

Our questions to the managers at *Main Finance* focused on their intended goals in implementing the AI system, the already observed outcomes, as well as how they assessed consultants' views. The questions to the *AI Provider* representatives were designed to gain an in-depth understanding of *CleverLoan*, its functions, development, and implications. We conducted the interviews until we reached theoretical saturation and no further new insights arose from additional interviews. We recorded the semistructured interviews and transcribed them verbatim. Table 1 gives an overview of the interviewees.

3.3 Data Analysis

There were three rounds of data analysis. Following an iterative grounded theory approach (Strauss & Corbin, 1990), we analyzed our data inductively and interactively, following Gioia et al.'s (2013) recursive three-round coding process. Therefore, we started with open coding, followed by selective coding of the transcribed data. We first coded the interviews independently. Afterwards, we discussed and revised the identified categories until all authors agreed on the codes and their allocation.

In the first round, open coding gave us an overview of how consultants used to carry out their work before *CleverLoan* was introduced. Also, we coded statements that illustrated how the AI system had altered the ways in which loan consultants work and how they perceived this new way of working. Based on this open coding process, we derived our first-order concepts.

In the second round of coding, we categorized the emergent first-order concepts into second-order themes. In doing so, we moved back and forth between the themes that emerged and our theoretical framing of professional role identity (Chreim et al., 2007; Nelson & Irwin, 2014; Pratt et al., 2006; Reay et al., 2017). For example, we summarized interviewees' statements in the first-order concept describing their perceived

professional role before and after the AI system had been introduced, such as: "As a consultant I used to make the final decision. Now I feel more like a data entry assistant" (Consultant, SR-C, *Main Finance*). We then clustered the first-order concepts into the second-order theme, *professional role identity*. Further, we combed through the data to find information on how employees adapted to working with the AI system and identified two opposing perceptions: one group of consultants particularly emphasized *CleverLoan's* positive effect on their work processes and their professional role identity; another group mainly addressed negative effects. Closer inspection and data clustering revealed that the critical difference between the two groups lay in the respondents' previous work experience. Specifically, we found that consultants with prior loan consulting experience largely addressed the negative impact that *CleverLoan* had on their work processes and thus also on their professional role identity. The second group of consultants were those with little or no prior consulting experience; they particularly emphasized the positive impact of working with the AI system.

Once we derived a full set of second-order themes, we started connecting them to more abstract dimensions in order to derive a coherent picture of our data. In the third coding round, we discussed and rearranged our aggregated dimensions multiple times, constantly comparing the findings to our theoretical lens. At the end of this round, we derived an empirically grounded model that guided us in answering our research questions. Figure 2 illustrates our data structure.

4 Findings

Our interviews disclosed major differences between two groups of loan consultants—that is, between the group who had worked as loan consultants before the AI system's introduction and the group who only started working in this capacity after the AI system was introduced. The first group, which we labeled *Self-Reliant-Consultants* (SR-C), perceived the newly introduced AI system as a threat to their professional role identity. Becoming a loan consultant had previously required special training and education in loan consulting, banking, and financial services, as well as extensive experience in the field. SR-C previously enjoyed considerable freedom in terms of how they approached loan solutions and also made independent decisions on loan amounts. In terms of reputation, they enjoyed high esteem among their colleagues and friends.

The second group of consultants, labeled *AI-Dependent Consultants* (AID-C), perceived the newly introduced AI system as empowering. They particularly stressed the AI system's positive effects on their work. AID-C were employees who had not been in the lending business for long and therefore had less experience in

the area. AID-C had been transferred to the loan department within the bank from lower positions and departments (e.g., from the service front desk or reception) or they were newcomers. AID-C were able to work as consultants only because the AI system had taken over the core task of loan consultancy. Despite the differences, the two groups work in the same setting, have the same job description, and fulfill the same tasks. In the following section, we explain how the AI system changed the two groups' professional role identities (for an overview see Table 2) and illustrate which mechanisms each group developed in response to their altered professional role identity.

4.1 Consultants' Professional Role Identity Before the AI System

The tasks and responsibilities of SR-C, their work processes, and their professional role identity were shaped by their expertise and experience in loan consulting. In addition, SR-C had a special standing in the bank because of their competence and authority in granting loans, which was a privilege afforded only to certified loan consultants. Resulting from their decision-making autonomy and their particular expertise, SR-C reported perceiving themselves as "creative artists" and "problem solvers" who could "make dreams come true," "enable families to build their dream house," or "fulfill individual customers' dreams," because SR-C were able to find and create solutions for each individual customer request. Some SR-C compared themselves to respected community leaders because the loan consultancy profession was so highly respected and recognized:

> *Well, in the end I became a consultant because the job description was interesting and being a consultant felt something like being the mayor in a city council, or a pastor, or an alderman in town; someone you could always go to for advice.* (Consultant, SR-C, *Main Finance*)

