THE BIRTH OF
ALGORITHMIC
ASPIRATIONAL
CONTROL
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To my daughter. May she grow up curious and with the courage to challenge what others take for granted.
ACKNOWLEDGEMENT

An old saying suggests that it takes a village to raise a child. Similarly, I believe that attaining a PhD degree requires the support of a dedicated community. Many people have a stake in the publication of this dissertation, which also marks a final step in my rites of passage of entering the scholarly community. I want to raise a toast to everyone who has shared this journey with me.

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Early in my PhD journey, Jonas Hedman advised our cohort to always obtain proofreading before submitting any writing. Following his advice, the second article in this dissertation was significantly enhanced by Dolan Cummings’ contributions. The editing of Monica Birth undoubtedly elevated the kappa.

Before concluding this toast, I express my gratitude to my assessment committee comprising of Rob Gleasure, Ella Hafermalz, and Eric Monterio for dedicating their time to read and provide feedback on my work. Although I am writing this before my defense, I eagerly anticipate our discussion.

Last but not least, I want to thank my family for their unwavering love and support throughout the entire process. These declarations of acknowledgement are not complete without mention of Helene Lund, my life companion, bulwark, and faithful cheerleader.
ABSTRACT

This dissertation coins the term algorithmic aspirational control (AAC) to describe an emergent configuration of algorithmic control. In this class of algorithmic management systems, computer-programmed procedures direct workers toward organizational goals through prompts, personal productivity dashboards, targeted algorithmic recommendations, and other forms of digital nudging. Drawing on Michel Foucault’s analytical strategy of analyzing the process of problematization, the dissertation asks what assumptions and dilemmas emerge as managers attempt to control workers through digital productivity nudges.

The dissertation offers a twofold contribution: First, it maps the philosophical and ethical worldviews underpinning the design and use of AAC systems from the archival material of Microsoft’s MyAnalytics application and the evolution of managerial thought. The analytical work shows that while AAC systems are packaged as a means of enhancing the productivity and well-being of workers, AAC systems are also committed to an individualization of the challenges of contemporary work life. Thus, while AAC systems can support workers, they also introduce simultaneous risks of obscuring systematic work arrangement issues and potential conflicts of interest between workers and their employers. Second, this dissertation conceptualizes an analytical strategy for conducting historically oriented problematization research on information systems (IS). The approach offers guidance on how IS researchers can draw upon archival material to map the conditions of possibility for contemporary digital technologies and practices, opening up spaces for renewed curiosity, refusal, and reconfiguration.
**RESUME**


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In the fall of 2020, I encountered a startling vision of the future of work in a patent application from IBM. The patent application envisions coffee delivery drones flying around the office. Coffee deliveries would be timed to support workers’ productivity by analyzing their meeting schedules, sleep quality, blood pressure, pupil dilation, and facial expressions. Based on these data inputs, the drone system would detect when people need a break and then deliver a timely cup of coffee or other caffeinated drink (Erichson et al., 2018).

The drone system merges two of the most salient artifacts of the modern workplace: a computer and a coffee machine (Ehn, 1988). The merge is symbolic and draws links to formative, early explorations of data-driven approaches to managing people (O’Neil, 2017; Stein et al. 2019). In the early 2000s, researchers started to become more and more interested in how the proliferation of digital means of tracking worker activities and experience makes it possible to measure and shape social interactions in the workplace. For instance, researchers collaborated with companies to measure the effects of managerial interventions such as shared coffee breaks for workers in call centers (Waber et al., 2010) and office redesigns that placed coffee machines in strategic locations to foster more interactions between siloed groups of workers (Waber et al., 2014).

According to Gartner Research, organizations will be increasingly relying on digital applications like IBM’s coffee delivery drone to help workers prioritize work tasks and thus avoid stress and burnout (Griffin & Coleman, 2018). A quick gloss of recent information systems (IS), computer science, human-computer interactions (HCI), and computer-supported cooperative work systems (CSCW) literature supports Gartner’s claim. This literature provides a long list of prototypes for applications identifying the optimal moments for breaks and co-worker interactions by analyzing digital trace data, sensors generated from the metadata of system use, sensors, and wearables (e.g.
Luo et al., 2018; Schaule et al., 2018; Züger et al., 2017). Given that some of these prototypes will eventually become off-the-shelf solutions, we need to prepare ourselves for a future where digital applications guiding workers on how to work and live most optimally will become widely available.

On the heels of the COVID-19 pandemic, Gartner’s prediction seems to have become several steps closer to reality. In a commentary on the impact of the pandemic, Leonardi (2020) points out that the transition to remote work means that nearly all activities performed by knowledge workers are being conducted through digital technologies that create time-stamped logs of their behavior as a side effect (i.e. metadata of system use). He argues that regardless of whether remote work remains common or not, the digital trace data produced during COVID-19 will serve as the basis for many organizational practices, policies, and ideologies in the future. Suggestive of the massive scale at which such systems are marketed and implemented, at recent workplace summits, Gartner has encouraged organizations to harness the growth in digital trace data for guiding workers’ personal development and optimizing how work gets done (Gartner, 2021, 2023). As such, while IBM has not yet put the coffee delivery drone into production and there may be no current plans for drone baristas at IBM offices, the vision behind the drone heralds the formation of a new type of managerial intervention—one made possible by advances in computational technologies and the development of sensors and IoT devices and configured through a certain discourse on productivity.

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I came across IBM’s patent for the coffee delivery drone as I was searching for relevant literature for my PhD studies. I was about a year into my PhD candidacy, studying the use of computer-programmed procedures to direct workers toward organizational goals through prompts, personal productivity dashboards, digital nudges, and targeted recommendations (Kellogg et. al., 2020; Möhlmann et al., 2021). Immersing myself in the literature on algorithmic management and control, I encountered a Harvard Business Review (HBR) article by the business consultant, public speaker and self-proclaimed futurist, Mike Walsh. In the HBR article, Walsh discussed how a growing portion of workers, from those working on online labor platforms to those laboring in factories and offices, are experiencing “being managed by an algorithm.” The article elaborated on the arguments for and against algorithmic management that had become familiar to me through my studies.

AI, algorithms, and automation might allow you to manage more people at scale, but … [without] careful consideration, the algorithmic workplace of the future may end up as a data-driven dystopia. … We have been here before. About a hundred years ago, the world experienced the Scientific Management revolution, or more popularly, Taylorism. … Many principles of Taylorism are being revived today with a digital or AI-based twist. … Just as with Taylorism, reliance on algorithmic management may end up creating unease in the workplace and broader social unrest (Walsh, 2019, p. 3).

The HBR article portrays two polarizing views held by scholars and public opinion makers on data-driven approaches to managing people. For some people, the prospect of algorithmic
managers heralds an era of efficiency and unbiased decision-making. For others, these algorithmic managers represent another fateful step toward a Tayloristic nightmare (Giermindl et al., 2022; Koukouvinou & Holmström, 2022; The Economist, 2018).

I similarly have conflicting views about the IBM coffee delivery drone. On the one hand, the idea of a coffee delivery drone seems like a smart productivity-enhancing solution to a common problem. I am interested in behavioral economics, which suggests that due to our limited cognitive ability to process information, we sometimes need a nudge to improve our decision-making (Thaler & Sunstein, 2008). Further, there is a growing body of productivity literature suggesting that most of us work in ways that make us less productive than we could be (Newport, 2016; Schwartz & McCarthy, 2007). Personally, since I often forget to take breaks during the workday—leading to mid-day mental crashes—a drone delivering coffee would seem like a welcome reminder to take a break. Thus, the prospect of developing systems to help workers maintain productivity throughout the day seems highly promising.

On the other hand, however, the idea of a coffee delivery drone also invokes a sense of unease. While a cup of coffee seems rather innocent, what if this drone offered other productivity-enhancing interventions? Members of quantified-self and biohacking communities promote various forms of intravenous therapy and even microdosing to improve efficacy (Friis & Tobias, 2019; Grant, 2017), suggesting that coffee may not only be only productivity-enhancing intervention offered by such a drone. Such a scenario feels rather dystopic to me. Another source of unease arises from the ambition to engineer social interactions in the workplace implied by such a drone. Pioneers of workplace datafication have previously portrayed the growth of digital data and advancements in computational technologies as a means to engineer socialization, performance, and social serendipity (Eagle & Pentland, 2015; Lindsay, 2013; Pentland, 2012; Waber, 2014). Again, this ambition gestures toward a potentially dystopic future, where social interactions are meticulously planned, with the sole focus of advancing organizational goals. Yet in describing why such scenarios might invoke unease, comparisons with Taylorism somehow fall short.

Taylor and the cadre of engineers gathered around him in the early 20th century leveraged emergent and mundane technology (stopwatches, cameras, and clipboards fitted with spreadsheets) to map work processes and identify possibilities for optimization (Gregg, 2018). But as Taylor found that workers were rejecting his recommendations, he began to ponder how to mitigate the permanent antagonism between employers and workers that he perceived to be hindering his efforts. He described the antagonism as fueled by a certain disincentive to work harder—whenever workers increased their effort and output, their payment per piece declined proportionally (Rudin, 1970). He therefore employed state-of-the-art technology to measure and specify what constituted a fair day’s work, rewarding workers who delivered beyond this quota (Barley & Kunda, 1992).

Even at the time, Taylorism was met with fierce resistance. Taylorism was criticized for ignoring the human factor in production, deskilling workers, and being inhumane and undemocratic in that the time-motion studies invented by Taylorism tended to eliminate workers incapable of attaining the prescribed quotas (Barley & Kunda, 1992; Moore, 2018). Drawing upon the historical
experience of Taylorism, scholars warn that data-driven approaches to managing people may make work conditions more precarious or lead to job fragmentation (e.g. by Altenried, 2022; Khovanskaya et al., 2019; Rosenblat, 2018). However, provided that our focal drone system uses data only to detect coffee needs—rather than to organize work processes, determine promotions, or fire or reward workers, for example—this particular system can hardly be accused of introducing such risks. As such, while this drone system is based on a conviction, similar to Taylorism, that technological advancements can be positively used to measure and modulate workers’ behaviors, drone systems that lack the ability or intent to sanction workers would mark a significant difference in how such technologies aspire to alter the conduct of workers. Thus, we must be careful not to reduce all forms of algorithmic management and control to a simple rehearsal of Taylorism.

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Another source of unease invoked by the coffee delivery drone relates to how computational procedures allow for the extensive monitoring of workers’ activities and experiences. While the monitoring of workers’ activities can be traced back to the birth of industrial capitalism (Thompson, 1967), the scale and scope of such monitoring have intensified. The digitalization of work allows monitoring to occur in real time and at a granular level of detail (Kellogg et al., 2020). A long tradition of organizational and information systems research has drawn extensively on Michel Foucault’s conceptualization of the panopticon as a metaphor to describe how omnipresent workplace surveillance can function as an internalized discipline mechanism (e.g. Bain et al., 2000; Vieira da Cunha et al., 2015; Zuboff, 1988). Foucault originally developed the panopticon metaphor based on an idealized prison design, in which a single anonymous prison guard could watch all prisoners, as the prisoners would not know whether they were being watched or not. The point of the metaphor is that within such an architecture, the mechanism of surveillance becomes internalized. In his work, Foucault demonstrates how the architectural design of the panopticon models a wide range of institutions, including factories, schools, and hospitals. According to Foucault, the panopticon architecture illustrates the shared political anatomy underpinning these institutions.

Over the years, scholars have adopted the image of the panopticon as an archetype of social control based on information technology (Willcocks, 2004). However, the metaphor has also been used

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1 In organizational and IS research, references to Taylorism and scientific management are often made to accentuate the risks of digital transformations of work. However, when comparisons to Tayloristic scientific management are made, I think it is important that we also recognize the context in which Taylor invented and refined uses of technology to map work processes. At Taylor’s contemporary, new ways of organizing factory production made it possible to optimize work processes. Taylor was himself involved in this optimization work. However, he also observed that his efforts mattered little, as workers would often sabotage their efforts to streamline production processes. He blamed the traditional piece-rating systems of his time for creating “a permanent antagonism between employers, and a certainty of punishment for each workman who reaches a high rate of efficiency” (cited in Rudin, 1970, page 67) and thus set out to invent a way to measure and specify what he called “a fair day’s work” (Taylor, 1911). The focus of this dissertation is not to discuss the issues and merits of Taylorism. Rather the point that I seek to make is that the tension between optimization, on the one hand, and dehumanization and surveillance, on the other, do not capture the stakes of the type of systems that this dissertation concerns itself with.
to describe practices that are only tangential to the kind of spatial control performed by its original design (Leclercq-Vandelannoitte, 2013; Munro, 2000). Mobile information systems, social media profiles, Big Data analytics, and digitized state surveillance reach beyond the limits of the metaphor—indeed, these systems render control that is even more pernicious than traditional panoptic arrangements (Koopman, 2020; Leclercq-Vandelannoitte et al., 2014). Nevertheless, provided that the data collected by a drone system is not used for purposes of promoting, firing, or rewarding workers, the panoptic metaphor falls short of capturing the stakes of the coffee delivery drone system.

Confronted with the shortcomings of the panoptic metaphor, scholars have begun to develop new metaphors that better represent the evolutions in technology and organizational structures. For instance, Ella Hafermalz (2021) suggested replacing the metaphor of the panopticon with the metaphor of 

exile

to better capture the role of technology in organizations driven by a post-industrial network. Rather than the fear of being exposed, as in a disciplinary logic of control, Hafermalz contends that it is the fear of being exiled (being left out, overlooked, ignored, or banished) that functions as a regulating force in the context of distributed organizations. Likewise, Jean-François De Moya and Jessie Pallud (2020) suggested the term 

heautopticon

(“heautos” = self, “opticon” = vision) to conceptualize the digitally enabled self-surveillance practices performed in the quantified-self movement. Along the same lines, Zorina et al. (2021) coined the term 

IT veillance

to describe the flexible decentralized interconnected web of multidirectional watcher-watched relationships characterizing our present-day information systems.

Akin to the growing choir of voices calling for a new conceptualization of IT-enabled social control, we as a research community must continue expanding our vocabulary. While advancing our understanding of social control based on digital information technology, the notions of IT veillance, heautopticon, and exile do not fully capture the stakes of the coffee delivery drone. The fear of exile can help explain why workers would welcome the drone, as it can be conceived as a means to maintain productivity and thereby avoid exile. But the metaphor of exile in itself lacks explanatory power for the type of control performed by the drone. Likewise, in the conceptualization of emergent watcher-watched relationships, the notions of IT veillance and heautopticon do not account for managerial efforts to steer workplace socialization by using technology to engineer social phenomena such as serendipity.

Hence, I argue that only by continuing to expand our vocabulary, will it be possible to grasp the operations of managerial practices based on targeted algorithmic recommendations and other forms of digital nudging and appreciate their merits. Expanding our vocabulary is particularly important, as these systems do not readily compare with Taylorism and/or panoptic surveillance, which are some concepts we have traditionally used to voice concerns about how information systems enable social control. The expansion of our vocabulary of algorithmic management and control is the task of this dissertation.


INTRODUCTION

DILEMMAS OF ASPIRATIONAL ALGORITHMIC CONTROL

Research on algorithmic management and control has documented how advancements in machine learning and other computational technologies for analyzing large datasets can enable new managerial practices in organizations where digital data are used to augment and automate managerial tasks (Benlian et al., 2022; Gal et al., 2020; Wesche & Sonderegger, 2019). This line of research predominantly focuses on the use of technology to exercise formal control over workers through monitoring, evaluating, and sanctioning (see Cameron et al., 2023; Heinrich et al., 2022 for recent reviews of literature on algorithmic management), studying, for instance, how technologies can be used to obtain desired behaviors from workers through algorithmically distributed rewards and the constant threat of swift replacement (Kellogg et al., 2020). Based upon findings from research on algorithmic management, scholars, trade unions, and public opinion makers have warned that the growing tendency of workplace datafication threatens personal privacy and autonomy and may result in discrimination, the deterioration of workplace relationships, and dehumanization (e.g. Altenried, 2022, Kantor et al., 2022, UNI Global Union, 2020).

In contrast to algorithmic management systems deployed to monitor, evaluate, and sanction workers, the coffee delivery drone system presented in the Preface represents an emergent class of information systems in which algorithmic control is practiced in far more subtle and informal ways (Burr et al., 2018; Möhlmann et al., 2021). This “other” configuration of algorithmic control uses computer programming to alter the conduct of workers by collecting data about workers’ activities, which are then used to deliver digital nudges through dashboards, prompts, targeted recommendations, etc. Scholars have cautioned that despite the positive intentions of such systems to enhance the productivity and well-being of workers, there is growing and disturbing evidence that the diffusion of digital productivity-enhancing applications risks reconfiguring work practices in harmful ways. For instance, Moore (2018) followed a quantified work project in which workers were asked to track their time and movement and concluded that workplace quantification initiatives risk subsuming every aspect of workers’ lives into the logic of capitalism. In a similar vein, Wajcman (2019) cautioned that intelligent calendar applications aimed at nudging people into making better decisions transform time optimization into a moral imperative, applying Moore’s law of acceleration to every aspect of life. Thus, while dashboards, prompts, targeted recommendations, and other types of digital nudges may help support smarter, more efficient, and less risky ways of working, this class of systems also invokes thorny dilemmas and ethical concerns.

One obstacle to discussing the dilemmas and concerns associated with various digital productivity-enhancing applications is the many names and labels used to describe this emergent class of digital technology. Systems and applications that program procedures to alter the conduct of workers through dashboards, prompts, targeted recommendations, etc., have been alternatively characterized as “digital productivity assistants” (Winikoff et al., 2021), “AI coaches and AI-
driven nudges” (Amar et al., 2022), “nudge tech” (Gartner, 2023), and “algorithmic recommending systems” (Kellogg et al., 2020). Henceforth, I refer to this broad class of digital technology as *algorithmic aspirational control systems* (AAC). This term indicates how control systems like IBM’s coffee delivery drone operate in a certain organizational environment. Their modus of operandi is aspirational, as they only work because workers are already aspiring toward the system’s goals in some sense. Workers do not expend their best effort because of the system or the normative pressure it invokes. They do not work harder because they are getting a cup of coffee; rather, the coffee break imposed by the drone supports workers in their desire to continue working hard.