In contrast, the second group of consultants defined their professional role identity in more service-oriented terms. Before the AI system was introduced, AID-C worked in lower service-oriented positions, for example at the front service desk. They welcomed customers to the bank, guided them to their consultants, filled out transfer forms, helped disburse funds, etc. In that capacity, AID-C completed given tasks and acted as the bank's representatives, shaping customers' first impressions. Consequently, AID-C perceived themselves as "friendly, customer-oriented, and helpful" employees, who set "the first impression of the bank," and "make customers feel welcome." AID-C mostly described their professional role identity as follows: "It's all about making customers feel welcome and giving them the feeling that they are in good hands at our bank." (AID-C, *Main Finance*)
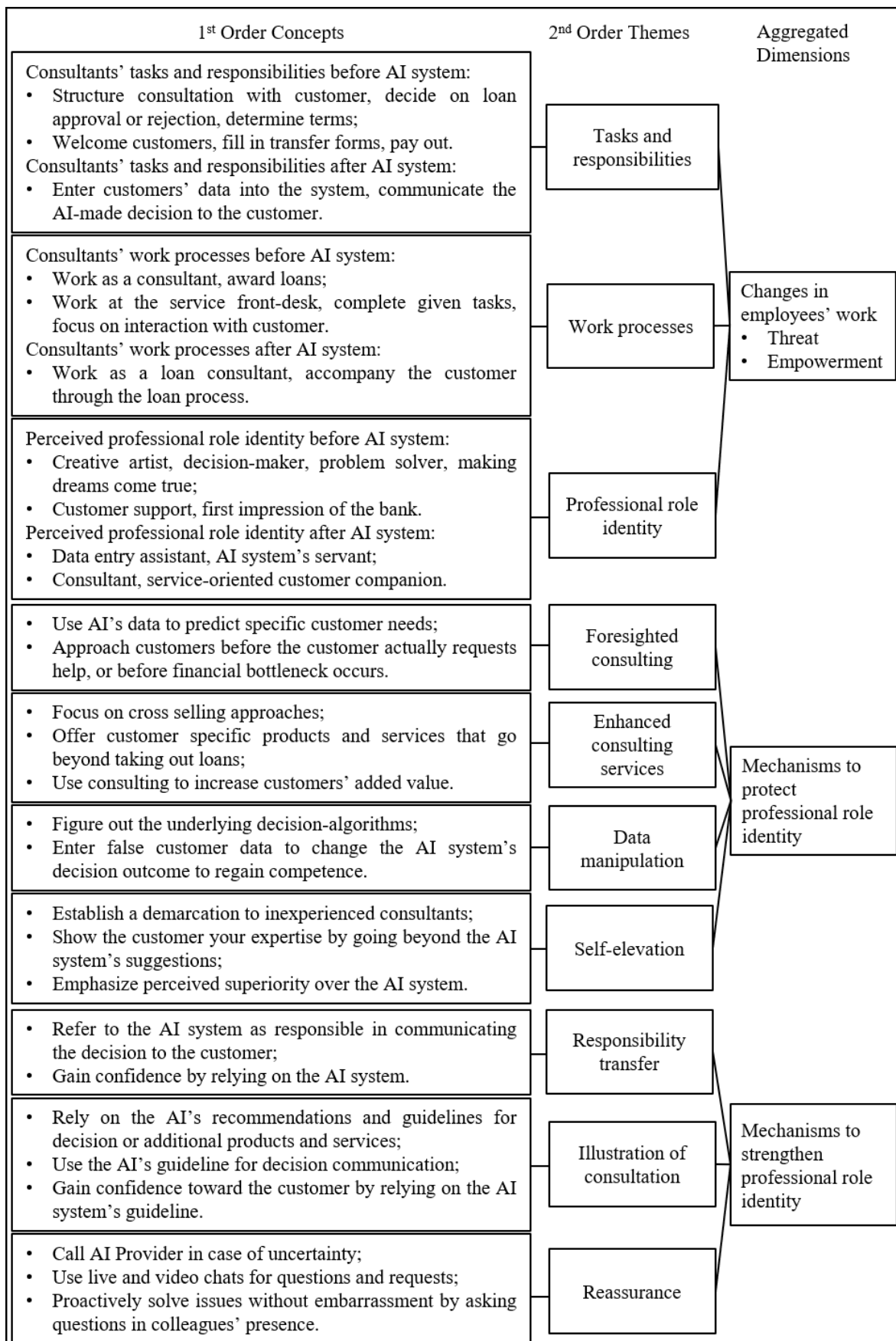
1st Order Concepts	2nd Order Themes	Aggregated Dimensions
Consultants' tasks and responsibilities before AI system: • Structure consultation with customer, decide on loan approval or rejection, determine terms; • Welcome customers, fill in transfer forms, pay out. Consultants' tasks and responsibilities after AI system: • Enter customers' data into the system, communicate the AI-made decision to the customer.	Tasks and responsibilities	
Consultants' work processes before AI system: • Work as a consultant, award loans; • Work at the service front-desk, complete given tasks, focus on interaction with customer. Consultants' work processes after AI system: • Work as a loan consultant, accompany the customer through the loan process.	Work processes	Changes in employees' work • Threat • Empowerment
Perceived professional role identity before AI system: • Creative artist, decision-maker, problem solver, making dreams come true; • Customer support, first impression of the bank. Perceived professional role identity after AI system: • Data entry assistant, AI system's servant; • Consultant, service-oriented customer companion.	Professional role identity	
• Use AI's data to predict specific customer needs; • Approach customers before the customer actually requests help, or before financial bottleneck occurs.	Foresighted consulting	
• Focus on cross selling approaches; • Offer customer specific products and services that go beyond taking out loans; • Use consulting to increase customers' added value.	Enhanced consulting services	Mechanisms to protect professional role identity
• Figure out the underlying decision-algorithms; • Enter false customer data to change the AI system's decision outcome to regain competence.	Data manipulation	
• Establish a demarcation to inexperienced consultants; • Show the customer your expertise by going beyond the AI system's suggestions; • Emphasize perceived superiority over the AI system.	Self-elevation	
• Refer to the AI system as responsible in communicating the decision to the customer; • Gain confidence by relying on the AI system.	Responsibility transfer	
• Rely on the AI's recommendations and guidelines for decision or additional products and services; • Use the AI's guideline for decision communication; • Gain confidence toward the customer by relying on the AI system's guideline.	Illustration of consultation	Mechanisms to strengthen professional role identity
• Call AI Provider in case of uncertainty; • Use live and video chats for questions and requests; • Proactively solve issues without embarrassment by asking questions in colleagues' presence.	Reassurance	

Figure 2. Overview of Data Structure

Table 2. Overview SR-C and AID-C Before and After the AI System

Before the AI system		
	SR-C	**AID-C**
Tasks and responsibilities	Structure consultation with customers, decide on loan approval or rejection, determine terms.	Welcome customers, fill out transfer forms, help with pay-outs.
Work processes	Work as a consultant, award loans.	Work at the service front desk, complete given tasks, focus on interaction with customers.
Professional role identity		
"What do I do?"	Loan consultancy	Customer support
"Who am I?"	Creative artist, decision-maker, problem solver, makes dreams come true.	Service front desk employee, link between bank and customer, first impression of the bank.

After the AI system		
	SR-C	**AID-C**
Tasks and responsibilities	Enter customers' data into the system, communicate the AI-made decision to the customer.	
Work processes	Work as a consultant, accompany the customer through the loan process.	
Professional role identity		
"What do I do?"	Loan consultancy	
"Who am I?"	Data entry assistant, the AI system's servant, customer companion.	Consultant, service-oriented customer companion.

4.2 Consultants' Professional Role Identity Following the Introduction of the AI System

The AI system altered both employee groups' professional role identities. The two groups reported perceiving the AI system introduction differently because of their different previous professional role identities. SR-C largely indicated that they felt the AI system and its consequences were a threat to their professional role identity. They still had to collect customers' data, which they then entered according to the AI-prescribed fields, with no possibility of entering any additional information. Furthermore, although SR-C could not alter or reject the AI-made decision even if they disagreed with the decision, they had to communicate the decision to the customer. Finally, since SR-C have no access to the underlying algorithms, they are not able to explain what led to any specific decision because the AI system is not transparent to them. Also, the AI system's ability to learn means that algorithms change. Consequently, SR-C expressed that they no longer perceived themselves to be full-fledged consultants because the AI system had taken over what used to be their defining competence and removed their opportunity to influence the decision-making process. In fact, most SR-C reported feeling that the AI system had deskilled them, downgrading them to data entry assistants:

> Well, [CleverLoan] takes away your power to act decisively. I just enter the data and ask the customers for their information, but anyone can do that. Then, the system says

"yes" or "no," and decides which interest rates the customer gets. I no longer have the flexibility to change anything. That's not really great for my self-esteem. The system has made the job so easy. Before [CleverLoan], I had authority to make my own loan decisions. It was easier back then to live out my profession as a consultant. (Consultant, SR-C, *Main Finance*)

The introduction of *CleverLoan* enabled nonexperts and employees from less specialized positions to work as consultants, which further threatened the professional role identity of SR-C. Their special training, expertise, and experience in the area of loan consulting became useless once the AI system had been installed because the AI system has taken over the core activities of SR-C. Consequently, most SR-C perceived that their position had lost status recognition:

> The Board of Management also increasingly emphasizes the value of certain groups of consultants, such as IT consultants. Their reputation is higher than a loan consultant's; at least, that is how I perceive it. We are less respected than before. (Consultant, SR-C, *Main Finance*)

In contrast, the substitutive decision-making AI system empowered AID-C to act as full-fledged consultants with the same responsibilities, privileges, and competencies as SR-C. The AI system enabled AID-C to take on new and different activities, even if they are strongly bound to the AI system's guidelines. For example, prior to *CleverLoan* being introduced, AID-C

were responsible for welcoming customers and listening to what they needed, making appointments, and running errands. Given the qualifications and expertise they began with, these employees would neither have been eligible to work as loan consultants nor deemed capable of doing so:

> *And for the [AID-C] the job is totally clear, because suddenly he is able to do loan consulting, while before, he was only at the service counter and somehow led people from one consultant to the next, and at most would fill out a transfer form.* (HR, AI Provider; Former Consultant, *Main Finance*)

The same principle applies to newly appointed consultants who had to meet significantly fewer requirements to work as a consultant than SR-C had to when they were first hired. The AI system enabled new hires to establish themselves as fully qualified consultants within a short time and to take on a wide range of tasks and responsibilities from the very beginning.

> *Anyone can use [CleverLoan] immediately after a short training course, and you don't need a lot of experience in the loan business anymore. The system can be used very quickly and in any kind of conversation with the customer. That's what makes it so easy and that's the reason why it was introduced. Earlier, you first needed to have some loan expertise before you could decide "Does the customer get the loan, how much, at which rate?" With [CleverLoan], the system makes that very easy for you.* (Consultant, AID-C, *Main Finance*)

> *It is quite a good system, because even poorly trained employees are able to award a loan via [CleverLoan] seeing that the process is standardized. Finally, [CleverLoan] decides whether the customer gets the loan or not. It doesn't really matter what the consultant's opinion on the decision is or whether the consultant has any specific loan expertise.* (Manager, *Main Finance*)

Consequently, the AID-C we interviewed perceived themselves as loan consultants, with a focus on accompanying the customer through the loan securing process. AID-C reported strictly following the instructions and guidelines the AI system provided and expressed being satisfied acting as consultants:

> *I want to explain everything to the customer and do the best I can … You have to have some idea of what you're doing if you don't want to be perceived as incompetent, but*

> *you don't have to make the loan decision anymore, as [SR-C] had to. This decision is taken over by the system, and thus you can't actually make mistakes. You just have to accompany the customer and that's what matters.* (Consultant, former service employee, AID-C, *Main Finance*)

Overall, introducing the AI system affected the professional role identity of both SR-C and AID-C. However, because of the different professional role identities they started out with and the unique characteristics of the AI system, SR-C perceived the AI as a threat, whereas AID-C reported perceiving the AI as an enhancement. Although neither group was able to influence, alter, or overrule AI-made decisions, they developed different mechanisms to either protect or strengthen their professional role identities.

4.2.1 Mechanisms that SR-C Use to Protect Their Professional Role Identity

To protect their professional role identity, SR-C use four mechanisms, namely *foresighted consulting*, *enhanced consulting services*, *data manipulation,* and *self-elevation*. First, by using *CleverLoan*, SR-C indicated that they try to focus on a broader consulting approach, drawing on their ability to advise customers with foresight. This is possible because the AI system provides additional information on matters such as customers' current expenses or debts. Prior to system implementation, consultants were able to offer loans only after the customer actively approached them. *CleverLoan* changed this, automatically notifying the consultant if customers defaulted on payments or ran up unplanned expenses. One consultant remembered a case where a customer had applied for a loan at another bank, which *CleverLoan* automatically reported to the consultant. The consultant invited the customer to make an appointment, explained how bundling all current loans would offer better conditions, and finally convinced the customer to take out a new loan from *Main Finance* rather than from a competitor. Although consultants are no longer able to influence the decision-making process, they are now enabled to approach customers who needed additional loans even before an actual financial bottleneck occurs:

> *We call customers, for example, when we get a message from SCHUFA via [CleverLoan] that the customer has applied for a loan at another bank; loan applications are usually reported to SCHUFA, and because CleverLoan is connected to SCHUFA, we get such a message. And sometimes, I use that information to invite the customer to a consultation. Often, customers don't know exactly what they agreed with the other bank, which interest rates they are paying,*

or what percentage, and so on. Then we double-check their external liabilities and contracts to see whether we can, for example, reschedule some of their debts. (Consultant, SR-C, *Main Finance*)