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The notion of aspirational control arrived on my radar as I was reading a case study of a corporate well-being initiative in which employees were given wearable activity trackers to help them improve their sleep (Elmholdt & Haahr, 2021). The authors theorized their case study as an example of how digital self-tracking in the workplace enables new forms of aspirational control. They drew their notion of aspirational control from a maturing body of literature describing how control occurs through aligning oneself with a particular career idea and prospect combined with a support structure for acquiring a set of skills, objectives, rewards, and other mechanisms that facilitate compliance with a specific normative order (Costas & Kärreman, 2013; Alvesson & Kärreman, 2007). The aspirational mode of control is characterized by noncoercivity, assuming alignment between the company’s interests and employee interests (Elmholdt & Haahr, 2021; Jenkins & Delbridge, 2014). Aspirational control operates differently from traditional forms of control, including disciplinary power.

In coining the notion of aspirational control, Alvesson and Kärreman explain:

> What is at stake here is neither time independent like “pure” normative control (where internalized values reach beyond time and space) nor fairly precise future directed control as most instrumental and performance-related motives are (where the bonus/wage raise, promotion, or visible result is targeted). Here we instead have the fusion of a sense of self (identity), the struggle to maintain and improve skills, the prospect of realizing objectives and get (instrumental) rewards (wage increases, rapid promotion), and the desire to comply with and live up to a specific normative order (being a blend of instrumental and value-oriented elements). (Alvesson and Kärreman, 2007, p. 721)

As described in the Preface, the stakes of managerial efforts to alter the conduct of workers through dashboards, prompts, targeted recommendations, and other types of digital nudges, cannot be fully grasped through the vocabulary developed to describe disciplinary power (e.g., the panopticon metaphor). For instance, the coffee delivery drone does not direct workers through instrumental and performance-related motives such as paying workers a bonus. Digital nudges  

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1 I coined this term as a shorthand for describing the empirical interest of this dissertation. However, since I coined the term only during the final stage of my PhD project, the articles presented in this dissertation, employ the alternative labels of *digital productivity assistants* and *AI-driven nudges*. 
represent technological instruments of normative control (Lomborg, 2022). Thus, the concerns emerging in the use of these instruments cannot be captured through our traditional vocabulary of normative and value-oriented control. While the drone manipulates social interactions, it is not internalized values that cause workers to take a break. Rather, dashboards, prompts, targeted recommendations, and other types of digital nudges are typically intended to appeal to the individual employee’s rational self-control (Lomborg, 2022). As such, this emerging class of control systems manifests a complex blend of normative and instrumental control tactics.

While I only recently encountered the notion of aspirational control, the idea that my empirical interests revolve around a distinct blend of control tactics was forged during my first encounter with the coffee delivery drone. I entered the PhD program at Copenhagen Business School with a somewhat odd fusion of philosophy and business administration acquired during my previous studies. My education was firmly rooted in the world of critical management studies concerned with understanding emerging control practices. In particular, a book chapter by Michael Reed (2011) evolved into a personal intellectual reference point. In this chapter, Reed synthesizes the literature on organizational control hybrids, describing how organizations from the late 1990s started to blend market-based, hierarchy-based, and network-based modes of control in novel and distinct ways. When I first encountered the drone, I immediately recognized it as an instantiation of a system underpinned by a hybridized control logic. Similar to organizational control hybrids, the drone system engages in detailed operations management where a new cadre of technocratic managers (programmers, social scientist consultants, etc.) are responsible for designing and implementing the system, and autonomy is delegated to workers through structures of self-management. Hence, when I later encountered Alvesson and Kärreman’s concept of aspirational control, I sensed that this was a concept capturing the dilemmas manifested in IBM’s coffee delivery drone.

**CONDITIONS OF POSSIBILITY FOR DESIGN AND USE**

Studies of aspirational modes of control have illuminated how material modalities afford critical options for control and influence (Alcadipani & Islam, 2017; Paring et al., 2017). The literature has surfaced a range of managerial practices, mainly concerned with the management of knowledge workers—for instance, human resource management systems of large international management consultancy firms and banks (Alvesson & Karreman, 2007; Cäker & Siverbo, 2014) and CSR initiatives (Costas & Kärreman, 2013). However, Elmholdt and Haahr (2021) caution that this stream of literature does not yet consider algorithmic control practices such as those involved in a coffee delivery drone or a sleep tracking app: “The norms are not just set by the organisation (or society) and followed by the employee”; rather, “the metrics provided via the digital self-tracking also provide new norms or data points to follow, hence, normativity cuts multiple ways” (Elmholdt & Haahr, 2021, p. 180).

Elmholdt and Haahr’s study is broadly situated within a rich scholarly tradition of information systems research, science and technology studies, and organizational science. This tradition
concerns itself with how emerging technologies occasion social processes and alter work practices in often unforeseen and unexpected ways. Built on the premise that the implications of a technology vary significantly with its context of use, studies from these disciplines tend to remain within the boundaries of a single organization (Bailey & Barley, 2020). However, in a recent research commentary, Diane Bailey and Stephen Barley encouraged scholars to examine the implications of emerging technologies beyond the point of use. The authors argue:

We need to admit that the implications of a new technology are not always the product of ongoing action and interpretation at the point where people are using technologies. Rather, those who design and promulgate technologies have visions of what work is and what it should be like (Orlikowski, 1992; Pollock & Williams, 2010; Williams & Pollock, 2012). Such visions shape the outcomes of technological change. Thus, we cannot continue to view the implications of new technologies as solely situated, contextual, and emergent. (Bailey & Barley, 2020, p. 2)

The commentary draws upon multiple streams of literature to encourage scholars expanding their studies of emerging technologies to cover the entire timeline of a technology’s trajectory. For instance, they cite studies drawing on Swanson and Ramiller’s (1997) concept of organizing visions. According to this literature, the visions of technology deserve critical attention, as they provide the cognitive structures for interpreting what purposes a given technology can and should be used for (Swanson & Ramiller, 1997). As such, the visions of a technology produce the conditions of possibility for its use.

Picking up where Bailey and Barley (2020) left off, this dissertation engages in a historical examination of aspirational algorithmic control (AAC) systems. The dissertation draws on Michel Foucault’s analytical strategy of analyzing the process of problematization to shed light on the philosophical and ethical worldviews displayed in the visions underpinning the design and use of AAC systems (e.g., Foucault, 1983/2001, 1984, 1984/1990). In a broad stroke, the analytical strategy followed aims to open up the conditions of possibility by disclosing the worldviews that we as researchers, users, citizens, legislators, managers, etc., commit to when engaging with AAC systems. Importantly, the critical concern of the approach is not to reveal the problematic nature of AAC systems; rather, the form of critique practiced when analyzing the process of problematization aims to transcend the dichotomous dystopic and utopian views of technology by allowing for the refusal of, reconfiguration of, and renewed curiosity in emerging technologies and their use (paraphrasing Foucault, 1980/1988, p. 13).

Foucault’s work has made a significant mark in a wide range of social science disciplines, including IS research, where scholars frequently draw upon the iconic metaphor of the panopticon and Foucault’s notions of governmentality and biopolitics to make sense of modern technologies (Willcocks, 2006). However, the most inspiring part of Foucault’s legacy for my purposes is not the sociological concepts he developed (i.e., the panopticon metaphor, governmentality, and biopolitics) but his analytical approach. As argued in the Preface, in the time since Foucault conducted his empirical work, the technologies of control have mutated. Given that new layers and complexities have been added, we cannot fully grasp the stakes of modern workplace
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datafication technologies using the concepts Foucault crafted to diagnose the challenges of his time. Thus, instead of engaging with Foucault’s sociological concepts, I follow in the footsteps of Marius Gudmand Høyer (2013) and Colin Koopman (2019) and engage with his philosophical and historical analytical approach instead. Based on Foucault’s analytical approach, the dissertation proposes the following research agenda:

Dashboards, automatically generated recommendations, and other forms of digital nudging are increasingly being designed and promulgated as means to enhance workers’ productivity. But what dilemmas emerges when managers seek to alter the conduct of workers (i.e. manage workers) through this emerging class of digital technology that I label aspirational algorithmic control (AAC)? How did this particular form of algorithmic management become established as a meaningful, acceptable, legitimate, and effective way for managing workers? What are the worldviews that underpin the design and use of AAC systems? What are the problematics that have structured the development of AAC systems and the formation of the practices within which they are embedded? This dissertation explores these questions with the aim of allowing scholars, policy makers, organizational leaders and workers to think differently about the role of computational technologies, data, algorithmic generated recommendations and digital nudges in the workplace?

This dissertation explores these questions through engagement with archival material pertaining to the origins of an emblematic instantiation of ACC (Microsoft MyAnalytics) as well as a seminal text on nudge theory and the evolution of managerial thought to disclose the broader intellectual lineages of AAC.

The Plan of This Dissertation

Thus far, my examinations have materialized into three research articles. The first article develops the methodological foundation of the dissertation by conceptualizing a strategy for conducting historically oriented problematization research on information systems. To illustrate the potential of historically oriented problematization research, the first article interrogates the evolution of an application marketed by Microsoft as MyAnalytics (recently rebranded as Viva Insights). By collecting and analyzing the digital traces we leave behind when using Microsoft’s applications, MyAnalytics paints vivid pictures of how office workers spend their workdays and makes targeted suggestions for improvement. The MyAnalytics application has been featured in numerous Harvard Business Review articles, thus serving as both an emblematic example and a shaping force for the wide category of AAC systems and the broader discourse on workplace datafication.

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2 In the articles, later presented in this dissertation, I refer to this approach as a problematization lens. In the first essay, I elaborate on why I now label the approach historically oriented problematization research on information systems.
3 The article covers application material from the period of 2011-2020. In 2021, MyAnalytics was rebranded as Viva Insights (Rewari, 2021).
However, due to the first article’s ambition to provide methodological guidance, the analytical work related to the history of the MyAnalytics case is presented in a condensed form. The second article foregrounds the MyAnalytics case by presenting the empirical work in greater detail. The article tells the origin story of the MyAnalytics application and how the data-mining technology fueling MyAnalytics was first developed in a start-up envisioning the use of data to stimulate conversations about workloads and organizational priorities. But once the start-up was acquired by Microsoft, the outlook of the application gradually shifted toward being a tool for individual employees to reform their work habits using data-driven insights. In the article, my co-authors and I discuss how the two distinct visions display multiple possible pathways for workplace datafication: One casts the challenges of contemporary work life as a collective issue, as it presents data as a dialoging tool for job priorities and workloads; the other underpins AAC systems, presenting data as a tool for self-improvement, which, in turn, casts the challenges of contemporary work life as a condition the individual knowledge worker must learn to navigate.

Whereas the two first articles home in on MyAnalytics as a particular instantiation of AAC, the third article looks at the theory of nudging, which underlies the MyAnalytics application and the broader category of AAC systems. This article traces the differences and similarities between the discourse of so-called “AI-driven nudges” and previous managerial paradigms. It shows how past managerial logics are merged in novel ways, allowing managers to handle the tensions between autonomy and control inherent to self-management practices. The analysis suggests that we must be careful not to reduce all forms of algorithmic management and control to a simple rehearsal of Taylorism. The article then discusses how this historical reading contributes new perspectives on why people promote and resist AAC systems and how AI-driven nudges only work when assuming that the interests of workers and their employers are perfectly aligned.

The articles, which were previously presented as independent works, are brought together here. The occasion is the greater spectacle that is unfolding as I, the author and co-author of these works, seek to become part of the academic community by obtaining my PhD degree. According to the local guidelines of Copenhagen Business School, the institution hosting my PhD candidacy, a doctoral dissertation may assume a number of formats. One of them is the article-based format, in which the PhD candidate presents a collection of articles. In this case, the articles must be complemented by an additional component of the dissertation that explains the relationships and synergies among the different articles, synthesizes the key findings, sheds light on blind spots, and broadens the discussion of the findings. This additional piece, also known as the “wrapper” or “kappa,” provides space for post hoc reflection and a personal account of the candidate’s experience. As part of my wrapper/kappa, I have chosen to craft a series of confessional essays that tell the story behind my research contributions. The essays contextualize the research process that guided the articles and take stock of the major ideas and concepts that emerged in that process.

The first essay is a prelude to the first article. It elaborates on the development of my translation of Foucault’s analytical strategy to the discipline of IS research and how the events of the pandemic led me to explore archival material. The second essay introduces the second article. It
portrays the experiences that awakened my initial curiosity in the MyAnalytics application and workplace datafication issues. The third and last essay tells the story behind the third article, where I turn my empirical attention away from the MyAnalytics application to a wider engagement with the nudging literature and the history of managerial thinking.

I wrote these essays as explorations of the role of authorship in my research. It is a well-established axiom in information systems research that we cannot understand the impact of digital technology without taking its contexts into account (Avgerou, 2019). As such, I find it worthwhile to dwell on the context in which the outcomes of my academic work have been crafted. The essays were inspired by postmodern inclinations of research traditions. As such, I conceived of the essays as experiments involving the methodical questions of representation and presentation in which the traditional view of “writing down results” is rejected for being too limited (Alvesson & Sköldberg, 2009).

The format and style of the essays draw upon my love affair with the discipline of behavioral economics. During my master’s degree studies, I became fascinated with the lab and field experiments conducted by behavioral economists. I felt that these studies materialized the philosophical critique I had been exposed to when studying the notion of homo economics on a provocative pedagogical testbed. This fascination led me to Daniel Kahneman’s (2011) Thinking Fast and Slow, in which the author portrays his academic partnership with Amos Tversky and all the detours their journey included. Richard Thaler’s (2016) Misbehaving is written in a similar style. In this popular science book, Thaler recounts the history and making of the discipline of behavioral economics, with the point of departure being his personal experience and publications. I found the confessional style of these popular science books refreshing, as it allowed the authors to engage in reflexive exercises concerning their own work (Alvesson & Sköldberg, 2009). I hope that by following a similar style I am also able to share the lines of my thinking, which are typically given little space in classical research articles.

In the concluding chapter, I synthesize the three research articles and their accompanying essays. But since I conceive of my dissertation as the beginning of a journey rather than a final product, the conclusion also outlines my plans for new research endeavors. Here, I share my suggestion for a new IS research agenda exploring alternative trajectories for the role of digital data and algorithmic technology in the workplace.
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ESSAY ONE
FROM STUDYING TECHNOLOGY IN USE
TO ARCHIVAL EXPLORATIONS

This essay prefaces the first article in my dissertation titled Exploring the Archive: A Problematization Lens for Conducting Critical IS Research, originally published in the proceedings of the 2021 International Conference on Information Systems. The current essay takes stock of the events, ideas, and concepts that shaped the development of the problematization lens. It tells the story of how my initial plans for data collection suddenly became impossible on the night of March 11, 2020, when the Danish prime minister closed down the country due to the COVID-19 pandemic, and how an empirical focus on archival materials that would eventually become the core of my final dissertation emerged from the ruins of these plans.

FORGING THE FIRST PLANS

The story starts with me as a freshly minted PhD candidate desperately trying to develop a sound plan for my PhD project. When applying for PhD candidacy, I already knew that I wanted my project to address the wider tendencies of workplace datafication. Thus, when I saw that the Department of Digitalization at Copenhagen Business School had an open position, I immediately began to draft an application.

Once I started, I was told to align my project with the discipline of information systems research, which was the core focus of my new academic home. From my new colleagues, I learned that the IS discipline itself is rife with tensions about what IS research is and what it is not. Thus, I quickly realized that planning my project would also be an exercise in figuring out how to position myself in the wide landscape of IS research. What IS research is was and continues to be a difficult question for me to answer. While first bewildered by these tensions, I came to appreciate the IS discipline as a broad tent of scientific orientations and approaches. Over time, I learned that the broad arena of IS is bound together by a shared interest in emerging information technologies and the social issues pertaining to them. Early in the process of getting to know my new academic home, I encountered Wanda Orlikowski and Suzanne Iacono’s (2001) influential conceptualization of the IS research landscape. The article resonated. I appreciated how the authors described information technology as bundles of material and cultural properties packaged together in some socially recognizable form of hardware and/or software. From then on, it became clear to me that I could anchor my project in a particular application.

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1 For instance, this is argued by Bjørn-Andersen in an interview with Torkil Clemmensen (2017) on the history of the Scandinavian IS tradition.
I had already identified Microsoft’s MyAnalytics application as an interesting empirical focal point for my work. In short, MyAnalytics uses a patented data mining technology to extract the digital traces that knowledge workers leave behind when using Microsoft’s applications. The application then presents an analysis of these traces on several dashboards, which are complemented by targeted suggestions for improvement and shared privately with the individual knowledge worker via email. The narrative around the application aligns with the wider discourse on time optimization, presenting MyAnalytics as a tool to help people work smarter and boost their productivity (Microsoft, 2019). The two later essays tell the story of how I first became interested in the MyAnalytics application and my later struggles in figuring out how to classify my empirical interest—i.e., what it is that the MyAnalytics application is a case of. In this essay, I continue with the story of how I engaged with Michel Foucault’s notion of analyzing the process of problematization to examine the philosophical and ethical worldviews underpinning this bundle of material and cultural properties packaged as the MyAnalytics application (cf. Orlikowski & Iacono, 2001).

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I entered the PhD program with bachelor’s and master’s degrees presenting an odd fusion of philosophy and business administration. I had previously engaged Foucault’s works in several courses and projects, including my final master’s thesis project, which I wrote together with Andreas Mogensen. In our thesis, Andreas and I took inspiration from Michel Foucault’s philosophically oriented analytical approach to investigating why and when nudging is relevant to driving organizational change. We undertook our project in 2016 and 2017. At this point, the concept of nudging had recently started to attract attention among managerial thinkers and practitioners. We wanted to understand the limitations of nudging as a change management strategy from a philosophical perspective.

When we started our project, Foucault was already an integrated part of our intellectual repertoire. We had both previously engaged with several of his books and interviews in coursework and other projects. But the idea to engage with Foucault’s analytical approach was motivated by our supervisor, Marius Gudmand-Høyer, who has contributed extensively to the area of Foucault studies. Guided by Marius, we embarked on a journey to further expand our Foucauldian understanding. We read a series of texts that Foucault produced toward the end of his life as he reflected upon the nature of his work and the analytical strategies that he had developed alongside it (e.g. Foucault, 1983/2001, 1984, 1984/1990). In these texts, Foucault presents his oeuvre as concerned with the history of thought, asking how and why we have come to think of psychological institutions, the penal system, or sexuality as we do. Further, he questions how these ways of thinking prioritize and enact certain philosophical and ethical worldviews while denying others.