The learning nature of *CleverLoan* reinforced the *foresighted consulting* mechanism because the AI system uses past data from similar customer profiles to predict future customer needs. Thus, the AI system can continuously improve applicable recommendations and personalized offers. Consequently, the consultant can add value to the services offered by approaching customers in a much more targeted and foresighted manner:

As a consultant, you have a very, very high added value, because you get all third-party liabilities ... displayed at a relatively early stage and can talk directly to the customer about rescheduling their settlement plans. This was not possible before. And thus, in this way, you gain a higher level of consulting competence. And ... you can already provide the customers with liquidity today, before they even know they need it. (Sales Manager, AI Provider)

Second, SR-C responded to their threatened professional role identity through *enhanced consulting services*. Through *CleverLoan* SR-C can offer customers a wider range of products and services than applied for, offering consultants the benefit of a larger consulting portfolio. Prior to introducing the AI system, consultants were in charge of the loan granting process itself and had to search for additional products and information on their own. Because this process is time consuming, only a limited number of additional products could previously be presented to the customer, and some opportunities were not realized. *CleverLoan* automatically suggests related additional products that match the customer's creditworthiness, which the consultant can use as a template for cross-selling approaches. Importantly, SR-C indicated that they consciously focus on other products and services during the consulting process in order to shift the focus from lending to cross-selling and try to move the actual loan granting process into the background, paying attention to services less impacted by the AI instead:

We have more time for cross-selling now, and thus can be like: "Dear customer, you have a loan with us; think about what will happen if, for health reasons, you can no longer work? Don't you want to make arrangements for your retirement? Perhaps you should consider a special savings account." You can always play these themes. (Consultant, SR-C, *Main Finance*)

Well, because you have more time, you can take a cross-selling approach. For example, when I see in [CleverLoan] that the customer is eligible for more credit, I offer the customer different products and services, such as a building loan agreement, a savings plan, or an investment. (Consultant, SR-C, *Main Finance*)

Third, to counter their threatened professional role identity, SR-C extended their tasks in a rather unusual and surprising way—through *data manipulation* intended to outsmart the AI system. Some SR-C explained that they tried to figure out how the AI system works and then manipulated the data entry to alter the system's most likely decision. Consultants felt that they could at least partially impact the decision and affect the customer's situation:

You can outsmart the system ... Because you are in conversation with the customers and somehow a customer seems, how shall I put it, nice. And perhaps even subconsciously, in order to get back a certain capability. (Consultant, SR-C, *Main Finance*)

Based on prior experience and attempts to understand the decision-making structures of the tool, these consultants figured out how to tweak tiny details to influence a decision without being culpable for deliberate deception. For example, some SR-C noticed the system's strict evaluation criteria regarding customers' duration of stay in Germany (e.g., a minimum of six months). Because *CleverLoan* does not rely on other data sources during the approval process to verify the customers' duration of stay, SR-C can adjust the customer's duration of stay, which strongly impacts decisions:

[CleverLoan] does not grant a loan, for example, if someone has not lived in Germany a long time. If they've been living in Germany for less than a year, for example, they'll get a red decision [indicating loan rejection]. If I change one year to two years, that easily tricks the system, because [CleverLoan] doesn't necessarily verify this kind of data. Then I might get a green decision [indicating loan approval]. (Consultant, SR-C, *Main Finance*)

However, when *AI Provider* realized that some consultants were deliberately manipulating data, they introduced specialized pattern detection software to recognize and intervene in increased incidences of possible data manipulation. In cases of severe manipulation, the provider could contact a particular branch's management directly:

So, we know very, very well what the consultants are doing. We can see when they've made an entry and got a red decision [rejection], for which they change data afterwards. We know that. But we also know that some things were changed because they simply made a mistake in the input. The algorithms know that too, or the AI learns it gradually. We also know that there are employees who manipulate the system. To a certain degree, we allow this to happen ... However, if we find a cluster of manipulations in a branch, we definitely respond to it. If it's only a single consultant ... usually nothing happens. But if a consultant deliberately manipulates the data and we find out, then Main Finance is liable for the employee's misbehavior. So, it is not AI Provider that carries the financial damage, but Main Finance. (Former CEO, AI Provider)

The fourth mechanism, *self-elevation,* reflects our finding that SR-C actively seek to distinguish themselves from AID-C. SR-C emphasized their ability to provide better and more comprehensive advice than that provided by the AI system. They claimed that the guidelines were insufficient to answer very detailed questions because they lack the necessary depth to deal with complex customer needs. The SR-C clearly believe they are specially equipped to handle such complexity. Although their specific skills have become redundant in terms of loan decisions, they indicated that they still felt that their skills were exceptional enough to set them apart from AID-C.

I know how to deal with the customer if the system is offline. It may sound mean, but the new colleagues would have a big problem, because they are only used to working according to the predefined path. And if something beyond that happens, they [AID-C] would be helpless. When they [AID-C] get a loan rejection, they don't know how to explain this because they don't have the insight into what is being evaluated. And of course, we [SR-C] are able to take a closer look. I don't think that the [AID-C] are confident in doing this. They are less flexible than we are, because we learned it differently. (Consultant, SR-C, *Main Finance*)

In summary, the four mechanisms explained above are used by SR-C in response to their threatened professional role identity, as explained above.

4.2.2 Mechanisms AID-C Use to Strengthen Their Professional Role identity

In order to strengthen their professional role identity, AID-C use the three mechanisms of *responsibility transfer*, *illustration of consultation,* and *reassurance*. First, AID-C stated that they consciously avoid taking decision-making responsibility themselves and directly refer customers to the AI system in cases of rejection. Consultants use this mechanism in particular when customers object to a loan rejection decision or try to persuade the consultant to change it. Because AID-C lack extensive expertise, as well as the necessary depth to justify their decisions, they happily transfer such responsibility to the system. AID-C can thereby avoid negative situations while still considering themselves to be competent consultants:

I think it is quite nice in the case of a loan rejection ..., because you don't have a long discussion with the customer, the decision is final ... If the loan is rejected, mostly because the loan rating doesn't fit, I can show the rejection to the customer and there's no further discussion. I actually think that's much nicer, as I personally don't have to get involved in the discussion. (Consultant, AID-C, *Main Finance*)

Further, the AI system is designed to pick up information that employees might accidentally have missed, skipped, or omitted when they processed a customer's loan application. The consultant merely adheres to what the input fields require, following *CleverLoan's* instructions. Thus, *CleverLoan* enables AID-C to minimize possible mistakes through structuring their work processes by defining the selection and sequencing of all required customer information. As one AID-C explained*:*

Simply, you don't forget anything, especially in loan matters and all that legal stuff. When do I need which consent? What information do I need before I sign a contract? [CleverLoan] is a compact, simple process, and as a consultant, I get everything that I need in that moment from the system. Moreover, when it comes to data entry, everything is always structured in the same way, so I can't forget anything. (Consultant, AID-C, *Main Finance*)

Second, AID-C make use of the mechanism *illustration of consultation* to strengthen their professional role identity. Prior to *CleverLoan* being introduced, the consultants themselves had to reflect on how they would help the customer visualize the decision and then recommend further steps. The AI system provides an automatically generated guideline with illustrations and recommendations consultants can use in the conversation following the AI system's

decision (e.g., additional options, recommended products, and services). Even without the necessary background knowledge, AID-C follow these guidelines, which helps them feel more competent in dealing with the customer:

> *We have this guideline that [CleverLoan] creates. It also includes explanations. I explain everything to the customer as it is written in the guideline, so that when they leave the consultation, the customers at least have the feeling that they have been advised well.* (Consultant, AID-C, *Main Finance*)

If both these mechanisms fail, however, consultants reported finding it difficult to maintain credibility and assert competence:

> *The underlying mechanisms of the system are not exactly public. There's a [CleverLoan] score in the background, and therefore it sometimes happens that I have trouble explaining the decision. I can't convincingly explain why it's not possible to grant a loan.* (Consultant, AID-C, *Main Finance*)

Third, AID-C use the mechanism *reassurance* to strengthen their professional role identity. The AI system offers consultants direct contact to *AI Provider* through, for example, live chat or video consulting. Before this feature was introduced, AID-C often did not dare to ask questions if they were uncertain about the tool or the decision outcome because they were afraid that it would make them look incompetent. Since its introduction, however, consultants have increasingly been asking questions, even repeatedly, because it is easy to do so and they have no direct working relationships with *AI Provider* staff. As one AID-C commented:

> *To be blunt, if I know nothing, I have to ask. Of course, it is nice and easy with [CleverLoan]. You don't have to move away from the desk, you can stay in the consulting room with the customer. And you don't have to tell your colleagues you didn't know it.* (Consultant, AID-C, *Main Finance*)

Further, AID-C expressed appreciation for the opportunity the system offered to immediately communicate the loan decision to the customer because this allowed them to enact the consultant role more authoritatively:

> *We don't have to fill out any self-disclosures, we don't have to file loan applications, and there are no loan departments in the background that verify everything, which would take weeks to get back with us. ... If the loan is approved, the customer can sign the contract right away,*

> *and then he has the money within a day.* (Consultant, AID-C, *Main Finance*)

In summary, we identified three mechanisms through which AID-C strengthened their empowered professional role identity. *CleverLoan* enabled AID-C to engage in new tasks, while also putting the customer at the center of their work. AID-C were enabled to resolve potential problems or knowledge gaps by directly using the AI system without having to discuss their concerns with colleagues, especially not SR-C. Overall, circumstances that SR-C found to be negative and identity threatening were the same ones that made this transition possible for AID-C.

5 Discussion

Up to this point, there had been insufficient understanding of the effects of introducing a substitutive decision-making AI system on employees' professional role identity and the ways in which employees adapt their identity in response to such a system. By investigating AI's effects on employees' professional role identity, we provide insightful theoretical and practical implications for research on IS and identity.

5.1 Theoretical Implications

Our research makes four theoretical contributions. First, we contribute to the literature on IS and identity by shedding light on how a substitutive decision-making AI system affects employees' professional role identity. Previous studies either investigated how a single profession's role identity changes following the introduction of an IS (e.g., physicians' altered professional role identity, as in Reay et al., 2017), or how IS affect multiple professions, with one profession perceiving the IS as a threat and another profession perceiving it as an enhancement (e.g., Craig et al., 2019; Lapointe & Rivard, 2005; Marakas & Hornik, 1996; Mishra et al., 2012; Nach & Lejeune, 2010). Notably, in the latter studies, the two professions remained at different hierarchical levels after the IS had been introduced. For instance, Mishra et al. (2012) report how implementing an electronic health records system opened up some of the physicians' work processes and responsibilities to other health care professionals such as nurses. Importantly, in these studies, hierarchical differences between different professions remained the same: even with more responsibility, nurses were still nurses and physicians were still physicians.

In contrast, our findings indicate that substitutive decision-making AI systems can equalize two formerly distinct professions in terms of "What do I do?" but results in different professional role identities regarding the question "Who am I?" Notably, when the AI system examined here was introduced in the banking industry, the professions of loan consultants and service employees merged into one. Consequently, employees'

professional role identity was affected on two levels, both individually and collectively. Employees individually experienced a fundamental change in their work processes, which, in our case, resulted in a very limited scope of action for both SR-C and AID-C regarding task execution. While both groups now work as full-fledged loan consultants, SR-C articulated their role as data entry assistants while AID-C focused on their role as service-oriented customer companions. On a collective level, introducing the AI system affected the relational perception of the respective professions. SR-C perceived threats to their former professional role identity by both the substitutive AI and the rise of AID-C, whereas AID-C felt empowered by joining the (previously) prestigious group of consultants. Accordingly, our research indicates that introducing a substitutive decision-making AI system can cause discrepancies within the professional role understanding of a single profession. Our contribution to the literature therefore relates to IS and identity by emphasizing the need to consider both parts of professional role identity: "Who am I?" and "What do I do?"