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2 For instance, Google’s former head of People has described the potential of nudging as a managerial strategy (Bock, 2015). For further references on how nudging has been appropriated by managerial scholars and practitioners, see Mogensen and Christiansen (2017).

3 Marius serves as the review editor of Foucault Studies and has published important contributions on Michel Foucault’s work, thought, and complete oeuvre—e.g., Raffensoe et al. (2016).
I was astonished by the simplicity and potency of our approach. Mimicking Foucault’s analytical approach enabled us to produce an interesting comparison between the nudging literature and past managerial ideas such as Taylorism, human relations, and human resource management. From this comparison, we articulated a number of assumptions that a nudging-based change management approach would entail.

As part of our master’s thesis process, we presented our work to change management practitioners with the aim of further refining our analysis. We also presented our work in several workshops with change management practitioners, hoping to learn more about nudging after we defended our thesis. Each time, I was delighted to find that our historically oriented philosophical analysis also resonated with the experienced practitioners we met, who were often both fascinated and skeptical about the concept of nudging in the context of change management. Our conceptualization of nudging became a starting point for them to assess whether or not they should invest time exploring nudging as part of their toolbox for change management.

In light of my positive experience with Foucault’s historically oriented analytical strategy, I wanted to continue exploring how I could leverage a similar approach to shed light on assumptions of workplace datafication. However, my search for additional methodological guidance revealed that historical perspectives continued to be rather rare in IS research, despite the fact that leading figures in the IS community had been calling for more historical perspectives (Kallinikos, 2002; Stahl, 2011). It has even been argued that historical perspectives and methods represent a missed opportunity for IS research (Land, 2010).

I figured that if I wanted to include a historical perspective in my work, it would require some methodological development. But this also offered an opportunity to contribute. Even though I was less than one and a half months into my PhD program at the time, I had already been asked to reflect on what articles I envisioned including in my final dissertation on several occasions. The realization that the development of a historical Foucauldian perspective could become the first article in my dissertation inspired me to invite my old master’s thesis supervisor, Marius, and my new PhD supervisor, Mads, into a collaboration. Humbled to have two minds with much broader intellectual horizons than my own onboard, I started to translate the methodological thoughts from my master’s thesis project into an analytical strategy suited for IS research. Joyful and confusing discussions with Marius and Mads enriched this process. After a hectic and intense month of writing, we submitted a draft to the European Conference of Information Systems (ECIS) entitled: “Analyzing IT Artifacts as ‘Answers’ to Problems—How Histories of Thought May Strengthen the Critical Potential of IS Research?”

I remember I felt proud that I was able to submit an article within the first three months of my PhD studies. However, when three months later, we received the message that our article had been rejected, I recognized that more work was needed. One reviewer commented that it felt like a philosopher had stumbled into IS. I did not take the rejection too hard. After all, the reviewer was

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4 Although several authors—e.g., Mason et al. (1997), Bannister (2002), and Bonner (2013)—have demonstrated the value of historical methods in IS, their use is still in a nascent state. This claim is supported by Mitev and De Vaujany (2012), who only identified 31 historical IS journal papers when reviewing the field.
right: I was a philosopher who had just started to find my ground in IS. Moreover, my colleagues had already prepared me—rejections happen to everyone. This helped me accept the rejection as a natural part of the research process.

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During my search for methodological guidance on how to use Foucault in IS research, I came across Shoshana Zuboff’s first book *In the Age of the Smart Machine*. As will be further elaborated in the second essay, Zuboff’s more recent work on surveillance capitalism had already made its mark on my thinking. Thus, when learning that her first book from 1988 was a classic in the IS community, I quickly ordered a copy. As I started to read *In the Age of the Smart Machine*, I was captivated by Zuboff’s writing once again. The book depicts the dilemmas of digital transformation by combining a historical Foucauldian perspective with rich ethnographic data. I was astonished by how words written in 1988 foreshadowed contemporary debates on AI and algorithms. Zuboff had gathered rich ethnographic data from sites where workers experienced some of the first examples of computers entering the workplace. Reading her observations through a historical lens, Zuboff depicted the dilemmas of digital transformation with a precision rarely seen in the contemporary discussions I now had begun to follow thirty years later. Thus, seeing how Zuboff neatly combined ethnographic and historical material inspired me to follow in her footsteps.

**ESTABLISHING ACCESS TO THE FIELD**

The idea of using ethnographic methods in my PhD research was already present before my encounter with Zuboff (1988). Thus, from the first weeks of my candidacy, I had been actively looking for organizations to collaborate with. I mingled at practitioner conference events, wrote countless LinkedIn messages and emails, and reached out to my network. I met with start-up owners, HR leaders, consultants, and people from Microsoft. The meetings revealed a challenge. Despite MyAnalytics being featured in prominent outlets such as *Harvard Business Review*, I could not identify any organizations actively using it. Uncertain of what this might mean, I started to question my choice of focus. Why would it be relevant to study an app that nobody uses? And how on earth would I then be able to conduct a study on it?

In the late fall of 2019, I met with a corporate digitalization unit at a large Danish multinational. They had reached out to our department to establish new research collaborations and they shared my curiosity about workplace datafication. At our first meeting, they showed me some slides from their digital strategy. One of the slides featured the MyAnalytics icon. Excited to see MyAnalytics featured in an actual organization, I asked why they had the icon there. They replied that they saw MyAnalytics as a tool that could support their ambition of using digital tools to free fifteen

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5 The influence of Zuboff’s works on the IS field has been noticed, for instance, by Willcocks (2006) and Burton-Jones (2014).
6 The Harvard business review articles are presented in detail in the second article of this dissertation.
minutes a day of their employees’ work time. Immediately, I recognized how the sales pitch of the MyAnalytics application had now become part of this organization’s digital strategy.

The organization had already made the MyAnalytics tool available to their employees. However, they had thus far only communicated sparsely about the application internally. The team published a short article on the intranet about MyAnalytics but had done little else to follow up. According to the people that I met, most employees in the organization had not even noticed that a new button with the MyAnalytics logo had appeared in their Outlook application. But a couple of employees who had noticed the MyAnalytics logo reported back to the digitalization unit that they found that the metrics provided by the new application provided them with valuable insights. Based on this feedback, the digitalization unit was now looking into ways to better leverage MyAnalytics.

Interestingly, the people I met also expressed the feelings of unease that had hit me when I first encountered the MyAnalytics application. The head of the unit told me that he generally saw digitalization as a double-edged sword. Hence, he welcomed the opportunity to collaborate with me in learning about the potential and pitfalls of MyAnalytics. He reflected that MyAnalytics was only one example of many workplace tracking tools that they would need to deal with and form opinions about in the near future.

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The meeting reassured me that MyAnalytics was indeed an interesting focal point for my PhD project. I invited Stine Lomborg from Copenhagen University to a second meeting with the digitalization unit. Like me, Stine was interested in doing empirical work on MyAnalytics. Ideally, we would have liked to shadow organizations already using MyAnalytics or organizations with plans to roll out the application. However, since we had both been struggling to identify existing uses of MyAnalytics, we decided to engage in a more interventionist, action research-flavored study (Book, 2012; Herr & Anderson, 2014).

The digitalization unit agreed to help us recruit twenty volunteer employees for our research project. The participants would be invited to take part in a study exploring the broader tendency of workplace datafication. My research collaborator and I would then host a workshop to introduce the participants to MyAnalytics. Following the workshop, we planned to track each participant for three months via three interviews. In between the interviews, we intended to ask the participants to share pictures of their experience with MyAnalytics. These pictures were used as conversation starters in the interviews. My colleague was a media scholar and was used to including prompts such as screen dumps in interviews. She pointed me toward the work of Nanna Gorm, who used a similar set-up with photo diaries in her PhD work. Here, Gorm investigated the use of Fitbits—at that time, an emerging wearable technology for tracking the movements of its user. Based on my experience hosting more co-creative workshops for my master’s thesis project, we decided that our engagement with the participants should conclude with a final

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The sense of unease are described in the Preface and further elaborated in the second essay.

See Gorm and Shklovski (2017) for an elaborate description of her use of photo diaries.
workshop. In the workshop, we planned to ask participants to formulate principles for ethical uses of tracking technologies in the workplace.

In addition to the collaboration with the Danish multinational, I convinced another large Nordic organization and two start-ups to engage in similar setups. The setup would allow us to observe the use of MyAnalytics in four different organizational contexts, covering both large and small organizations. In total, we planned to follow over 50 people, reporting on their experience with the application. After much planning and several long conversations between the legal unit of our universities and collaboration partners, we were finally ready to enter the field in the spring of 2020.

**PLANS BREAKING DOWN**

Unfortunately, I only managed to run the first introduction workshop with one of the start-ups. On March 11, 2020, one week before we planned the first workshop with the Danish multinational, the Danish prime minister locked down the country due to the COVID-19 pandemic. The next months represented the most frustrating and mentally challenging time of my PhD journey.

The lockdown meant that the organizations we had planned to collaborate with were being turned upside down. Overnight, organizations all over the country went into crisis mode. Building long-term sustainable work habits was no longer a priority in a world where core business activities were placed on hold and entire organizations needed to learn how to use Microsoft Teams to conduct their daily activities. It was a time that called for deep reflection on the empirical focus of my project. In this time of crisis, it was unlikely that any organization would have the bandwidth to participate in a research project about an app that still needed to prove its worth. As the lockdown period extended, I started to wonder if I should pivot my PhD project into focusing on the timely topic of remote work.

Moreover, when I told people about my project and the MyAnalytics application, people often commented that a lot of their work would not be captured by the application. Since many work and collaboration activities do not leave any digital traces (e.g. a spontaneous meeting not scheduled via Outlook), these activities do not appear in MyAnalytics metrics. However, with the shift toward remote work, this seemed to change. With remote work, even informal talks over coffee are facilitated online via Microsoft Teams (or Zoom), generating massive amounts of digital traces that can enhance the accuracy of the metrics produced by MyAnalytics and similar applications.

In the end, I decided to stick to my original plan of focusing empirically on the MyAnalytics application. For one thing, I was less excited by questions about remote work; for another, I wanted to stay focused. I was now more than six months into my PhD program and had already invested significant resources into familiarizing myself with the literature on workplace datafication and the new types of managerial practice enabled by the trend toward datafication. Moreover, the shift toward remote work appeared to be accelerating the diffusion of digital
collaboration tools, generating more data traces (Leonardi, 2021). Thus, applications like MyAnalytics would be increasingly gaining a stronger corpus of data to feed on. Against this backdrop, I believed that the topics of algorithmic management and workplace datafication would only become more prominent in the near future. This belief was further confirmed by the spike in Google searches for “employee monitoring” during the pandemic, indicating that more organizations were launching new workplace tracking initiatives to ensure the health and productivity of their employees (Bond, 2020; Chesler, 2020; Putzier & Cutter, 2020). Thus, I felt that despite the difficulties of gathering research data under the current circumstances, I could continue to focus on algorithmic management and the broader issues of workplace datafication.

DEVELOPING THE PROBLEMATIZATION LENS

Waiting for things to normalize, I continued to develop the methodological and analytical foundation for my work. This work was stimulated by a PhD course at Lund University introducing qualitative methods and research philosophy, which was organized by Mats Alvesson and centered around his own work—in particular, his book (co-authored with Kai Sköldberg) on Reflexive Methodology. The book had served as a textbook in a methodology course I took during my master’s studies. Despite being a textbook, it had a playful feel. I was particularly taken by one chapter in which the authors portrayed various research paradigms as different religious stances (Alvesson & Sköldberg, 2009, pp. 263-265).

I signed up for the course with Alvesson because I wanted to meet the author in person. But due to the pandemic, I was unfortunately only able to meet him over Zoom. He was an entertainer—making the best of the sometimes dreadful nature of online learning. During the course, we read Alvesson’s Generating Research Questions Through Problematizations, which he co-authored with Johan Sandberg. Alvesson and Sandberg (2011, 2013) introduce the notion of problematization as an alternative to the gap-spotting approach for motivation research. They propose that in gap-spotting, scholars motivate their work by either referring to either a “lack of studies or a shortage in the delivery of conclusive results in the existing literature.” However, the approach of gab-spotting “is unlikely to produce interesting and influential knowledge contributions” as it “reinforce[s] rather than challenge[s] existing theories” (Alvesson & Sandberg, 2013, p. 47). As an alternative, they suggest using the alternative method of problematization. The notion of problematization naturally caught my eye. While the title of the article had already flagged my interest, as I started to read it, it became even clearer that I needed to pay close attention to how Alvesson and Sandberg’s work related to my own.

After participating in Alvesson’s course, I started to see references to his and Sandberg’s work on problematization in IS editorials and research articles (e.g. Rivard, 2014; Te’eni, 2016; Wiener et al., 2019). Seeing this connection gave me the idea of drawing upon Alvesson and Sandberg’s work on problematization to motivate the previously rejected ECIS article that one reviewer characterized as a philosopher stumbling into IS. When developing the notion of problematization

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9 The second essay further elaborates on how these topics became central to my work.
into a methodology for generating research questions, Alvesson and Sandberg take their point of departure from Foucault’s work. Similar to the problematization approach that I had worked on with Marius and Mads, Alvesson and Sandberg present their project as an examination of the limits of our thinking and the assumptions that we take for granted.

However, it also became evident to me that the work that I started with Marius and Mads offered a different and important contribution. Our work departed from Alvesson and Sandberg’s notion of problematization in two ways. First, Alvesson and Sandberg write about how researchers might formulate more inspiring research questions. In contrast, we aimed to develop a strategy to guide researchers examining empirical cases (for instance, to examine the philosophical worldviews underpinning an application like MyAnalytics). An emerging stream of research had already started to explore how the tactics of problematization could be used to examine the various “assumptions” of digital phenomena (Gkeredakis & Constantinides, 2019; Hafermalz et al., 2020). I believed that our work could contribute to this emerging stream of research.

Second, based on their aspiration to examine and challenge researchers’ theoretical assumptions, Alvesson and Sandberg move beyond Foucault’s work in developing their own set of analytical tactics that researchers could follow to conduct problematization research. However, when I first read their proposed analytical tactics, I felt something was missing. When Andreas and I wrote our master’s thesis project, we gained a lot from simply mimicking Foucault’s analytical approach to analyze the context we were interested in. In the introduction to The History of Sexuality Volume 2: The Use of Pleasures, Foucault describes his oeuvre as concerned with the formation of discursive practices. He also describes the structuring of his analysis around three interrelated axes: the epistemic rules that a given practice refers to, the systems of power that regulate it, and the forms within which individuals are able and obligated to recognize themselves as subjects. Thus, I was puzzled that I saw no variation of these three axes in the problematization approach proposed by Alvesson and Sandberg. Third, it also puzzled me that the historical perspective that is so interwoven with Foucault’s work and his analytical approach was seemingly absent in the way that problematization-based research was practiced in IS.

These differences further motivated me to explore how a closer engagement with Foucault’s analytical strategy might be leveraged in IS studies—an approach I first labeled as a problematization lens for conducting critical IS research. However, in presenting my work at conferences, seminars, and in informal chats, I learned that the label of problematization lens insinuated to some people that we believed that the scholarly work inspired by Alvesson and Sandberg (2011, 2013) was not problematization research or that this line of work was somehow wrong or of lesser value. We certainly did not intend to make either of these points. Rather, what we wanted to convey was that Foucault’s writing hides a potent yet underutilized strategy that supports similar aims as the line of work taken as inspiration. Nevertheless, the approach we suggested also differed in that it followed a different set of analytical tactics. Thus, when I started to draft my PhD dissertation, I decided to rethink how to label the analytical strategy I wished to promote. I decided to rebrand it as an analytical strategy for conducting historically oriented problematization research on information systems. As a consequence of this rebranding, the articles presented in the dissertation adopt the term problematization lens, whereas I use the label
Another source of inspiration for developing the methodological and analytical foundations of my work came from a course I took before the pandemic. The course was titled “Frontiers of Digital Innovation Research,” and even though it was not strictly on my topic, the course helped me better understand the broader landscape of IS research. The course was offered as a collaboration between three Swedish universities, each hosting a part of the course. The first module was held in Gothenburg. Here, we were exposed to different theoretical perspectives on how to study emergent technology. One session introduced us to the concept of organizing visions. We read Swanson and Ramiller’s (1997) original article where they argue that the direction of technological change depends not only on what functionalities become possible but on the tales we tell ourselves about these functionalities.

When reading Swanson and Ramiller’s work, my thoughts drifted to the comments made to our rejected ECIS article that called me out as a philosopher who had stumbled into IS. In the concept of organizing visions, I started to recognize a way to better ground my Foucauldian-based approach in the IS research community. Swanson and Ramiller characterize organizing visions as community discourses. They argue that these discourses provide the cognitive structures for emerging technologies as they reveal to the members of the community the organizational opportunities for exploiting a given technology.

As the lockdown continued and data collection continued to be impossible, I started to look further into the notion of organizing visions. I found a lot of interesting work building on the organizing vision concept, which helped me motivate and position my Foucauldian engagement further. For instance, I came across the research commentary cited in the introduction by Diane Bailey and Stephen Barley. Citing works affiliated with the organizing vision concept, the authors call for more research that “investigate the rhetoric and dialogue around emerging technologies”, moving the “analysis beyond [the point of] single organizations” (Bailey and Barley, 2020, p. 7).

Encouraged by the commentary, I started to think of the notion of organizing visions as a way to frame the unit of my analysis. I sensed that Foucault’s analytical strategy of analyzing the process of problematization could add to the organizing vision literature. I believed the approach would be of value, as it offered a way to better understand what kind of opportunities, related to a given technology, are being produced and silenced within the discourse of a certain community.