Second, we contribute to the literature on IS and identity by revealing different mechanisms utilized by the two consultant groups to respond to the changes in their professional role identities. Our research illustrates the challenges employees encounter in their attempt to enact different mechanisms in response to an AI system's specific characteristics. In terms of previous IS use, employees used constant—strategies based on mechanisms developed by trial and error to cope with the changes to their work processes and to reconfigure their professional identities (e.g., Craig et al., 2019; Mishra et al., 2012; Petriglieri, 2011; Stein et al., 2013). However, as exemplified by our case company, the AI system is capable of learning from both customer data and employees' behavioral patterns, thus denying stability in terms of consultants' strategies.

For example, the AI continuously adjusts the loan criteria based on previous customers' repayment behaviors, changes in interest rate policies, and tracked behavior. Moreover, the system can react to undesirable user behavior and report misconduct. Therefore, employees' aims to regain a certain degree of their former competence and power (e.g., through data manipulation) are continuously frustrated because the AI system requires them to continuously adapt their mechanisms. Accordingly, our research illustrates that adaptation in working with AI is not a one-way street; it emphasizes the need for theories and models on human-AI interaction to consider the effect of double-sided feedback. The employee gains insight by drawing feedback from working with the technology, but learning AI systems can also optimize their processes in drawing information from the employee's behavioral patterns.

Third, we contribute to the literature on IS and identity by highlighting the boundary conditions resulting from introducing a substitutive decision-making AI system. Previous literature has shown that engaging and mastering technology are important prerequisites for employees to integrate technology into their identity. For instance, Carter et al. (2020b) emphasize that using an IS becomes an integral part of employees' understanding of who they are. Working closely with the IS (e.g., by using different features or making innovative use of the IS) helps employees develop a strong self-identification with the IS. Based on employees' relatedness (incorporating the technology's capabilities into their self-concept), emotional energy (users' emotional attachment to interacting with the technology), and dependence (users' reliance on the technology), IT identity may be either strong or weak. Nelson and Irwin's (2014) "paradox of expertise" is a good example of how interacting with a substitutive IS can initially be perceived as negative but can then turn into an identity-enhancing experience by means of interaction.

As discussed above, despite being highly professionalized experts, librarians initially did not recognize the potential benefit that new technology could hold for them and actually felt their professional identity threatened. This changed once they engaged with the technology and started to use search engines interactively. However, substitutive decision-making AI systems do not provide employees with the opportunity to influence, adapt, or overrule decision-making processes or outcomes, thus precluding interaction with the technology. In fact, substitutive decision-making AI systems represent a class of autonomous IS that make decisions without human input, often only allowing humans to communicate the results. Consequently, neither the paradox of expertise (as suggested by Nelson and Irwin, 2014) nor the development of a strong IT identity (as suggested by Carter et al., 2020b) is possible. Indeed, in both of the groups we studied, IT identity was weak (if present at all) because, although the employees depend on AI to practice their profession, they cannot directly relate to the AI nor are they emotionally attached to it. Consequently, our research contributes to the understanding of how employees react to IS with which they cannot interact and how they respond to a perceived threat that they cannot overcome. We thus answer the call for a deeper investigation of the meanings that individuals attach to themselves rather than the outcomes of their interactions with an IS (Carter et al., 2020b).

Fourth, our research makes an important contribution to the empirical literature on AI and employees. Prior research has mainly investigated AI's conceptual impact on employees' work processes, but empirical findings remain scarce. *CleverLoan* represents a successful field case of introducing a substitutive decision-making AI

system that allows in-depth insights into the effect of AI systems on employees' work processes and identities. Therefore, our study provides insight into the effect that AI has on employees' professional role identity, revealing several related opportunities and downsides. On the one hand, introducing a substitutive decision-making AI system can empower less qualified employees by allowing them to fulfill tasks they would otherwise not be able to complete. On the other hand, we found that these AI systems can also deskill well-qualified employees, lowering the required skills needed for their job. Although other IS can also result in deskilling employees (Faraj et al., 2018; Noble, 1979), substitutive decision-making AI systems go a step further in taking over employees' core activities.

Further, we found that the AI allows less skilled employees to mask their inexperience and conceal limited insight by referring to the AI. This enables relatively unskilled employees to perform jobs previously requiring specialized training and extended education. Because unskilled employees do not have the necessary knowledge and experience to question the decision or critically reflect on it, errors in the system might remain undetected. Moreover, we found that substitutive decision-making AI systems massively restrict employees' autonomy and room to maneuver. Such circumstances may tempt some employees to commit fraud or try to game the system. Findings reported in prior literature suggest that the less comprehensible an algorithm, the less employees are willing to game the system (Faraj et al., 2018). In contrast, we have found that although the AI system's underlying algorithms lack transparency, employees do try to outsmart the system to regain some of their previously assigned competence and authority. Finally, our case study revealed that employees' constrained work processes were strictly monitored in that the AI recorded and evaluated even small deviations from the norm. Accordingly, we contribute to the literature on AI by revealing the downsides of AI systems based on empirical findings.

5.2 Practical Implications

While substitutive decision-making AI systems offer great potential to elevate human capabilities, they simultaneously present new and previously unknown challenges to the future of human work. To support organizations in strengthening the potential of a substitutive decision-making AI system while avoiding its negative effects, we explicate practical implications derived from our case study.

First, our research shows that a substitutive decision-making AI system is capable of taking over the core activity of loan consultants. We found that particularly employees who worked in this profession before the AI system's introduction struggle because they feel that their professional role identity is being threatened

by the AI system. However, since experienced employees are valuable to the organization because of their ability to provide superior consulting, organizations should have an interest in keeping such employees. To avoid losses of knowledge and experience, managers should provide early coping strategies or alternative options for employees with valuable knowledge and experience who perceive this new form of work to be threatening and perhaps even a reason to leave the company, isolate themselves, or engage in malpractice. To prevent such outcomes, managers could offer skilled employees the option of taking over broader areas that cannot (yet) be taken over by the AI. One example is in cross-selling approaches, where the loan consultant's responsibility is not only to offer loans but also to holistically advise customers on their financial needs. Further, a basic understanding and knowledge of the loan process should be promoted among all employees to enhance awareness in case of possible system errors, among other reasons. Skilled and experienced employees could be used to supervise and train new employees who lack appropriate long-term experience (Beane, 2019).