However, I later loosened my commitment to the organizing vision concept. When presenting my work at my first work-in-progress seminar, I became aware that the intellectual roots of the organizing vision concept in institutional theory represented a source of confusion to some readers. I realized that despite its affinities with Foucault’s works and institutional theory, the critical project that I sought to undertake, with inspiration from Foucault, was more ethical than sociological (see Power, 2011 for further elaboration). Hence, whereas in my first work-in-progress seminar, I referred to organizing visions as the unit of analysis, I started to look for alternative ways of theoretically describing what my analysis pertained to. During another PhD
course,\textsuperscript{10} I came across one of Foucault’s many interviews. In this interview, titled \textit{Questions of Method}, Foucault (1980/1991) describes his analytical approach as concerned with the rational and theoretical schemas of practices. Taking inspiration from this formulation, I then started describing my work as concerned with analyzing the schematics of digital practices.\textsuperscript{11}

\textbf{LOCATING AND EXPLORING THE ARCHIVE}

As the pandemic continued, I became more and more stressed about the situation. Entering my second year, I felt like the clock was ticking. I wanted to have some kind of output to show to the world. Thus, I started to consider alternative forms of data collection. Again, I found inspiration in the “Frontiers of Digital Innovation Research” course. Due to the pandemic, the course had unfortunately moved online, which I found to be a pity because I had enjoyed how the first part of the course offered opportunities to interact with PhD students from all over Sweden. The interaction naturally became more formal and the discussions less lively.

However, one sleepy afternoon, while attending the seminar, Daniel Skog from Umeå University awakened my curiosity. He had done work on the evolution of Spotify using a wide range of archival sources. For instance, he used Spotify’s official blog and other Spotify-related posts using a news blog aggregator and The Internet Archive Wayback Machine, which was particularly fascinating to me. Since the Wayback Machine enables the examination of historical websites, Skog used it “to accurately deduce the timing of specific incidents by examining the Spotify website at particular points in time” (Skog et al., 2018, p. 4566). When I listened to Skog’s presentation, I thought that perhaps I could do something similar.

A couple of months later, I started to explore how I could draw on Skog’s work to map the evolution of the MyAnalytics application. From Google searches, I had learned that Microsoft had acquired the technology behind their MyAnalytics application from a start-up called VoloMetrix. Following similar steps as those taken by Skog, I started browsing old websites of VoloMetrix and Microsoft and scrutinized VoloMetrix’s original patent applications. I scrolled through numerous blog posts and news articles mentioning MyAnalytics, VoloMetrix, and Delve (the name of the application when it was first acquired by Microsoft). Making my way through this large body of material, I stumbled across an interesting quote by the co-founder and CEO of VoloMetrix, Ryan Fuller.

VoloMetrix was founded in 2011 upon a promise to “increase the effectiveness of enterprise managers and knowledge workers through breakthrough visibility and insight” (VoloMetrix, 2011) through a dashboard showing managers a set of operating metrics about organizational activities. In 2013, two years after its foundation, VoloMetrix launched a personal dashboard for

\textsuperscript{10} The PhD course took place at Roskilde University 2021 and was titled “Critical Research of Critique in an Age of Uncertainty, Neoliberalism, and Populism: Insights from Pragmatic Sociology in Dialogue with Other Critical Perspectives.” With a point of departure in French pragmatic sociology, the course discussed different critical research approaches, helping me to elicit the critical aspirations underpinning historically oriented problematization research on information systems.

\textsuperscript{11} The concept of schematics and how I operationalize it is further elaborated in the first and second articles.
the individual worker. Following its initial launch, Fuller explained that this new feature of the application was developed to empower workers:

The more junior you are, the less control you have over where your time goes. Without hard data to back up your complaints, let’s face it, often times, it’s just brushed off as an employee whining … But with these kinds of reports, employees can say, “Look, I really am being pulled in a billion different directions, and let’s figure out how to address that so I can be more productive and have better relationships.” It can be very empowering. (Florentine, 2013).

According to Fuller, collaboration data can support a better dialogue about workloads between managers and workers. The vision for workplace datafication stood in sharp contrast to how Microsoft later packaged their MyAnalytics application as a tool to help the individual employee “learn ways to work smarter” (Microsoft, 2019). As I continued to make my way through the archive, I found more material showing how the sales pitch of the application has shifted significantly over the years. However, I could also see that while the discourse of workplace datafication shifted when Microsoft acquired VoloMetrix in 2015, the MyAnalytics technology essentially relied on the same data mining techniques and metrics as the original VoloMetrix application. Rendered through a Foucauldian lens, I would later present this difference as disclosing a discursive shift in the system of power and forms of subjectivity, indicating two alternative visions and pathways for the future of workplace datafication.

From what I felt to be my lucky strike in the archive, the analysis of the MyAnalytics application began to materialize. I resumed work on our rejected ECIS article and invited my newly added secondary supervisor Tina to the collaboration with Mads and Marius. Using the MyAnalytics archival material as an illustrative case, we further developed the Foucauldian notion of analyzing the process of problematization for the IS discipline. We rewrote the entire article and submitted it to the 2021 International Conference on Information Systems. The article received a positive review with fruitful suggestions for additional improvements. Our revised article was accepted, and I went to my first in person academic conference in Austin to present our work.

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12 Strictly speaking, the conference was a hybrid conference. But it was the first time I was able to meet with people from the IS research community in person at a conference.
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ARTICLE ONE

EXPLORING THE ARCHIVE: A PROBLEMATIZATION LENS FOR CONDUCTING CRITICAL IS RESEARCH 1

By Stig Nyman, Mads Bødker, Tina Blegind Jensen & Marius Gudmand-Høyer

ABSTRACT

Critical IS research agendas are more important than ever if we wish to uncover the unanticipated and potentially harmful consequences of digital technologies. Developed from Michel Foucault’s late work, we introduce the problematization lens as a critical IS research strategy for exploring discursive commitments embedded in digital phenomena. The problematization lens is characterized by a genealogical approach to history and a limit attitude towards critique. Building on three analytical presumptions, we conceptualize the problematization lens and demonstrate how it can be operationalized through an illustrative case that analyzes the evolution of the Digital Productivity Assistant, MyAnalytics. The paper contributes to critical IS research by advancing the use of historical and philosophical analytical strategies, allowing researchers to explore the limits of their thinking as well as supporting the design of alternative visions for how our engagement with digital technologies may (also) be configured.

Keywords: Problematizations, genealogical research, critical IS research, speculative critique, Foucault, philosophy in IS

1. INTRODUCTION

Critical research that challenges prevailing assumptions in the development, use and impact of digital technology has emerged as an important research agenda in the information system (IS) community (Myers & Klein 2011; Willcocks et al. 2015; Rowe 2018). As track descriptions for this year’s ICIS conference testifies, critical IS research is more important than ever in light of the wide range of unanticipated, and sometimes harmful, consequences brought by the accelerated diffusion of digital technologies in the workplace and everyday life (e.g. Carter et al. 2021; Windeler et al. 2021). According to Rowe (2018), the unprecedented challenges of digital transformation call for the IS community to look beyond our comfort zone and engage with philosophical analysis. Doing so will help scholars “break out of limitations that unduly restrict

1 The article was first published in the proceedings of the International Conference of Information Systems (ICIS), 2021 as a completed research paper of the track: Advances in Theories, Methods and Philosophy. https://aisel.aisnet.org/icis2021/adv_in_theories/adv_in_theories/7
our theoretical imagination and our theoretical reasoning through metatheories and intuition” (ibid. p. 380). Such engagement requires, Rowe argues, that we approach philosophy as more than a means by which we sharpen the methodological awareness and position analytical approaches to IS research. Rather, we need to appreciate philosophical reflection and contemplation concerning important IS topics as a form of research in itself.

Stahl (2011) reminds us that cultivating such critical reflection requires historical awareness: “In order to understand the role of IS in organizations and societies […] it is important to be aware of the historical roots of the current situation […] If the researcher is to understand why a particular interpretation of technology has become dominant, then historical knowledge of earlier systems, or relationships between employees and management and other relevant issues is helpful” (p. 204). At the same time, Land (2010) asserts that historical methods continue to be underutilized and hence represent an overlooked opportunity for IS scholars to better understand the complexities of IS phenomena.

Responding to these calls, this paper examines how IS scholars may draw upon Michel Foucault’s historical oriented, philosophical analytical approach to “analyzing the process of problematization” (Foucault 1983/2001; 1984a) in their work. Developed from Foucault’s late work, the paper conceptualizes the problematization lens as a philosophical, analytical strategy for mapping discursive commitments embedded in digital phenomena. As an analytical strategy, the problematization lens scrutinizes a wide range of archival materials to display how digital phenomena, and the practices that they are embedded in, have been formed as responses to historical problems. In analyzing digital phenomena as responses to problems, we allow ourselves to sense how we in our engagement with digital phenomena inevitably commit to certain assumptions of what we can know, what we assume to be legitimate and praiseworthy modes for governing others, and how we assume ourselves and others to be moral subjects.

Our conceptualization of the problematization lens contributes to critical IS research by advancing the use of historical and philosophical analytical strategies. Towards this aim, in the next section, we briefly review how the notion of problematization is currently used within IS research. We differentiate the problematization lens from Alvesson and Sandberg’s (2011) strategy of using problematization as a method for challenging research assumptions. We then revisit what we find to be underexplored parts of Foucault’s oeuvre in IS to sketch out the foundation of the problematization lens. As an analytical strategy, the problematization lens is characterized by a genealogical approach to history and a limit attitude towards critique, as well as by three analytical presumptions. Exemplified with an illustrative case study of the evolution of MyAnalytics, a Digital Productivity Assistant (DPA) developed by Microsoft, we show how we as IS researchers can harness the problematization lens to explore the discursive commitments embedded in digital phenomena.

We conclude the paper by discussing and further clarifying the critical attitude of the problematization lens by situating it in the landscape of critical IS. We position the problematization lens as an alternative to the broader Critical Theory orientations that have been dominant in the IS field (Brooke 2002) and suggest that the problematization lens is well suited...
to support emerging genres in the IS field that experiment with speculative and performative approaches to critique.

2. Uses of Problematization in IS Research

Recently, the notion of problematization has caught the attention of IS researchers. Gkeredakis and Panas (2019) and Hafermalz et al. (2020) have used problematization as a research strategy for identifying and challenging ideological and onto-epistemological assumptions concerning emerging digital phenomena and the theories applied to describe them. This research strategy is based upon Alvesson and Sandberg’s conceptualization of problematization within the field of organization studies (2011; cf. also Alvesson and Kärreman 2007, Alvesson and Sandberg 2014), urging researchers to investigate “root metaphors” of existing research with the purpose of generating new, interesting research questions. Here problematization is mobilized to challenge “the assumptions that underlie not only others’ but also one’s own theoretical position” (Alvesson and Sandberg 2011, p. 47).

Accordingly, in their study of IT enabled coordination phenomena in organizations, Gkeredakis and Panas (2019) follow Alvesson and Sandberg in focusing on problematization as an analytical strategy for explicating and revising underlying theoretical assumptions or limiting tropes and fashions that guide the conceptual landscapes in the IS literature. Similarly, Hafermalz et al. (2020) draw upon Alvesson and Sandberg’s work (2011) but with a particular focus on the informative ‘surprise’ that may arise from disjunctions between tacit expectations informed by implicit assumptions and actual experience, exemplified by the digital practice of running with an exercise-tracking app. With an emphasis on established theory in company with novel empirical material, Hafermalz et al. (2020) add to Alvesson and Sandberg by drawing attention not only to how the existing research literature theorizes a given digital practice, but also to how someone involved in this practice problematizes (it) herself in light of e.g. a surprising experience.

While endorsing these developments, we want to introduce an alternative to Alvesson and Sandberg’s ‘assumption challenging’ research methodology by returning to what these authors claim to be their own “starting point” (p. 253), namely Foucault’s conceptualization of his approach as ‘analyzing the process of problematization’. Instead of focusing on what the researcher assumes and does, we conceptualize problematizations as the object of an analysis that asks how, why and in what respect commitments are made to certain things in the specific shapes of a problem. Such analytical strategy shifts away from a focus on how digital phenomena are theorized in the academic literature towards an empirical historical-oriented analysis of discursive commitments embedded in digital practices. This shift implies that we are more interested in how the practice under scrutiny commits to its own problems, how it ‘problematizes’ itself, rather than how we could problematize or criticize implicit assumptions implied by a theoretical perspective.
3. **FOUCAULT’S ANALYSIS OF PROBLEMATIZATIONS**

Overall, Foucault’s approach to analyzing the process of problematization (e.g. Foucault 1983/2001; 1984a; see Gudmand-Høyer 2013) constitutes an empirical inquiry that asks under what circumstances someone commits and responds to something in the form of a problem, and how this response introduces certain commitments to what we later label as forms of knowledge, power and subjectivity. This type of work implies an orientation towards a certain critical attitude. Works of what is today often referred to as post-modern thinkers (including Foucault) highlight that critical work is confronted with the challenge that we as scholars are intimately entangled with the very logic that we are trying to discern (Alvesson and Skjoldberg 2009). To address this challenge of entanglement, Foucault (1984b) urged us to conduct critique with ‘a limit attitude’. Instead of searching for formal and universal structures, critique should be directed at analyzing and reflecting upon the limits of our current thinking. Foucault therefore advocated that we investigate “the events that have led us to constitute ourselves and to recognize ourselves as subjects of what we are doing, thinking, saying” (ibid. p. 46). For IS research, this translates into the ambition of gaining a clearer picture of the problems we take for granted and assume to be of importance in our practices, as well as understanding the new problems that such assumptions carry with them. For Foucault, this focus entailed a particular approach to critique:

I’m not a prophet, I’m not an organizer, I don’t want to tell people what they should do […]

I try to analyze a real situation in its various complexities, with the goal of allowing refusal, curiosity, and innovation (Foucault 1980/1988).

As such, Foucault’s critical approach translates into approaching technology critique with a renewed curiosity, thereby *allowing* for new ways of refusing, innovating, or re-configuring practices. Significant for this type of technology critique is the word *allowing*. When working with the problematization lens, critique does not take the form of a verdict. Critique is an an activity which aims at exploring how we may “think differently” about the practices that we take part in and reproduce (Foucault 1985/1990). While this allows us to see how emerging technology may also be configured, the problematization lens does not tell us anything about how practices ought to be configured.

A defining feature of this approach to technology critique presented here implies a specific understanding of the notion of ‘problematization’. According to Koopman (2009), Foucault used the term problematization to differentiate his genealogical method from the one exercised by Friedrich Nietzsche. Whereas Nietzsche built on history to subvert some of our most central modern practices, Foucault used history to show how certain practices have structured what is seen as core problematics within a particular ‘episteme’ (a ‘period of thought’), most notably our own modernity (Koopman 2009). Accordingly, the notion of problematization is primarily employed as a technical term for the object of analysis (cf. Foucault 1983/2001, p. 171; 1985/1990, p. 12). This implicates that the problematization lens does not subscribe to any particular pregiven critical attitude in respect to its object. Analytically, it is not imbued with the intention of ‘problematizing’ this or that issue; that is, to render some putative given or unconscious assumption questionable and precarious in order to uncover the complications
inherent in its origin, its application or its consequences. Refraining from the enactment of a normative critical attitude that has its justification outside of or prior to the specific inquiry, is reflected on the level of the object of analysis as well. When Foucault emphazises “the relation between the thing which is problematized and the process of problematization” (Foucault 1983/2001, p. 171) this is not a matter of studying how something was rendered ‘problematic’ only in the negative sense of constituting or presenting a undesireable difficulty, or merely in the interrogative sense of being puzzling, perplexing or enigmatic. To study how things are problematized is also to study, in a more positive sense, the ‘preoccupation’ and ‘concern’ with, or the ‘care’ and ‘solicitude’ for something (Foucault 1985/1990, p. 10).

Metaphorically, we describe the problematization lens as concerned with elucidating ‘the price paid’ for engaging with a particular digital phenomenon. Importantly, the problematization lens does not predicate acceptance or refusal, but (merely) allows us to know the price we pay for a certain engagement. The idea and critical potential of elucidating the price of a practice (i.e. the given commitment embedded in the practice), is that that when we know the price in greater detail it becomes possible – however, neither necessary nor obligatory – to refuse to pay up.

Next, we describe how the critical aspirations outlined above rests upon three presumptions: First, that we accept the possibility that digital phenomena, and the practices that these phenomena are embedded within, can be seen as contingent responses to problems. Second, we show that these responses involve commitments to questions of knowledge, power, and subjectivity; and finally, that their history can be told in terms of mutations in what we refer to as their schematic configurations.

3.1 Presumption #1: Digital Phenomena are Analytically Construed as Contingent Responses to Problems

The critical attitude associated with the problematization lens rests on the presumption that emergent technologies can be analytically construed as ‘answers’ to certain problems, and that these answers are constructed within a wide range of historical contingencies, discourses and ways of articulating problems. Foucault (1983/2001) characterized his work as an inquiry into the events that have made the emergence of a given phenomenon possible. He noted that the practices we engage in today have emerged on the backdrop of a complex process, in which widely accepted practices at a given time in history have become confronted with a certain difficulty. Accepted practices thus become problematic as they start to raise discussion and debate. This in turn prompts a crisis that incites new reactions, leading to the formation of new practices.

When working with the problematization lens, the goal is to map out problem-response sequences (Gudmand-Høyer 2013). The interesting part of zooming in on problem-response sequences is that several responses are often proposed to one single set of problematics (Foucault 1983/2001) and hence variations illustrate the contingencies of a given practice. Consequently, the problematization lens presumes that the specific configuration within a given practice is not the causal “effect or consequence of a historical context or situation, but is an answer [structured by certain problematics] given by definite individuals [at a specific point in history]” (ibid. p. 172).
Construed as contingent responses to problems, the next section argues that these responses, that take the form of emerging digital phenomena, involve commitments to questions of knowledge, power and subjectivity.

3.2 Presumption #2: The Practices that Digital Phenomena are Embedded in Enact Contingent Commitments to Questions of Knowledge, Power and Subjectivity

Simply demonstrating that actual practices are contingent responses to historically embedded problems is not the end goal of the problematization lens. While the critical aim of the problematization lens is not to tell people what they should do, it is not merely descriptive work. Rather, an analysis of problematizations aspires to entertain discussions on whether or not our engagement in a certain practice is “worth its price” as described above. This is done by providing an empirical grounding that shows how our engagement in certain practices entails specific commitments to questions of a philosophical nature.

Foucault (1985/1990) argued that practices enact contingent yet specific ‘epistemic rules’, ‘governmental models’ and ‘forms of the self’. The point is that in our engagement with digital phenomena, we inevitably commit to certain assumptions of what we can know, what we assume to be legitimate and praiseworthy modes for governing others and how we assume ourselves and others to be moral subjects. Thus, the problematization lens rests on the analytical presumption that just as emerging digital phenomena can be construed as responses to problems, these responses inevitably imply commitments to questions of knowledge, power, and subjectivity.

Foucault (1984b) provided a guiding framework that allows us to explore these commitments. We can enhance our understanding of the discursive commitments of the practices we take part in by asking: “How are we constituted as subjects of our own knowledge?”, “How are we constituted as subjects who exercise or submit to power relations?” and “How are we constituted as moral subjects of our own actions?” (Foucault, 1984b, p. 49). When working with the problematization lens, we use these three questions as our analytical point of departure.

While these first two presumptions indicate how IS scholars may identify discursive commitments embedded in practices related to digital phenomena, the third one points out how such discursive commitments can be articulated by analyzing the evolution of the schematic configurations of a practice.

3.3 Presumption #3: Analytical Orientation towards Mutations in the Schematic Configurations of Practices

Foucault (1980/1991) has occasionally characterized his work as concerned with programs of a practice, particularly concerning the technical mutations in matters of details, tactics calculated in response to situations and the theoretical ideas that guide their application.

In our conceptualization of the problematization lens, we refer to these programs as the schematic configuration of practices. As we will exemplify later, the problematization lens helps uncover discursive commitments embedded in a practice by carving out and comparing the ways in which
the schematics of a practice are configured differently at various points in time. Consequently, the problematization lens is partial to archival materials associated with the practice under scrutiny. This material can include almost any conceivable type of archival media such as documents featuring accounts and testimonies, stories, architectural plans, or texts promoting certain concepts and ideas. Within an IS context, the orientation towards mutations in the schematic configurations translates into empirical attention to a range of archival materials related to the digital phenomena or practices of interest. These might range from patent applications, system specifications, to pitch decks for investors, reviews, marketing- and training materials, as well as references to books, articles, or popular culture artefacts.

In light of the increased focus on sociomaterial configurations of practices in the IS field (Schultze et al. 2020), the idea of prioritizing analytical attention to discourse or schematic configurations may appear as out-of-date to some scholars. Following Suchman’s (1987) demonstration of the local situatedness of knowledge production, some would most likely consider it naïve to study practices without studying them in situ. Barad, who is an intellectual reference point for the sociomaterial oriented research program, argues that Foucault’s work is constrained by not noticing “[i]n what way the biological and the historical are ‘bound together’” (Barad 2013, p. 808). Barad’s point is that by giving primary attention to the schematic configurations of practices, Foucault’s analytical approach is not sensitive towards how material conditions, in particular the role of the body, alter practices.

Despite such criticism, aspects of Foucault’s scholarship continues to serve as the foundation for sociomaterial research. For instance, Hultin (2019) recently favored the genealogical research perspective for providing an understanding of digital phenomena as historically contingent, performative practices. Such understandings enable IS scholars “to move beyond the dichotomous view of structure and agency and recognize how categories […] are radically unstable and open to modification and alteration” (Hultin 2019, p. 97). However, Hultin also urges scholars to study practices in situ in order to preserve their situated and performative nature. Thus, we may say that sociomaterial research embraces the first two presumptions of the problematization lens while contending the third. While sociomaterial research and the problematization lens follow different routes for generating insights, the two analytical orientations share onto-epistemological assumptions of understanding digital phenomena as historically contingent, performative practices.

We find that Barad’s critique of Foucault highlights an important limitation to the problematization lens. However, analyzing the schematic configurations of practices should not be neglected for that reason. In a recent commentary, Bailey and Barley (2020) urge scholars to investigate how “macrosocial and economic trends emerge over time as unanticipated consequences despite variation at the local level” (ibid. p. 2). As demonstrated by an extensive body of IS research (e.g. Swanson & Ramiller 1997; Gorgeon & Swanson 2009; Pollock & Williams 2011), community discourses shape the trajectory of digital phenomena by providing common understandings of the types of applications that a given emergent technology is deemed relevant for.
Our aim here is not to say that the problematization lens provides a better way of analyzing practices. Rather, we think of the problematization lens as an analytical orientation that is complimentary to e.g. sociomaterial analyses in the IS field. Rather than being attentive to the local situatedness and how sociomaterial entanglements configure IS phenomena, the problematization lens can help turn our analytical attention to what we may term the historical situatedness and schematic configurations of a given digital phenomenon. This does not entail that bodies and materials are completely ignored. As Foucault (1984b) noted, problematizations are responses to problems that are real. In an interview, elaborating on his historico-philosophical approach, Foucault argued that schematic configurations deserve analytical attention because of the very real interrelations between schemas and what people do and think:

Bentham’s Panopticon isn’t a very good description of ‘real life’ in nineteenth-century prisons. To this I would reply: if I had wanted to describe ‘real life’ in the prisons, I wouldn’t indeed have gone to Bentham. But the fact that this real life isn’t the same thing as theoreticians’ schemas doesn’t entail that these schemas are therefore utopian, imaginary, etc. One could only think that if one had a very impoverished notion of the real. For one thing, the elaboration of these schemas corresponds to a whole series of diverse practices and strategies (Foucault 1980/1991, p. 81).

The schematic configurations deserve analytical attention because they allow us to appreciate how these schematics have been re-configured over time. Engaging with the problematization lens requires that researchers and readers accept that it is both possible and relevant to study practices that involve technology through archival sources and without studying the practices in situ.

We have now presented the foundation of the problematization lens. We have detailed how this lens is oriented towards the research aim of generating possibilities for “thinking differently”, and how the lens entails three analytical presumptions regarding responses to problems, commitments to knowledge, power and subjectivity. Similarly, we have presented how we can study mutations in the schematic configurations of practices. The next section aims to show how the problematization lens can be used to analyze discursive commitments embedded in specific digital phenomena, using the introduction of Digital Productivity Assistants (DPA) in work settings as an illustrative case study.

4. ILLUSTRATIVE CASE: HOW TO OPERATIONALIZE THE PROBLEMATIZATION LENS

Myers and Klein (2011) encourage critical researchers to organize “data collection and analysis around core concepts and ideas from one or more critical theorist” (p. 25). To provide a better sense of how Foucault’s notion of problematization shapes the research process, we share insights from a study we are currently working on. First, we briefly motivate the inquiry. Second, we detail how we collected and analyzed a body of empirical material with respect to the three presumptions outlined above. We conclude the case by discussing the type of analytical insights that the problematization lens can allow researchers to generate.
4.1 Motivating the Inquiry

For our illustrative case, we turn to Digital Productivity Assistants (DPA), a term coined by Winikof et al. (2021) to describe an emerging class of applications in which digital trace data are used to create awareness among knowledge workers of their work patterns and to make targeted suggestions for improvements. Cecez-Kecmanovic (2011) suggests that critical IS research should focus on a problematic situation or phenomenon informed by critical theoretical concerns. Our interest in DPA is motivated by an ambivalence concerning the emergence of a new class of managerial applications. On the one hand, DPA address the challenges involved in digitally afforded flexible work practices, which IS scholars have documented to engender fear, anxiety, stress, and burnout among knowledge workers (Gregg 2011; Mazmanian et al. 2013; Stein et al. 2015). On the other hand, a growing body of recent critical research indicates that, despite having many noble intentions to increase well-being and productivity of knowledge workers, the current trajectory of DPA risks bringing a wide range of unanticipated harmful social consequences for the individual worker. For instance, studies of productivity apps (Gregg, 2019), intelligent calendars (Wajcman, 2019) and corporate self-tracking initiatives (Moore, 2018) alert us that engagements with DPA risks silencing questions of power and introducing novel forms of exploitation and control. This ambivalence motivated us to employ the problematization lens in order to evaluate “the price” of engaging with DPA and to explore alternative trajectories for DPA in order to allow for its refusal or reconfiguration.

4.2 Organizing the Data Collection

A recurring consideration when analyzing the process of problematization is its temporal framing and which materials to confront. There is no definite answers as it depends on where mutations in the schematic configurations can be sensed. In preparing an illustrative case, we decided to focus on the evolution of Microsoft’s application, MyAnalytics, over the past decade, since MyAnalytics serves as an archetypical example of DPA. Scholars have pointed to VoloMetrix and MyAnalytics as examples of how advances in algorithmic capabilities re-configure managerial practices (O’Neill 2017; Gal et al. 2020). Furthermore, in Winikof et al. (2021), MyAnalytics is used as a key case of Digital Productivity Assistants (DPA). The data mining technology driving MyAnalytics was originally developed by the start-up VoloMetrix, later to be acquired by Microsoft. The people involved in VoloMetrix and MyAnalytics have actively articulated the schematics for DPA as they disseminated their visions for the role of algorithms and digital data in the future of work in influential outlets such as Harvard Business Review and Wired Magazine.

In our effort to map the evolution of MyAnalytics, we found inspiration in the study by Skog et al. (2018) on platform evolution. This led us to collect a comprehensive body of materials showing the schematic configurations of the application. We collected materials from multiple publicly available sources such as the news aggregator Factiva, site specific searches on Microsoft’s official blogs, archive.org’s The WayBack Machine, as well as Google patent applications searches. In total, we collected more than 600 documents that covered news items found to be useful in developing an initial timeline of the evolution of MyAnalytics over the past decade.
Early in the analytical process, we found that these articles yielded somewhat limited insights into the commitments to the questions of knowledge, power and subjectivity which we were concerned with. Most news articles, for example, were either articles reporting on funding, acquisition and people changing jobs. Hence, in later stages of the analytical work, we focused on articles that were authored by people involved in VoloMetrix and MyAnalytics, on articles that included quotes from interviews on – or reviews of – the application, as well as company websites, official blogposts and patent applications. This selection allowed us to see lineages and breaks in the evolution of the discourse around DPA and we immersed ourselves in the materials through repeated readings, as advocated for by e.g. Braun and Clark (2006).

4.3 Analyzing the Empirical Material

To analyze the empirical material, we draw upon the two first presumptions outlined above to ask the four questions presented in table 1 as a point of departure.

<table>
<thead>
<tr>
<th>Presumptions</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presumption 1: Core problematics</td>
<td>To what problems are digital technologies presented as a solution?</td>
</tr>
<tr>
<td>Presumption 2: Commitments to questions of knowledge, power, and subjectivity</td>
<td>How are people constituted as subjects of their own knowledge?</td>
</tr>
<tr>
<td></td>
<td>How are people constituted as subjects who exercise or submit to power relations?</td>
</tr>
<tr>
<td></td>
<td>How are people constituted as moral subjects of their own actions?</td>
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</tbody>
</table>

Table 1: Analytical Questions for Articulating Discursive Commitments

The analytical procedure can be characterized as relying on thematic coding (Braun and Clark 2006). We used NVivo to aid the coding process and to keep an overview of all the archival material. We began the analytical process by coding sentences and paragraphs that presented MyAnalytics as a solution to a given problem or expressed commitments to questions of knowledge, power and subjectivity. For instance, we coded a sentence from the editor of Inc. magazine, John Brandon (2016), who in his review of MyAnalytics described how “the app watches ‘signals’ during your day”. In this quote, data were conceptualized to constitute knowledge about work as a signal and thus we coded this phrase as a commitment to the question of knowledge. Following the first round of coding, we clustered and re-clustered the nodes to form coherent categorizations of the various discursive commitments expressed over time. By adopting Brandon’s metaphor of “signals” to characterize how the DPA discourse commits to the question of knowledge, we were able to capture a general pattern in our source material.

To support the analytical process, we also created nodes for key events in the history of MyAnalytics along with the technological configurations of the application. For instance, we noticed when VoloMetrix attracted new funding or when VoloMetrix and MyAnalytics released product updates or engaged in new partnerships. We used our notes for crafting a timeline and for creating a visual representation of the evolution of MyAnalytics.
Interestingly, we noticed from the timeline that the data mining techniques and productivity metrics, on which MyAnalytics is based, have changed little since VoloMetrix introduced them in 2011. When VoloMetrix was launched, the first version of the application featured a dashboard showing managers a set of patented operating metrics about organizational activities. VoloMetrix based their metrics on so-called “collaboration data” that was extracted from sent mails and calendars and then linked to correspond to one or more types of activities (Fuller et al. 2016). In 2013, two years after VoloMetrix was founded, the company added a dashboard for team leaders and a personal dashboard for the individual knowledge worker. The personal dashboard featured adopted versions of the same operating metrics as the managerial dashboard. It displayed collaboration data at the level of the individual knowledge worker and compared such insights to organizational benchmarks and personal targets. However, although the core technology behind the application evolved little, we identified a shift in the way personal productivity dashboards have been envisioned and marketed over time. The next section elaborates on this shift and presents an example display of the analytical insights.

4.4 Displaying Insights from the Illustrative Case

In this section, we demonstrate the kind of analytical insights the problematization lens can generate. When displaying the analytical work conducted using the problematization lens, this is perhaps ideally done in a way that enables the audience to become sensitive to the identified shifts in commitments. A classical exemplar of this is the opening sections of Discipline and Punish where Foucault (1977) dedicated the first four pages to display quotations from testimonials of a public execution from 1757 followed by a prison timetable dated eighty years later. It was only after having provided such extensive accounts that Foucault offered his interpretation of how the two texts each represented two different “penal styles” (p.7). However, in this conference paper, in the interest of brevity, we instead summarize our analytical insights in the form of a table. Seeing that the purpose of the paper is to illustrate the use of the problematization lens, rather than presenting the case of DPA, we see this as a necessary tradeoff.

Studying relevant websites and news articles, we noticed that VoloMetrix initially marketed digital trace data as a vehicle for better distribution of workloads and alignment of organizational priorities. However, following Microsoft’s acquisition of VoloMetrix, the sales pitch for personal productivity dashboards gradually evolved into one that promoted digital trace data as a means to enable individual knowledge workers recognize and reform counterproductive work patterns. Table 1 shows an upshot of the identified shift. The first column of the table displays the analytical questions of the problematization lens. The second and third columns present the schematic configuration of VoloMetrix’s version of the personal productivity dashboard (covering the period from 2013-2015) and the schematic configuration of MyAnalytics’s personal productivity dashboards (covering the period from 2016-2019).

We have chosen to highlight these two schematic configurations of personal productivity dashboards since they each represents a distinctive vision for the use of data and personal productivity dashboards in the workplace.
Analytical questions

Core problematics: What problems are DPA presented as a solution to?

- How to manage knowledge workers in organizations where it has become impossible to ‘manage by walking around’?
- How can organizations take advantage of data to render knowledge work more visible in order to mitigate the risks of collaborative overload?

As a solution to these core problematics, DPA entail commitments to questions of knowledge, power and subjectivity:

Knowledge: How do DPA constitute people as subjects of their own knowledge?

By using data to render hidden aspects of work visible: Data extracted from email and calendar function serve as signals that render hidden aspects of work visible within the organization.

Power: How do DPA constitute people as subjects who exercise or submit to power relations?

By enabling knowledge workers to voice concerns over workloads: Data analytics make possible meaningful conversations about workload, distribution and priorities. Challenges of collaborative overload are cast as a collective problem.

Subjectivity: How do DPA constitute people as moral subjects of their own actions?

By presenting data as an opportunity and obligation for self-reformation: Personal dashboards represent an opportunity, but also an obligation, for knowledge workers to reform counterproductive digital communicative behavior.

Table 2: Overview of Two Schematic Configurations of Personal Productivity Dashboards

4.4.1 Core Problematics: Collaborative Overload, the Invisible Nature of Knowledge Work and Opportunities of Datafication: When analyzing our data material, we observed that both VoloMetrix and MyAnalytics over time came to be understood as relevant solutions to what we labelled the problematics of ‘collaborative overload’ (a term adopted from Cross et al. 2020), the invisible nature of knowledge work and a call for organizations to take advantage of data in optimizing their operations.

In our data, we repeatedly found the argument that the accelerated use of digital technology has increased the number of collaborative activities at work to a level that in many cases negatively impact knowledge workers’ productivity and well-being. For instance, Ryan Fuller articulated the problematics of collaborative overload when he was CEO of VoloMetrix: “Within big companies
there are people who have five bosses […] spending 20 hours a week at midnight on calls with India”. However, according to Fuller, “it’s hard to imagine how you can really develop good ideas and innovate in settings that are perhaps a little bit overly collaborative “(Romano 2014).

In both schematic configurations, the problematics of collaborative overload is envisioned to be solved by deriving insight from the so-called collaboration data to provide visibility on how work is done. For instance, upon its launch in 2011, VoloMetrix pitched their offering by arguing that it had become impossible “to ‘manage by walking around’ and keep up with what was going on in your organization.” However, the founders of VoloMetrix, further notice that “embedded in the tools that knowledge workers use is the insight and visibility that managers crave” (VoloMetrix.com 2011). This rhetoric indicates how DPA emerged as a solution to an increasing complexity within modern organizations.

Since the launch of VoloMetrix, ideas of new ways of working have attracted much attention within the public discourse. When Microsoft bought VoloMetrix in 2015, they announced their acquisition as a big step forward in Microsoft’s ambition to “reinvent productivity” (Jha 2015). In Microsoft’s iteration of DPA, the data mining technology invented by VoloMetrix fueled discussions on how ways of working are rapidly transforming in the digital age. For instance, when the journalist Melanie Burgess visited Microsoft’s Envisioning Center to report on future trends in the workplace, Microsoft representatives showed her MyAnalytics as an example of how digital applications take over managerial functions to improve efficiency (Burgess 2019).

Interestingly, regardless of the focus on new ways of working, both schematic configurations of DPA revolve around topics of collaborative overload, the invisible nature of knowledge work, as well as the growing attention to the possibilities of data.

4.4.2 A Shift in Commitments to Questions of Knowledge, Power and Subjectivity: From Collective to Individual Responsibility: When analyzing changes in the commitments to questions of knowledge, power and subjectivity, our work indicates that both schematic configurations commit to the idea that data extracted from email and calendars can be used to render hidden aspects of work visible. As mentioned, we adopt the metaphor of signals from Brandon (2016) to describe the epistemic status of the data. However, within the initial VoloMetrix schematic configuration, data driven insights are aimed at rendering work visible to the organization. In the MyAnalytics schematic configuration, emphasis is on making work visible to the individual knowledge worker. This difference indicates how the two schematic configurations commit differently to the question of power.