Our research emphasizes that a substitutive decision-making AI system provides no opportunity for employees to interact with the system in terms of influencing the decision-making process or adapting or overruling the decision-making outcome. This restricts employees' ability to integrate the AI as part of themselves and develop an AI-related identity. A strong IS-related identity promotes acceptance of and beneficial engagement with technology, which then results in higher organizational performance (Carter et al., 2020b). Thus, organizations should provide employees with opportunities to develop a stronger connection to the AI. For instance, training sessions and workshops that cover the functionalities and potential of the AI system could help to enhance employees' understanding of the AI.

Moreover, management should clearly communicate the purpose of the AI introduction in order to avoid misunderstanding or false conclusions. In our case, for example, management did not intend to lay off consultants and replace them with the AI. However, the AI system took over consultants' core activities, with the result that many consultants perceived the introduction to be a downgrade. Therefore, training opportunities are vital to highlight the purpose of the AI system, its functionalities, and its potential.

5.3 Limitations and Future Research

Our research needs to be viewed in light of some limitations. First, this paper examined interviewees' perceptions and views on working with the AI system at a single point in time. Therefore, we could draw only on a snapshot. We encourage future research to

examine over a longer period the dynamic changes in employees' professional role identity, the stability of their response mechanisms to the AI system, and their assessment of the substitutive decision-making AI system as threatening or empowering.

Second, we used a single case study. Although our organization has about 900 institutions with more than 9000 branches, questions about the generalizability of our results remain. Further, because our case company is a German organization, there may be country-specific characteristics that should be considered. For example, specific labor laws often do not allow dismissal or financial downgrading of employees if technology takes over their tasks. Consequently, we encourage future research to compare different organizational applications of AI in different countries, which would contribute to the generalizability of these findings.

Finally, our case study centers on a substitutive decision-making AI system with which employees cannot interact; they can neither influence the decision-making process nor change the final outcome. Other AI systems (e.g., decision-supportive AI systems) allow employees to overrule or alter the AI-derived outcomes (e.g., Lebovitz, 2019; Rai et al., 2019). These AI systems allow employees to interact with the AI and still involve unique characteristics compared to previous IS (e.g., learning). Therefore, we call on future research to explore the effects that different AI systems have on employees' professional role identity and evaluate the relevance of potential differences.

6 Conclusion

Whereas professionals previously reconstructed their role identity by interacting with a new technology and integrating the technology as part of their identity, the limited interaction possible with substitutive decision-making AI systems introduces new challenges for employees seeking to protect or strengthen their professional role identity. Our study reveals how a substitutive decision-making AI system alters employees' professional role identity. We identified seven mechanisms that employees use in response to this new situation, thereby highlighting the unique characteristics of AI systems and the challenges they pose. Our illustration of different mechanisms and their consequences produces theoretical and practical contributions as a basis for future research investigating how substitutive decision-making AI systems affect employees' professional role identity.

References

Abbott, A. (1988). *The system of professions: An essay on the division of expert labor.* The University of Chicago Press.

Acemoglu, D., & Restrepo, P. (2018). Artificial Intelligence, automation and work. NBER Working Paper No. 24196. https://doi.org/ 10.3386/w24196

Agrawal, A., Gans, J. S., & Goldfarb, A. (2017). What to expect from artificial intelligence. *MIT Sloan Management Review, 58*(3), 23-26. https:// doi.org/10.7551/mitpress/11645.003.0008

Anderson, J., Rainie, L., & Luchsinger, A. (2018). Artificial intelligence and the future of humans. *Pew Research Center.* https://www.pew research.org/internet/2018/12/10/artificial-intelligence-and-the-future-of-humans/

Bahrammirzaee, A. (2010). A comparative survey of artificial intelligence applications in finance: Artificial neural networks, expert system and hybrid intelligent systems. *Neural Computing and Applications, 19*(8), 1165-1195.

Bailey, D., Faraj, S., Hinds, P., von Krogh, G., & Leonardi, P. (2019). Special issue of organization science: Emerging technologies and organizing. *Organization Science, 30*(3), 642-646.

Beane, M. (2019). Shadow learning: Building robotic surgical skill when approved means fail. *Administrative Science Quarterly, 64*(1), 87-123.

Becker, H. S., Geer, B., Hughes, E. C., & Strauss, A. L. (1961). *Boys in white: Student culture in medical school.* The University of Chicago Press.

Benbya, H., Davenport, T. H., & Pachidi, S. (2020). Special issue editorial: Artificial intelligence in organizations: Current state and future opportunities. *MIS Quarterly Executive, 19*(4), ix-xxi.

Brynjolfsson, E., & McAfee, A. (2017). How AI fits into your science team. *Harvard Business Review.* https://hbr.org/cover-story/2017/07/the-business-of-artificial-intelligence

Brynjolfsson, E., & Mitchell, T. (2017). What can machine learning do? Workforce implications. *Science*, *358*(6370), 1530-1534.

Bughin, J., Seong, J., Manyika, J., Chui, M., & Joshi, R. (2018). Modeling the impact of AI on the world economy. *McKinsey & Company.* https://www.mckinsey.com/featured-insights/artificial-intelligence/notes-from-the-AI-frontier-modeling-the-impact-of-ai-on-the-world-economy

Burrell, J. (2016). How the machine "thinks": Understanding opacity in machine learning algorithms. *Big Data & Society, 3*(1), https://doi.org/10.1177/2053951715622512

Carter, M., & Grover, V. (2015). Me, myself, and I(T): Conceptualizing information technology and its implications. *MIS Quarterly, 39*(4), 931-957.

Carter, M., Petter, S., Grover, V., & Thatcher, J. B. (2020a). Information technology identity: A key determinant of IT feature and exploratory usage. *MIS Quarterly, 44*(3), 983-1021.

Carter, M., Petter, S., Grover, V., & Thatcher, J. B. (2020b). IT Identity: A measure and empirical investigation of its utility to IS research. *Journal of the Association for Information Systems, 21*(5), 1313-1342.

Chreim, S., Williams, B. E., & Hinings, C. R. (2007). Interlevel influences on the reconstruction of professional role identity. *Academy of Management Journal, 50*(6), 1515-1539.

Craig, K., Thatcher, J. B., & Grover, V. (2019). The IT Identity threat: A conceptual definition and operational measure. *Journal of Management Information Systems, 36*(1), 259-288.

Dourish, P. (2016). Algorithms and their others: Algorithmic culture in context. *Big Data & Society, 3*(2), https://doi.org/10.1177/20539 51716665128.

Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of Management Review, 14*(4), 532-550.

Faraj, S., Pachidi, S., & Sayegh, K. (2018). Working and organizing in the age of the learning algorithm. *Information and Organization, 28*(1), 62-70.

Freidson, E. (2001). *Professionalism: The third logic*. Polity Press.

Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2013). Seeking qualitative rigor in inductive research. *Organizational Research Methods, 16*(1), 15-31.

Harari, Y. N. (2017). Reboot for the AI revolution. *Nature*, 550(7676), 324-327.

Ibarra, H. (1999). Provisional selves: Experimenting with image and identity in professional adaptation. *Administrative Science Quarterly, 44*(4), 764-791.

Kim, H.-W., & Kankanhalli, A. (2009). Investigating user resistance to information systems implementation: A status quo bias perspective. *MIS Quarterly, 33*(3), 567-582.

Kyratsis, Y., Atun, R., Phillips, N., Tracy, P., & George, G. (2017). Health systems in transition: Professional identity work in the context of shifting institutional logics. *Academy of Management Journal, 60*(2), 610-641.

Lapointe, L., & Rivard, S. (2005). A multilevel model of resistance to information technology implementation. *MIS Quarterly, 29*(3), 461-491.

Lebovitz, S. (2019). Diagnostic doubt and artificial intelligence : An inductive field study of radiology work. *Proceedings of the 40th International Conference on Information Systems.*

Lindenbaum, D., Vesa, M., & den Hond, F. (2020). Insights from "The Machine Stops" to better understand rational assumptions in algorithmic decision making and its implications for organizations. *Academy of Management Review, 45*(1), 247-263.

Manyika, J., Lund, S., Chui, M., Bughin, J., Woetzel, J., Batra, P., & Ko, R. (2017). *Jobs lost, jobs gained: Workforce transitions in a time of automation.* McKinsey Global Institute. https://www.mckinsey.com/~/media/BAB489 A30B724BECB5DEDC41E9BB9FAC.ashx

Marakas, G. M., & Hornik, S. (1996). Passive resistance misuse: Overt support and covert recalcitrance in IS implementation. *European Journal of Information Systems, 5*(3), 208-219.

Mayer, A.-S., Strich, F., & Fiedler, M. (2020). Unintended consequences of introducing AI systems for decision making. *MIS Quarterly Executive, 19*(4), 239-257.

Mishra, A. N., Anderson, C., Angst, C. M., & Agarwal, R. (2012). Electronic health records assimilation and physician identity evolution: An identity theory perspective. *Information Systems Research, 23*(3.1), 738-760.

Nach, H. (2015). Identity under challenge: Examining user's responses to computerized information systems. *Management Research Review, 38*(7), 703-725.

Nach, H., & Lejeune, A. (2010). Coping with information technology challenges to identity: A theoretical framework. *Computers in Human Behavior, 26*(4), 618-629.

Nelson, A. J., & Irwin, J. (2014). "Defining what we do—all over again": Occupational identity, technological change, and the librarian/internet-search relationship. *Academy of Management Journal, 57*(3), 892-928.

Noble, D. F. (1979). *America by design: Science, technology, and the rise of corporate capitalism.* Oxford University Press, USA.

Petriglieri, J. L. (2011). Under threat: Responses to and the consequences of threats to individuals' identities. *Academy of Management Review, 36*(4), 641-662.

Pouthier, V., Steele, C. W. J., & Ocasio, W. (2013). From agents to principles: The changing relationship between hospitalist identity and logics of health care. In M. Lounsbury & E. Boxenbaum (Ed.), *Institutional Logics in Action, Part A* (pp. 203-241). Emerald Group Publishing.

Powell, W. W., & DiMaggio, P. (1991). Introduction. In Powell & P. DiMaggio (Ed.), *The New Institutionalism in Organizational Analysis* (pp. 1-38). The University of Chicago Press.

Pratt, M. G., Rockmann, K. W., & Kaufmann, J. B. (2006). Constructing professional identity: The role of work and identity learning cycles in the customization of identity among medical residents. *Academy of Management Journal, 49*(2), 235-262.

Rai, A., Constantinides, P., & Sarker, S. (2019). Next generation digital platforms: Toward human-AI hybrids. *MIS Quarterly, 44*(1), iii-ix.

Raisch, S., & Krakowski, S. (in press). Artificial Intelligence and management: The automation-augmentation paradox. *Academy of Management Review.*

Reay, T., Goodrick, E., Waldorff, S. B., & Casebeer, A. (2017). Getting leopards to change their spots: Co-creating a new professional role identity. *Academy of Management Journal, 60*(3), 1043-1070.

Sluss, D. M., & Ashforth, B. E. (2007). Relational identity and identification: Defining ourselves through work relationships. *Academy of Management Review, 32*(1), 9-32.

Stein, M. K., Galliers, R. D., & Markus, M. L. (2013). Towards an understanding of identity and technology in the workplace. *Journal of Information Technology, 28*(3), 167-182.

Stone, P., Brooks, R., Brynjolfsson, E., Calo, R., Etzioni, O., Hager, G., Hirschberg, J., Kalyanakrishnan, S., Kamar, E., Kraus, S., & others. (2016). *Artificial intelligence and life in 2030. One Hundred Year Study on Artificial Intelligence: Report of the 2015-2016 Study*

Panel. Stanford Unversity. https://ai100. stanford.edu/sites/g/files/sbiybj9861/f/ai_100_ report_0831fnl.pdf.

Strauss, A., & Corbin, J. (1990). *Basics of grounded theory methods.* SAGE.

von Krogh, G. (2018). Artificial intelligence in organizations: New opportunities for phenomenon-based theorizing. *Academy of Management Discoveries, 4*(4), 404-409.

Vough, H. C., Cardador, M. T., Bednar, J. S., & Dane, E. (2013). What clients don't get about my profession: A model of perceived role-based image discrepancies. *Academy of Management Journal, 56*(4), 1050-1080.

Zuboff, S. (1988). *In the age of the smart machine: The future of work and power.* Basic Books.

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