In 2013, VoloMetrix marketed personal productivity dashboards as a confidential and personalized report to empower knowledge workers “to take control of their time” (VoloMetrix.com 2014). The sales pitch of the personal dashboard envisioned collaboration data as a means to support dialogue between managers, employees, as well as amongst employees. For instance, in an opinion piece, Fuller (2014) exemplifies the value of big data by describing how data can “open the door for meaningful conversations about workload, productivity and priorities” (Fuller 2014). Yet, in 2016, when Microsoft launched MyAnalytics, data was no longer envisioned as supporting dialogue but rather cast as a tool for self-reformation. For instance, the
Managing Editor at Microsoft, Richard Tso, stated in an official blogpost: “When you have a more complete view into your own work patterns through data, you can begin to make changes in how you work to be happier, well-balanced and more productive” (Tso 2017). This shift signifies what Foucault (1985/1990) would term two different governmental models: one where data can be used to negotiate and optimize priorities and workloads; and one that casts data as an opportunity and an obligation for individual self-reformation. We argue that the shift towards the second model implicitly signals two different responses to the question of subjectivity. With the shift towards data as an opportunity for self-reformation, the responsibility for handling the paradoxical nature of digital collaboration tools is reconfigured. Rather than being seen as a collective issue, collaborate overload is cast as a challenge that the individual knowledge worker must learn to navigate. As such, engagements with this iteration of DPA implies the acceptance of an individualization of the responsibility for coping with the challenges of contemporary work life.

By tracing this shift, the problematization analysis allows us to identify two pathways for DPA. As such, the two schematic configurations provide us with an understanding of the contingencies of a technological present. The lens indicates a discursively composed alternative pathway and rationale for digital technology in the past which, at the same time, serves as an indication of future possibilities. However, even though our analytical work demonstrates potentially problematic aspects of the way DPA are envisioned, we neither can or should prematurely conclude that DPA are exploitive or necessarily prone to be repressive. The problematization lens simply helps us recover the contours of abandoned and alternative trajectories for technologies. In this case, this it not to say that digital productivity dashboards must now be envisioned to be tools for a meaningful conversation about workload, but rather to bring to our attention that they could be seen as such. It is in this sense that analyzing the process of problematization allow us to “think differently”.

5. DISCUSSION: ORIENTATIONS OF THE PROBLEMATIZATION LENS WITHIN CRITICAL IS RESEARCH

We acknowledge how the critical attitude (what we termed a “limit attitude”) of the problematization lens may immediately come across as somewhat less than critical. After all, do we not, in applying the problematization lens, merely identify lost opportunities and trends abandoned, perhaps for good reasons? In the following, we explain how the problematization lens is associated with features of critique and transformation that are central to critical IS research according to Myers and Klein (2011). We suggest that the problematization lens can be part of a generative critique that prompts possible transformations by fostering critical-speculative engagements with digital phenomena. First, we point out how the problematization lens represents an opportunity for IS researchers to engage with Foucault’s philosophical work beyond well-known concepts such as governmentality or his metaphor of the panopticon used in social theory. Second, we situate the problematization lens in opposition to the critical tradition associated with
the Frankfurt School. Third, we discuss how the problematization lens and its discursive and historical inclination may benefit new forms of critical-speculative IS research.

5.1 An Orientation towards the Philosophical Foucault

The relevance of Foucault’s thinking in IS research has been articulated by Willcocks (2006), who notes that, given the influence of Foucault on academics studying issues connected and adjacent to IS, “it is surprising to find Foucault’s methods and concepts discussed, digested and used so little in the IS field” (Willcocks 2006, p. 274). When IS researchers have previously drawn on Foucault’s work, they have primarily been employing the concepts he created. For instance, IS researchers have been using his metaphor of the panopticon (e.g. Doolin 2004; Leclercq-Vandelannoitte & Bertin 2018) and the concept of governmentality (e.g. Introna 2015) in case studies. Others have applied Foucault’s characterization of how ‘discursive formation’ operates to discuss the status of the IS discipline (Hassan 2010).

According to Koopman (2013), the use of Foucault’s concepts tends to engage with his oeuvre primarily as social theory and to a much lesser extent as a philosophical orientation. Moreover, of particular importance to the IS field, Koopman (2019) suggests that further engagement with Foucault’s philosophical methods is increasingly relevant in a context in which social media profiles, big-data analytics and digitized state surveillance reach beyond the scope of what Foucault could discern in his own time. Rather than identifying forms of governmentality within practices involving digital technology or highlighting how technological practices might resemble panopticon-like architectures, the problematization lens looks for inspiration in the way in which Foucault framed the fundamental (philosophical) questions guiding his research. We hope that our introduction of the problematization lens will enable scholars in the IS community to purposefully engage with historical data in tracing genealogies of emergent phenomena in the digital era.

Here, we do not argue that we are the first to explore how Foucault-inspired historical analytical approaches can be used in IS research. As noted by Willcocks (2006), even if scarcely referenced, the influence of Foucault is striking in Zuboff’s (1988) iconic work on the dilemmas of technological transformation. While Zuboff employs the panopticon metaphor in her work, she also demonstrates how a genealogical examination of the relation between work and technology reveals novel insights on the dual role of information technology. Similarly in her latest work, Zuboff (2019) follows a historical approach by outlining the conditions that have allowed a new form of capitalism to emerge. By understanding how the conditions that make surveillance capitalism possible and attractive are contingent, we see that business models based on selling data are not ‘natural laws’ of digitalization. Rather, the proliferation of business models based on selling data is the product of several complex opportunities and challenges to the political economy of machines, people, production and economic systems. Studying this history closely, Zuboff demonstrates that capitalizing on commercial surveillance of consumers is not an indispensable quality of digitalization.
Uncovering an alternative trajectory, Zuboff (2019) shows how the Georgia Tech led project, Aware Home, became one of the distinct predecessors of today’s ‘smart’ home and office systems (p.234–247). However, unlike contemporary systems that capitalize on surveillance for their commercial success, researchers from Georgia Tech emphasized the importance of closed data circulation. From this example, it becomes evident that harnessing the benefits of ‘datafication’ of behaviors is possible without allowing corporations to profit from selling personal data. The Aware Home project, in Zuboff’s rendering, provides the outlines of an unrealized alternative to the present techno-political moment that denies the need for the current class of monopoly-like data driven markets that lead to new forms of exploitation.

While Zuboff’s work demonstrates the value of genealogical oriented research, little is said about the methodological choices inspiring her powerful analytical insights. Thus, we hope the synthesis of Foucault’s methodological reflections in the form of the problematization lens can support IS researchers in mobilizing genealogical perspectives in their work. It should also be noticed that especially in her work on surveillance capitalism, Zuboff supplements her historical insights with a plea for increased regulations of tech giants. Her work displays how genealogical work can also mobilize normative and political action. As we have suggested, and unlike the critical agenda in Zuboff’s work, the problematization lens restrains itself from drawing conclusions about how the world ought to be. To further elaborate on this point, we will make a few comments on how the ‘emancipatory interest’ of the problematization lens can be said to differ from the one traditionally associated with critical IS.

5.2 An Orientation towards a Generative-Emancipating Critique

Commentators (Cecez-Kecmanovic 2011; Myers and Klein 2011) have suggested that critical IS research is always motivated by an emancipatory interest. On this backdrop, we find it relevant to clarify that the emancipating aim of the problematization lens differs from the emancipatory interest originating in the application of different aspects of Critical Theory, which, according to Brooke (2002), have been prominent within critical IS studies so far. In broad strokes, the Frankfurt School orientation aims at challenging the status quo of technological applications and unmasking its harmful consequences. This classical application of Critical Theory in IS tends to be oriented around the ethos of an inherent incommensurability between the human subjective sphere of life and a modern, technical/instrumental rationality that increasingly colonizes deliberative/political lifeworlds (Habermas 1984), or human dignity and freedom (Marcuse 1964/1991; Horckheimer & Adorno and 1944/2002). It is a critical stance concerned with mounting normative resources for radical change.

The critical orientation of the problematization lens differs from the ambition of Critical Theory that has been accused of having a ‘rationalist bias’ (see Alvesson and Sköldberg 2009: 182-183 for a brief overview of this critique). Critical of the enlightenment ideals endorsed in Critical Theory, Foucault (1980/1991) argues that critique does not per se have to conclude what ought to be done. Critique can also serve as an instrument for those who strive to reinvent or refuse what already is, without providing the norms that should justify these changes beforehand.
As we have indicated above, the problematization lens implies a *limit attitude* towards critique. Hence, the critical aim of problematization is *not* to provide answers and solutions, but rather to redescribe and ask new questions. Foucault (1978/2008) emphasized that his aim was never “to say, look how oppressive [for example] psychiatry is, but to bring to light the conditions that had to be met for it to be possible to hold a discourse on madness […]” (ibid. p. 36). The aim is not to ask, “what we ought to do”, but to emphasize the limits of a naturalizing/predominating discourse on digital phenomena that does not leave much room for alternatives. To IS research, this limit attitude may translate into a research strategy that does not aim at debunking possible inconsistencies in the assumptions we have built into our use of digital technology, but to empirically *dispel* the natural, self-evident truths about digital technology, so that certain phrases can no longer be spoken lightly; and so that certain activities can no longer be performed thoughtlessly (Foucault 1980/1991). As such, applying a problematization lens to the study of digital phenomena implies writing a critique of digital technology that has both emancipating and generative potentials: the lens aims to elucidate ‘the price paid’ for engaging with a particulary digital phenomenon. The elucidation of ‘the price of engagement’ thereby makes it possible – however, neither necessary nor obligatory – to refuse to pay its price and allow for a reconfiguration of the engagement.

In the landscape of critical IS, Foucault and Habermas have come to represent two different strands of critical scholarship (cf. Ceecez-Kecmanovic 2011). We hope that we by conceptualizing Foucault’s writings into a set of analytical approaches, the current paper may inspire more researchers to practice forms of critique where digital technologies are not assumed inherently oppressive, corrupt, or unethical. Understood as a critical lens, analyzing the process of problematization enables us to uncover abandoned technological trajectories. Next, we argue that the problematization lens thereby can aid engagements with speculative and performative approaches to technology critique.

### 5.3 An Orientation towards Speculative and Performative Technology Critique

According to Foucault (1980/1991), the analysis of problematizations ought to be taken as ‘game openings’. Following this metaphor, we suggest that the problematization lens holds great potential for supporting emerging genres in the IS field that experiment with speculative and performative approaches to technology critique (Peter et al. 2021). For instance, design approaches such as reflective design (Gaver & Martin 2000; Bell et al. 2005; Auger 2013) already explore forgotten or neglected ideas or attempts to invoke new understandings. They do so by extrapolating past- and future technological developments into staged design artefacts for dialogue and reflection (Dunne & Raby 2013). Thereby, these approaches are likely to benefit from a structured analysis of shifts in technological and discursive configurations of the past so that they might become qualified starting points for tangible experimentation.

Taking outset in our illustrative case of DPA, the initial schematic configurations associated with VoloMetrix signified a technology envisioned to aid knowledge workers in their negotiations on workloads. Retracing and re-articulating a vision for digital trace data as a means for sparking meaningful conversations about workloads opens a whole range of imaginaries. For example, this
retraced vision could be used to pose the important critical question: what if digital trace data were envisioned in ways that did not place the burden of reformation of work on the individual workers? What if, instead of asking how knowledge workers can reform and discipline themselves to become more productive, trade unions began leveraging digital data to support dialogue with employers about excessive workloads?

Nevertheless, it is important to bear in mind that the problematization lens is not committed to any pre-given normative formula. When providing starting points for tangible experimentation, we should remember that the problematization lens merely allows us to explore alternative trajectories for emerging technologies that are otherwise restricted by an ossified commonsense reasoning. Thus, it does not follow that these re-discovered trajectories are necessary more attractive than the current ones.

6. CONCLUDING REMARKS

The purpose of this paper was to introduce the problematization lens as a philosophically oriented strategy for conducting critical IS research. We have outlined the problematization lens as one philosophical and historical research strategy for conducting critical IS research. The paper thus contributes to the field of IS research in several ways.

First, it draws directly on Foucault’s own conceptualization of problematization, allowing for a much more detailed and nuanced account of the commitments we implicitly make when engaging with digital phenomena.

Second, the proposed analytical strategy engages directly with history and philosophy in conjunction. Essential to this form of analysis is its ability to compare differences over time as well as displacements in the problems and commitments to philosophical questions. The analysis thus responds to Land (2010) and Stahl’s (2011) assertion that historical methods, which pay empirical attention to a wide range of archival materials, represent an overlooked opportunity for IS scholars to better understand the complexities of current and emergent IS phenomena. The analysis also responds to Rowe’s (2018) call for further philosophical reflection in IS research. It closely trails Foucault to discern how a problematization emerging at a certain point in time involves commitments to fundamental questions concerning knowledge, power and subjectivity, as well as their interrelations.

Third, the problematization lens presented here contributes to IS research by introducing a form of critique that not only supplements Alvesson and Sandberg’s assumptions in their problematizing methodology, but also the broader Critical Theory orientations that have been dominant in the IS field. We introduce a form of critique concerned with thinking differently. It is a form that focuses on contingency and which re-describes by use of history. Furthermore, it allows for acceptance, reinvention and refusal. This does not entail a normative ‘sway’ in proposing what to do, but instead aims to make it possible to do more (one must hope) by being able to see something in a new light; that tells us about the price we pay by committing to a problem, but not whether we can afford it or whether the commitment is worthwhile.
Fourth, we have argued that the problematization lens is well suited to support emerging genres in the IS field that experiment with speculative and performative approaches. By prioritizing analytical orientation towards archival sources and schematics of practices, the problematization lens, as we introduce it in this paper, distinguishes itself from the orientations towards ethnographic as well as sociomaterial research. The problematization lens draws upon past configurations of technology as ‘game openings’ when bringing things back into their original openness to change. The lens thereby provides empirical fuel and inspiration for investigating the limits of our thinking about digital technology by making it possible to speculate and design or perform alternative visions of how digital practices may be configured.
7. BIBLIOGRAPHY


Article 1


ESSAY TWO
FROM TIME TRACKING TO
digital productivity assistants

Because of the first article’s focus on introducing problematization to the IS community, the analytical work related to the MyAnalytics application was shared in a condensed form and presented as an illustrative case. The second article unfolds the empirical work of the MyAnalytics application in greater detail. The article is forthcoming as part of the special issue “The Ethical Issues and Unintended Consequences of Digitalization and Platformization” in the Journal of Information Technology. As a prelude to the second article, this essay describes the experiences that motivated me to spend four years pondering the issues of workplace datafication.

TROUBLESOME TIME TRACKING

My interest in the role of digital data in the workplace dates back to 2007 when I was an ambitious young high school kid who dreamed of a career in advertising. I was 18 years old and wanted to start an agency with like-minded people. I convinced an established firm that they needed a department with young, unconventional “idea makers” and found myself managing a team of young, reckless creatives.

In the advertising industry, you sell billable hours. Thus, we had to collect data on how we spent our time by tracking when and which clients we worked for and what we did. The tracking was simple but tiresome. We used a system where we manually logged activities. My mentor in the agency advised me to log my hours at the end of the day. This way I could ensure that I did not forget what I had worked on during the day and thereby ensure that we billed clients for the proper amount. I never became good at doing this. One issue was the annoyance of wasting the five minutes it took to register my time when I was already heading home in my mind. But the most mentally draining aspect was that the act of logging negatively affected how I felt about my work. This job was a combination of an internship for which I received high school credit, paid work, and a hobby. Even though it predated smartphones, the work embodied the paradoxical nature of freedom in fluid work arrangements (Maravelias, 2007; Mazmanina et al., 2013; Stein et al., 2015). I worked on school assignments at the office and collaborated with my team members over MSN Messenger, which back then dominated social media, from my bedroom at night. Thus, it was often quite hard for me to figure out when I was actually “working.” For instance, did it count as work if I read a book about branding before going to sleep? Or what if I had a few beers with a colleague and we talked about a project? And what about when I went for a run and brainstormed ideas on the road? If the run counted as work, should I then log the entire run as work or only the part where I thought about the project I was working on? Clearly, an hour of running is not the same as an hour of focused work in front of a computer.
Years later, after leaving the advertising industry, I learned that I was not the only one who felt frustration about time tracking. Several start-ups have launched successful and impressive crowdfunding campaigns that have attracted broad media coverage in marketing IoT devices to make time tracking easier for office workers. The start-ups TimeFlip, ZEI, and Timular all offer versions of a polygon that office workers can use to track their work time in a simpler, more tactile way, compared to the alternative of manually entering activities into time-tracking software. The polygons are equipped with sensors, allowing office workers to track their time simply by turning the polygon to reflect the appropriate activity.

![Image of TimeFlip polygon](https://example.com/timeflip_polygon.png)

*Figure 1: The time-tracking polygon developed by TimeFlip.*

The polygons piqued my interest in how digital technologies were enabling new ways to quantify how we spend our working time, which intensified when I learned about a new Microsoft application called MyAnalytics (e.g. Microsoft, 2019). By automatically collecting and analyzing the digital traces we leave behind when using Microsoft applications, MyAnalytics constructs metrics on how office workers spend their workdays—without the tiresome and challenging act of manually tracking work hours. Interestingly, the application does not use the data to tally people’s work hours; rather, it uses the data to produce a set of alternative metrics about work and to give users advice on how to become more productive. For instance, the application measures what it calls *focus time*. By measuring the time employees spend in meetings scheduled on Outlook, Teams, and Skype calls and chats and then deducting this time from their stated working hours, the MyAnalytics application asks users to reflect upon how much time they have left “to get their work done” (Microsoft, 2018).

Another one of MyAnalytics innovative alternative metrics of work is called *quiet days*. The metric of quiet days is constructed as the number of days where the user does not have significant

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1 Picture downloaded from the TimeFlip MediaKit. Timeflip.io
collaboration activities outside the user’s set work hours. Again collaboration is measured as meetings scheduled on Outlook, Teams, and Skype calls and chats. The application highlights the number of quiet days an employee has had over the last four weeks, including weekends. According to MyAnalytics, tracking one’s quiet days allows you to see whether “you are able to disconnect and recharge” (Microsoft, 2018).

I found these alternative metrics for work intriguing. When I first read about MyAnalytics, I had just completed my master’s degree in philosophy and business administration at Copenhagen Business School. In the program, which also included my bachelor’s studies, I met a world of thinking that made me conceive of my frustrations with time tracking in a new light.

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Reading works like Gilles Deleuze’s (1992) poetic descriptions of how the logic of factory control has been gradually replaced by the control logic of the corporation, I came to recognize my frustrations as rooted in a clash between different control logics. As economies have transitioned toward more knowledge-based and immaterial forms of work, many activities that were not traditionally characterized as work have now become matters of managerial concern (Lazzarato, 1996; Sørensen & Spoelstra, 2012)—including activities like chatting with colleagues or brainstorming ideas when going for a run, as I had experienced myself. Along this line of thinking, productivity and outputs are no longer a matter of the speed at which workers perform tasks as they are in the context of an assembly line. Rather, productivity depends on the work of others and serendipitous events. As a consequence, it becomes difficult to identify the moments of productivity (Drucker, 1999). These insights led me to dwell further on the issue of time tracking. I concluded that time tracking could be cast as an attempt to capture an immaterial form of work

2 The image is a personal screenshot.
with the perhaps incommensurable concept of working hours that was forged during the industrial revolution to control workers in large factories. This recognition led me to think about alternative ways of talking about the activity we call work.

When reading about MyAnalytics, I started to envision concepts like focus hours as metrics of work that allow us to recognize qualitative differences in working hours and how some work activities are more taxing on us than others. Looking back at my experience in advertising, I started to wonder: Would it be possible to use metrics like focus hours to differentiate between the types of activities we do at work when negotiating our commitments to our employer or clients in ways that go beyond counting the hours we spend working?

Moreover, I saw an interesting potential in the concept of quiet days. A returning theme in my studies of philosophy and business administration was the management of self-management. As the opaque nature of knowledge work limits managers’ abilities to oversee work processes, workers need to engage in self-management and have autonomy, flexibility, and freedom over their work (Drucker, 1999). When managerial thinkers started to realize this in the early 1950s, it led to a series of novel inventions, tactics, and strategies that sought to control workers without direct managerial oversight (Barley & Kunda, 1992). Luc Bolstanski and Eve Chiapello describe this development as a gradual transformation of political conjunctures, economic practices and ideological forms in their book *The New Spirit of Capitalism*. The authors describe how the manager-worker dynamic no longer relies on external forces of monitoring but upon workers’ ability to “control themselves.” Workers’ commitment is ensured “without recourse to compulsion, by making everyone’s work meaningful” (Boltanski & Chiapello, 1999/2018, p. 76). It operates by “transferring constraints from external organizational mechanisms to people’s internal dispositions” (Boltanski & Chiapello, 1999/2018, p. 79). In most regards, the MyAnalytics application, as well as IBM’s coffee delivery drone discussed previously, epitomizes this new form of capitalism, as it casts digital data not as a tool for monitoring workers but as a tool to help them become better versions of themselves.

The critique posed by Bolstanski and Chiapello has become even more pertinent as the diffusion of digital collaboration tools has torn down the spatial boundaries of work (Mazmanian et al., 2013; Stein et al., 2015). Paradoxically, when work arrangements become flexible, the freedom to work anywhere and anytime tends to mutate into an obligation to work everywhere and all the time (Gregg, 2011; Johnsen & Sørensen, 2015). Drawing upon my understanding of the dilemmas of self-management and digital collaboration tools, I sensed that the MyAnalytics application and its concept of quiet days represented an interesting solution to the pressing problem of the fluidity of work that seems to haunt contemporary work life.

As I reflected upon the concept of quiet days, I was reminded of an experience that I had during my time leading the advertising unit. Here I was taught that the act of time tracking can be more than a matter of improving efficiency. In my role as team manager for a group of fellow high school students, I learned that the hours we tracked mattered in ways that I had not anticipated. Since we were struggling to find new clients, I decided that we needed to meet more regularly in person to boost our collaboration and team spirit. One of my team members disagreed. He lived in a neighboring city thirty minutes from the office. While he joined the team for meetings, he
generally worked remotely. To him, more travel would make it impossible to continue to keep up with his high school classes without compromising his social life. During a discussion, my colleague argued that our contract stipulated that we were only employed for 10 hours a week. Since he was already tracking more than 10 hours per week on average, he felt that he was working too much. Back then, I was puzzled as to why he was comparing his tracked hours with the work hours defined in our contract. I felt like he did not want to expend the effort necessary to help us succeed. In hindsight, I see how tracking his hours gave him the data he needed to voice his concerns about the voracious appetite of contemporary capitalism and navigate the paradoxical nature of the fluid work arrangement. However, despite the intriguing potential of these new metrics, they also invoked a sense of unease in me. There is something about the ambition to render every aspect of our work life into data that I felt called for critical reflection.

**Surveillance Capitalism and Questions of Datafication**

When I decided to pursue an academic career, I knew it should somehow revolve around my fascination with time tracking. As I was preparing my project proposal for admission into the PhD program, I was encouraged to read a newly published book written by an unfamiliar author—the monumental and now widely cited work *The Age of Surveillance Capitalism* by Soshanna Zuboff. I was captivated from page one. In the book, Zuboff describes how we increasingly find ourselves confronted with a new mutation of capitalism in which “the production of goods and services is subordinated to a new global architecture of behavioral modification” (Zuboff, 2019, p. 1).

In line with Zuboff, the bits of productivity advice presented by the MyAnalytics application exemplify how the expansion of digital data has enabled unprecedented forms of behavioral modification. As evidence for her claim, Zuboff cites Google’s chief economist Hal Varian. Varian celebrates advances in digital technologies such as Big Data and AI, which he believes have enabled novel and more effective business models and organizational forms: “Because transactions are now computer-mediated, we can observe behavior that was previously unobservable and write contracts on it. This enables transactions that were simply not feasible before” (Varian, 2014, qtd. in Zuboff, 2015, p. 81). Varian’s celebration of the possibilities of digitalization displays a profound transformation in employment relationships. Varian depicts this transformation as fulfilling certain economists’ wildest dreams of achieving perfect market efficiency.

I was further captivated by Zuboff’s work because it reflects my intellectual training. As described in the first essay, my engagement with the thinking of Michel Foucault taught me to appreciate the efforts of tracing the intellectual lineages of our thinking. Thus, I resonated with how Zuboff details the historical events that have allowed the logic behind the datafication of our work and everyday life to take root. Zuboff provides evidence that the tendency to view business models based on selling data as a natural part of the digital economy was nurtured by a range of historically contingent factors. She describes how the attack on 9/11 shifted political tides and invoked new needs for surveillance tools by the American government. Similarly, the burst of the dot.com bubble led Google to change its business model to become more attractive to investors.
Combined, these events pooled financial resources to explore the predictive power of digital trace data and influenced legislators to allow its use.

Zuboff’s descriptions transformed my unease with the MyAnalytics application into a strong feeling of indignation. Her thorough historical analysis drew my attention to how datafication efforts have introduced risks of commodification and control that challenge democratic norms and invoke new forms of social inequality and exploitation that have not even been on our radar. When I turned the last page of *The Age of Surveillance Capitalism*, I was recruited into Zuboff’s “fight for humanity in the new frontier of power,” as her subtitle reads. I decided that my PhD project should address the wider tendency of datafication with a particular focus on the workplace.

**DISCOVERING THE TERM ALGORITHMIC MANAGEMENT**

When I started my PhD, I quickly realized that it would be strategic to anchor my project in a particular application. At the beginning of my studies, I retained a dual interest in both time-tracking IoTs and the MyAnalytics application. However, during a lunch talk, I learned that the shift in employment relationships described by Hal Varian already had a name—algorithmic management. The term caught my attention and ultimately led me to choose MyAnalytics over the time-tracking polygons as the empirical focal point of my project.

With Foucault’s work lurking in the back of my mind, I started to trace the origins of the concept of algorithmic management. I learned that the concept was first coined by a group of human-computer interaction (HCI) researchers to describe evolving concerns associated with how software was taking over roles that human managers used to play. The researchers observed how software was being used to automate managerial tasks. Through algorithms and tracked data, software was allocating, optimizing, and evaluating work and thereby managing a distributed workforce at scale. Already in 2015, this was happening across multiple contexts, ranging from traditional workers such as subway engineers and warehouse workers to Starbucks baristas, UPS deliverymen, and crowd-sourced workers on new platforms like Uber (Lee et al., 2015). Since then, the term algorithmic management has been adopted by organizational, management, and information systems scholars to describe a shift in organizational logic where management is no longer a human practice but a process embedded in technology (Kellogg et al., 2020; Möhlmann & Zalmanson, 2017; Schildt, 2017).

While I could see that the concept of algorithmic management was mostly being applied in the context of research on freelancing or “quasi-employment” on digital platforms (e.g. Möhlmann & Zalmanson, 2017; Rosenblat & Stark, 2016), I felt that the term could also be used to describe what was going on with the MyAnalytics application. As I started to learn more about the MyAnalytics application, I saw that the application was, on several occasions, presented as a kind of Fitbit for office work (e.g. Microsoft, 2019). This made me reflect on how the application introduces itself as a kind of automated employee development conversation. Here, workers do

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3 Described in the first essay.
4 i.e. MUS samtale in Danish.
not discuss how to organize their work with a human manager. Instead, they have this conversation with themselves, mediated by software. I then started to ponder whether MyAnalytics might be a form of algorithmic management and, if so, how could I then describe it? Rather than a narrow focus on time tracking, I gradually started to become more interested in how the broader trends of workplace datafication enable the automatization of managerial tasks, roles, and functions. Since MyAnalytics relies on digital traces rather than data (which require workers to consciously generate data inputs), I concluded that the MyAnalytics application spoke more directly to the agenda of algorithmic management, which I believed should become the focal point of my work going forward.

A NEVER-COMPLETED LITERATURE REVIEW

As described in the first essay, I was just about to start conducting fieldwork on how people were using MyAnalytics when the pandemic hit. Feeling the clock ticking on my project, I decided that writing a systematic literature review would be a good use of my time. While I had read a lot of literature on workplace datafication and algorithmic management over the past seven months, I had thus far not considered a systematic literature review to be part of the research output of my PhD. It was my first time engaging with the genre of the systematic literature review and, coming from a training in philosophy, this genre was utterly foreign to me. Thus, the first step was reading a lot of articles on how to conduct literature reviews in the business and IS disciplines (e.g. Schultze, 2015; Snyder, 2019; Templier & Paré, 2015; Webster & Watson, 2002).

The literature review process prompted me to reflect further upon my area of research. Naturally, I wanted my review to revolve around literature relevant to my interest in MyAnalytics; however, I was still unsure how to conceptualize it. To scope my literature search, I drew a Venn diagram with three circles illustrating my research interest. The diagram (displayed in figure 1) had three circles, each representing an academic conversion that I found relevant to my work. First, People analytics and data-driven HR described how organizations increasingly invest in software that harnesses advances in computational technology (machine learning, computation, and other statistical techniques) to broadly process large amounts of data for managerial purposes (Gal et al., 2017; Guennole et al., 2017; Waber, 2013). I wanted to engage with this literature, particularly because the MyAnalytics application has a sibling called Workplace Analytics that “provides [the management with] a dynamic view into collaboration patterns [of the organization] (Microsoft, 2020b). Similar to MyAnalytics, Workplace Analytics, is based on data from Microsoft Office 365. But whereas MyAnalytics produces a dashboard for the individual workers, Workplace Analytics analyzes data at an aggregate level and does not display any information about individual workers to managers. To make this distinction salient, I drew a second circle entitled Algorithmic management to capture my evolving interest in how information systems were used to automate managerial processes, functions, and tasks. As I had already learned more about the research landscape of algorithmic management, I saw a tendency of most research to focus on the
context of digital labor markets\footnote{Recent literature reviews of algorithmic management confirms the observation I made back then. For instance, Heinrich et al., (2022, p. 2) notice that “most papers using the term algorithmic management are dedicated to the issues around the platform economy.”}. Based on empirical observations—in particular, of workers on the Uber ridesharing platform—researchers pointed out that the automatization of managerial tasks and functions threatens to revive the piecemeal system. Researchers cautioned that digital technology allows employers to break down work processes into microtasks and herd people into new forms of freelance and contractual work in ways not seen since Frederic Taylor invented the piecemeal system (Farej et al., 2018; Khovanskaya et al., 2019; Rosenblat, 2018). Since MyAnalytics does not break down work into microtasks, I felt the need to connect with other literature streams as well. For this reason, I drew a third circle entitled Management of knowledge workers. In drawing this circle, I wanted to capture the context in which the MyAnalytics system operates. Aware of how the opaque nature of knowledge work limits managers’ ability to oversee work processes (Drucker, 1999), I felt my review somehow needed to make the context of knowledge work salient.

Based on these three circles, I then collaborated with the librarian affiliated with our department to construct an initial string to search for relevant literature, resulting in incredibly long and complicated search strings (see table 1). Accepting that these search strings would require more work, I treated them as an initial starting point for identifying relevant literature, which I hoped to refine later. I then started systematically going through the articles I identified, noticing key themes and relevant references that my initial search had not revealed.
The systematic review process dragged on. In addition to settling on relevant search terms, I struggled to determine which databases to use. What literature should I include in my searches? What kind of articles would and would not be relevant? Should I exclude work on labor platforms because labor platform research is vast and does not conceptualize the kind of algorithmic management practices I was interested in? But how would I then operationalize this distinction? Later, when I had assembled a pile of promising articles, I vigorously struggled to figure out what to look for in them. Should I systematically code them? The answer was certainly yes, but how should I do that? What kind of coding scheme would be relevant?

<table>
<thead>
<tr>
<th>String 1</th>
<th>(“algorithmic management” OR “performance management” OR nudging OR nudge OR “augmented management”) AND (“people analytics” OR “data-driven HR” OR “data-driven HRM” OR “data-driven human resource management” OR “digitalization of management” OR “quantified workplace” OR “datafied workplace” OR “workplace analytics”) AND (“knowledge work” OR “knowledge worker” OR “immaterial work” OR “immaterial labour” OR “immaterial labor” OR “office work”)</th>
</tr>
</thead>
<tbody>
<tr>
<td>String 2</td>
<td>(“personal informatics” OR “quantified self” OR “personal analytics” OR “self-tracking” OR “self tracking” OR “wearables” OR “smartwatch*” OR “Fitbit” OR “Oura ring”) AND (“knowledge work” OR “knowledge worker” OR “immaterial work” OR “immaterial labour” OR “office work” OR “workplace”)</td>
</tr>
</tbody>
</table>

Table 1: Examples of search strings. Both search strings were used to search the AIS library for relevant work for my systematic literature review.

Even under normal circumstances, the PhD journey has the reputation of being a long and lonely ride. Being forced to work at home because of the pandemic was a nightmare for me since I’m a generally social person who derives energy and inspiration from serendipitous encounters with colleagues. Moreover, I struggled to carve out time and space to relax. Seemingly incapable of taking breaks, my frustration with the project was constantly lurking in the back of my mind. I’ve always tried to work away from home—in libraries, cafés, and the office (when I had access to one). I learned to appreciate the separation of space as one way to manage the fluid nature of the type of work I was doing. However, under lockdown, this separation was no longer possible. This was further complicated by the fact that my girlfriend (now wife) worked as a doctor and was always working different shifts. Since we lived in a small apartment, it was nearly impossible to work effectively when she was home.

Despite these difficult circumstances, I kept pushing on. My literature searches helped me identify a lot of relevant work from neighboring disciplines. Through reading work from the computer science, human-computer interactions (HCI), and computer-supported cooperative work systems (CSCW) disciplines, I encountered a wide range of fascinating prototypes for applications designed to help workers detect when they needed a break, including the coffee delivery drone and the other systems presented in the Preface (e.g. Erichson et al., 2018; Luo et al., 2018; Züger et al., 2017).
My searches also revealed consultancy reports and new articles cited in the research articles I was reading. In particular, a report on the future of work by the influential think tank, Gartner Research stood out (the report is also cited in the Preface). According to their report on the future of work:

To counter the burnout, … [a new class of technology] will emerge to monitor when people have worked too much and when they need to recharge. Technology will catch up with our biorhythms, nutritional needs and exercise needs and help us prioritize. Cognitive load will be monitored and fit into the available time (Griffin & Coleman, 2018, p. 11).

Later, I would discover that the idea that technology could help workers prioritize and avoid cognitive overload appeared as a prominent theme in the history of MyAnalytics as well. Thus, whereas MyAnalytics harnesses metadata from users’ interactions with software, and systems like IBM’s coffee delivery drone connects with wearables, the two classes of systems converge in a shared discourse on time optimization and efficient living. Common to all the systems I read about during this period—e.g., the coffee delivery drone, time-tracking polygons, and the MyAnalytics application—was the belief that technology can be usefully employed to control and manage time.

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When reading and seeing how systems were marketed either commercially or in academic papers, I was reminded of work by the Science and Technology (STS) scholar Judy Wajcman. In the spring of 2019, when preparing for my PhD, I found myself at a lecture by Wajcman when she was visiting Copenhagen Business School. In the lecture, Wajcman introduced us to her recent study, in which she interviewed engineers in Silicon Valley working on the design of a smart digital calendar application. Wajcman told us that based on her interviews with the engineers and conversations with a wide range of people working in the tech industry, it became clear to her that the Protestant work ethic was alive and well in Silicon Valley. Here “the quest of optimizing time has become an overriding principle for life” (Wajcman, 2019, p. 316). This worried Wajcman. Having written extensively on the link between clock time and the accelerating pace of life in our contemporary world, Wajcman portrayed the smart calendars as materializing the moral enterprise of time optimization. As such, these apps have been developed from and enact an aspiration “to mechanize human thought and action in order to make them more efficient and reliable” (Wajcman, 2019, p. 318). In many ways, it was Wajcman’s talk that sensitized me to the importance of scrutinizing the visions driving the design and proliferation of digital technologies (discussed in Essay 1). As such, her work became part of my motivation to integrate the work of Michel Foucault into my project.

It became clear to me from my literature searches that the myriad ways in which this class of systems—which I still lacked a name for—were worthwhile to study. Yet I kept struggling with what to do with the body of papers, reports, and public news media articles compiled in my Mendeley application. While the material showed that there was something important at stake, I could not figure out how to translate it into a review article. I met online with Mads and my new supervisor Tina who had become my secondary supervisor in the late spring. I discussed a variety

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6 Mendeley is a referencing tool that I used to keep track of my literature review process.
of coding schemes with both of them but continued to struggle to make sense of the pile of literature I had assembled. Gradually, I lost sight of the project and my confidence dwindled. I started to seriously doubt myself and my capabilities, questioning whether I would ever complete my PhD.

**THE BREAKDOWN**

It was finally time for a summer vacation, but I was drained. I decided not to look at my work at all for the next three weeks. Despite my best efforts to not think about work, the feeling of being behind was a constant menacing companion. The pressure began to affect my surroundings. I started having trouble sleeping. My temper became shorter. On several occasions, I burst into tears over minor things. Halfway through my vacation, things completely fell apart. I was with my family and girlfriend and we were playing a board game. I lost and suddenly started throwing game pieces all over the place. Admittedly, I am a bit of a sore loser, but I am generally able to control my temper. This time I could not. I went to bed. I had zero energy and just wanted to stay in bed doing nothing for the next few days. Fortunately, my girlfriend and family were there to support me through my breakdown. Over the course of numerous painful conversations, they put things into perspective and helped me get out of bed. I made peace with the idea that I would give it all one more go, and if it kept making me miserable, I would terminate my candidacy.

Things gradually got better as the vacation continued. I managed to temporarily push my worries away. However, when the vacation was over, it all returned with a vengeance. When I returned to campus at the end of July, there were still restrictions on how many people could be in the building at one time, but a lot of people were away on vacation or working from home. Thus, when I entered the building, nobody else was there. I felt my pulse quicken the moment I entered my empty office and I started to panic. While I was walking around the building to try to calm down, I saw a sign for a number to call if you needed help managing stress. I took a picture of the sign and went home, where I immediately dialed the number. On the phone, I cried nonstop for about twenty minutes. Within a couple of hours, I had an appointment with a therapist for the following week.

The simple act of reaching out for help had already started to improve things. It was as if the realization that I did not want to feel like this had immediately started to turn things around. When I finally saw the therapist, he encouraged me to be more gentle toward myself. We also discussed the importance of honesty with my supervisors about the personal struggles I was having.\(^7\) Together with my therapist, I agreed that when my supervisors came back from their vacations, I would share how I was feeling so that we could discuss how to move forward.

Once both my supervisors had returned, I scheduled a meeting with them. I opened the meeting by sharing that I had not achieved all that I had hoped for over the summer. I then told them about

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\(^7\) It should be said that I felt and have always felt very comfortable with both of my supervisors. I had no doubt that they both genuinely cared about me. I shared this with my therapist, and it was in that context that our conversation about being very honest about my personal struggles emerged.
the whole situation. I was astonished by the care and understanding they offered; it was like a boulder had been lifted from my chest. We talked about the loneliness of the PhD journey and how our line of work is, unfortunately, not well designed for people like me who need ample social interaction and reassurance. We agreed that we would meet more often and that they would both come to supervisory meetings since Mads and Tina were also curious to learn more from each other. This meeting was our first in-person meeting since the pandemic had begun. The meeting made me suddenly feel like my work mattered again and I was part of a team.

During my therapy appointments, the therapist asked me how I could make work more fun (again). With my supervisors, I discussed strategies for revitalizing my energy. Quickly, we all realized that the nature of the systematic literature review called for a type of work that was poorly aligned with my inclinations. Indeed, the process of accounting for the search results tended to remove me from the literature rather than more strongly grounding me in it and I struggled to find ways to account for material that had come to me in somewhat serendipitous ways. This accounting work took the form of a creative straightjacket for me. Oddly, I became more concerned with search terms than with engaging in the conversation I was interested in. To revitalize my energy, we agreed that I would stop my work on the literature review, which we had never planned on being part of the project in the first place. While I never got to write the literature review, the many hours I spent reading the numerous articles related to my subject were far from wasted. The process enabled me to ground myself in the literature in ways that were not previously possible.

TOWARD MY FIRST JOURNAL SUBMISSION

As described in the first essay, during my isolation, I had been inspired to engage with archival material to map the evolution of the MyAnalytics application. Mads and Tina endorsed this plan, which turned out to yield interesting insights about a discursive shift taking place in the evolution of the applications preceding MyAnalytics. However, I continued to struggle with how to describe my empirical interest. I was still not able to articulate the phenomenon that MyAnalytics was a case of. By sheer luck, I was rescued by an article reporting a MyAnalytics case study. When I started searching the literature for my review, I set up a Google alarm with my search terms. Six months after my breakdown, I received a notification about an article by a group of scholars from New Zealand. They described MyAnalytics as an example of an emerging class of intelligent tools that “helps knowledge workers to improve their productivity by creating awareness of their collaboration behavior and by suggesting improvements” (Winikoff et al., 2021, p. 338). The article gave this emerging class of intelligent tools a name—the authors coined the term digital productivity assistants. Finally having a label to describe my field of study and an interesting insight to share, I set out to write up the origin story of the MyAnalytics digital productivity assistant.

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8 I want to emphasize that this is only my experience; I fully recognize the many merits of the systematic literature review process. In writing this, I also want to emphasize that there are many forms of literature review. Personally, I found Ulrike Schulze’s (2015) research commentary on the genre to be very helpful for understanding the different purposes and functions of a literature review.
I invited both my supervisors to join my work as co-authors. They identified a special issue in the *Journal of Information Technology* on “The Ethical Issues and Unintended Consequences of Digitalization and Platforms” that they believed would be well suited to our work. I was excited by the journal choice, as it was also where Zuboff first presented her work on surveillance capitalism (Zuboff, 2015). We submitted our manuscript in June 2021. Six months later, I read with great joy that we had received a positive review with major revisions. The reviewers were excited about our work but requested further clarification of our problematization approach. There were many overlaps between the reviewers’ comments and the comments we received on our ICIS conference article, which we had also received in the meantime. Recognizing the validity of the reviewers’ concerns, we worked to further clarify the analytical steps we had taken. After two rounds of revision, our manuscript was accepted for publication.

The experience of transforming our original draft into a journal publication taught me that fruitful collaboration can help push and improve an article. In particular, I am grateful for one reviewer who commented on the way we conceptualized the problematization lens (as we called our Foucault-inspired analytical approach) and our notion that practices emerge as responses to problems. The reviewer reflected that sometimes digital practices also emerge after new technologies have been developed because people are seeking application opportunities and domains. As we could indeed find evidence for this in our material, we included this point. Looking back, I feel that we were lucky to receive this suggestion because it provided an important nuance to the article as well as the broader efforts of conceptualizing a historically oriented approach for conducting problematization research on information systems.
BIBLIOGRAPHY


ARTICLE TWO

REFORMING WORK PATTERNS OR NEGOTIATING WORKLOADS?
EXPLORING ALTERNATIVE PATHWAYS FOR DIGITAL PRODUCTIVITY ASSISTANTS THROUGH A PROBLEMATIZATION LENS 1

By Stig Nyman, Mads Bødker & Tina Blegind Jensen

ABSTRACT

Digital trace data can be used to capture organizational practices in granular detail and enable the automation of a wide range of managerial tasks. One example is Digital Productivity Assistants (DPA) that harness digital trace data about knowledge workers’ performance and make targeted suggestions for how to improve and optimize their work patterns. Previous research shows that despite benevolent intentions to increase workers’ wellbeing, DPA tend to introduce novel forms of exploitation and control. Inspired by Michel Foucault’s philosophical strategy of ‘problematization,’ which emphasizes how practices are constructed in the form of problems that subsequently shape certain solutions, this paper takes a critical yet constructive view of DPA. Specifically, we conduct a genealogical reading of the DPA tool, Microsoft MyAnalytics, to investigate the problematics that have structured its emergence, as well as how its uses imply certain discursive commitments to philosophical and ethical questions. In the prevailing discourse, DPA cast digital trace data as a learning opportunity and thereby commit to individualizing the responsibility for handling the paradoxical nature of increasingly fluid work arrangements. Conversely, in our account of the history of MyAnalytics, we uncover a ‘lost discourse’ committed to trace data as a resource that can help knowledge workers negotiate excessive workloads. We propose the problematization lens as a way critically to articulate alternatives and speculate about instantiations of digital technology that today seem ‘unthinkable’.

Keywords: Digital Productivity Assistants; Algorithmic management; Management of Knowledge Work; Problematization lens; Critical IS; Foucault

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1. INTRODUCTION

The use of digital technologies in work and private life generates a vast amount of digital trace data that capture organizational practices in granular detail (Khovanskaya et al., 2019; Østerlund, Crowston and Jackson, 2020). Applications such as MyAnalytics and RescueTime display digital trace data on personal productivity dashboards, aiming to provide knowledge workers with an awareness of their own work patterns and make targeted suggestions for improvement. This emerging class of applications, which Winikoff et al. (2021) have labelled Digital Productivity Assistants (DPA), is generally intended to help knowledge workers improve their productivity and wellbeing. For example, MyAnalytics is presented as a tool that can help employees work smarter and boost their productivity even further (Microsoft, 2021). Similarly, RescueTime promises knowledge workers they can take back control of their time and find their ideal work-life balance (Rescuetime, 2021).

According to Gartner Research, it will be increasingly common for organizations to rely on digital applications that survey trace data to help workers prioritize work tasks and thus avoid stress and burnout. Characterized as ‘algorithmic managers’, Gartner predicts that such digital applications will replace human middle managers over the next decade (Griffin and Coleman, 2018). The idea behind DPA and ‘algorithmic managers’, and their predicted near-future ubiquity, has attracted growing critical attention among practitioners and researchers (Koukouvinou and Holmström, 2022). Media outlets paint dystopian pictures of a future where artificial intelligence (AI) tools provide managers with extraordinary control over workers (The Economist, 2018a), and where office workers are “evaluated not just for the work they do but for the way they accomplish it” (Captain, 2020). Scholars have called for more research that interrogates the blackboxed politics, ethics, risks of manipulation and performative effects embedded in the use of algorithmic management practices (O’Neil, 2016; Faraj, Pachidi and Sayegh, 2018; Bernhardtz, 2019; Gal, Jensen and Stein, 2020). Studies of productivity apps (Gregg, 2019), intelligent calendars (Wajcman, 2019), and corporate self-tracking initiatives (Moore, 2018) demonstrate that algorithmic management practices often silence questions of power and introduce new forms of exploitation and control. Hence, despite noble intentions to increase the wellbeing and productivity of knowledge workers, DPA risk bringing a wide range of unintended harmful consequences for the individual worker.

In this paper, we use the problematization lens to provide a critical yet constructive view of DPA by exploring its historical lineages. Taking inspiration from Michel Foucault’s analytical strategy of ‘analyzing the process of problematization’, we interrogate the historical evolution of Microsoft’s DPA, MyAnalytics. Based upon archival materials on MyAnalytics, and the applications that preceded it, we investigate the problematics that have structured the emergence of DPA, and examine how uses of DPA imply certain discursive commitments to philosophical and ethical questions. Our analytical work locates a distinct shift in the arguments made in the promotion of personal productivity dashboards that display analytical insight from digital trace

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2 The analysis covers the period from 2011-2020. In 2021, MyAnalytics was rebranded as Viva Insights (Rewari, 2021). We comment on this development towards the end of the paper.
Reforming Work Patterns or Negotiating Workloads?

The data mining technology driving MyAnalytics was originally developed by the start-up VoloMetrix, which marketed digital trace data as a vehicle for ensuring better distribution of workloads and alignment of organizational priorities. However, when VoloMetrix was acquired by Microsoft, the sales pitch gradually changed into one promoting digital trace data as a means to enable individual knowledge workers to recognize and reform counterproductive work patterns. We propose that this shift signifies two distinct models of control: one where data can be used to negotiate and optimize priorities and workloads; and another that casts data as an opportunity and indeed an obligation for individual self-reformation. The shift towards the second model implies a reconfiguration of the responsibility for handling the paradoxical nature of digital work practices (Mazmanian, Orlikowski and Yates, 2013) from a collective issue to a challenge for the individual knowledge worker to navigate.

Seen through the problematization lens, the story of MyAnalytics contributes to a long tradition of critical IS research that brings to our attention the dual capacity of information systems to automate and ‘informate’ work (e.g. Zuboff, 1988; Doolin, 1998). The story of MyAnalytics, as we tell it in this paper, prompts the critical and generative question: what if the informating capability of digital trace data (i.e. their ability to capture organizational practices in granular detail) were mobilized to challenge the organization of work? Currently, DPA harness digital trace data to automate supervision by providing knowledge workers with information and guidance on how they can reform themselves to live a well-balanced work-life and thus become more productive. Based on the recovery of a ‘lost discourse’ about DPA, and the ways in which they were seen as responding to a particular problem of a particular shape, our work introduces an alternative pathway in which digital trace data are mobilized to help knowledge workers negotiate workloads. By uncovering forgotten historical lineages that might have led to entirely different pathways for DPA, we are better able to articulate and speculate about instantiations of technology that today seem ‘unthinkable’.

The remaining part of the paper is structured as follows: the next section reviews current studies of DPA to motivate the need for critical inquiry on the topic. We then present the problematization lens as our analytical strategy, including the methodological procedures that we used to recruit and analyze archival material about MyAnalytics. We proceed by elaborating on the discursive shift and the abandonment of the ‘negotiation pathway’ we located in the archival material under scrutiny. Based on these insights, we conclude by discussing how the shift can inform the construction of alternative pathways for DPA as well as providing additional nuances in the vocabulary of critical IS, suggesting how philosophically inspired work on problematization can inspire new iterations of critical research. Lastly, we encourage further research avenues that explore how knowledge workers can use algorithmic technology and digital trace data to negotiate job priorities and workloads with their managers and peers.

2. UNINTENDED HARMFUL SOCIAL CONSEQUENCES ASSOCIATED WITH DPA

Advances in machine learning, computation and statistical techniques not only allow for the automation of work tasks; they also make it technically possible to ‘use an algorithm’ for
performing managerial functions (Wesche and Sonderegger, 2019). For instance, Winikoff et al. (2021) describe how DPA aim at helping knowledge workers improve their productivity by creating awareness of their collaboration behaviors and by suggesting improvements. However, the automation of managerial functions introduces new challenges. Based on interviews and auto-ethnographic work, Winikoff et al. (2021) found that Microsoft’s MyAnalytics software acted as a support for knowledge workers in identifying problems affecting their personal productivity. At the same time, the study reported that knowledge workers lacked a clear understanding of how DPA worked and that they perceived their data visualizations as inaccurate and irrelevant. Gal, Jensen and Stein (2020) echo these findings, warning that the use of digital data for managerial purposes risks providing knowledge workers with oversimplified representations of their behaviors. Furthermore, the authors warn that algorithmic management tools can be manipulative and ethically questionable if they covertly disrupt organization members’ decision-making or prevent them from flourishing.

Most research on algorithmic management draws attention to how algorithmic scores, recommendation engines, and other kinds of algorithmic management techniques seem to create the basis for a new form of rational administrative control, where employers obtain desired behaviors from workers through rewards and a constant threat of swift replacement (e.g. Wood et al., 2019; see Kellogg, Valentine and Christin, 2019 for a review). Less attention has been given to DPA applications such as RescueTime and MyAnalytics, which neither disconnect workers from traditional employment structures nor directly aim at achieving desired behaviors through rewards or threats of replacement. O’Neil (2017) observes that movements toward quantification in the workplace introduce a form of “soft domination” that mold knowledge workers’ physiological and social rhythms by carefully structuring the workplace and the working day. This ‘soft form’ of algorithmic management impacts organizational life by affecting how knowledge workers make sense of their work-life (Floridi, 2014).

Moore (2018) argues that workplaces increasingly introduce sensor and tracking technologies in ways that transform the nature of employment relationships and management practices. Based on observations from a “quantified work” project, in which workers were asked to track their time and movement, Moore alerts us to how self-tracking initiatives in the workplace risk alienating people by subsuming every aspect of their lives into the logic of capitalism. In a similar vein, Wajcman (2019) suggests that intelligent calendar applications make time optimization a moral imperative, with Moore’s law of digital acceleration applied to every aspect of life. Surveying the marketing material of productivity apps, Gregg (2019) contends that these apps order work in ways that ignore discussions of work limits, job content and questions of power.

As stated in the introduction, this growing body of critical research indicates that despite benevolent intentions to increase the wellbeing and productivity of workers, the current pathway of DPA risks introducing a wide range of unintended harmful social consequences. However, these ‘dark sides’ of technology might not imply that DPA are inherently troublesome or inevitably bad for organizations and workers. In some constellations, with the appropriate processes, policies and technical features, DPA can contribute to organizational functioning (Gal,
Jensen and Stein, 2020). Consequently, this paper explores alternative pathways for DPA to provide a critical view of the discourses that shape this ‘soft’ form of algorithmic management.

3. RESEARCH STRATEGY: A PROBLEMATIZATION LENS FOR EXPLORING ALTERNATIVE PATHWAYS FOR DPA

To explore alternative pathways for DPA, we adopt a problematization lens that involves an investigation of its historical contingencies. Developed with inspiration from Michel Foucault’s approach to analyzing the process of problematization (e.g. Foucault 1983/2001; 1984a), the lens entails a critical research strategy that allows researchers to map the ethical and philosophical commitments and worldviews associated with current technology uses (Nyman et al., 2021). In philosophical terms, the notion of ‘problematization’ signifies a major difference between the genealogical methods exercised by Friedrich Nietzsche and Foucault. Whereas Nietzsche built on history to radically subvert some of our most central modern practices, Foucault used history simply to explicate their contingent composition (Koopman, 2013). By analyzing the composition of practices as historical incidental responses to problems, Foucault reminded us that everyday activities related to for instance punishment (Foucault, 1977) and sexuality (Foucault, 1980/1990) are governed by a number of contingent assumptions concerning what we can know, what we assume to be legitimate and praiseworthy modes for governing others, and how we assume ourselves and others to be moral subjects. Thus, when we engage in activities involving digital technology, we also inevitably make assumptions regarding philosophical and ethical worldviews.

Taking inspiration from Foucault’s analytical approach, the problematization lens helps us become sensitive towards these assumptions. Later in the paper, we conceptualize the assumptions as commitments to the philosophical questions of knowledge, power and subjectivity. We argue that the analysis of these commitments should emphasize the empirical attention to archival materials that display what we conceptualize as the schematics of practices.

Before further detailing our conceptualization of Foucault’s analytical approach, and how we use it to map the commitments associated with the use of DPA, we first clarify our research aim.

3.1 RESEARCH AIM: ENABLING RECONFIGURATIONS OF PRACTICES

Recently, critical IS scholars have begun to draw upon analytical tactics of problematization to question the prevailing assumptions enacted within digital technologies. Gkeredakis and Constantinides (2019) have drawn upon Alvesson and Sandberg’s (2011) notion of problematization to explicate underlying theoretical assumptions and limiting tropes and fashions that guide the conceptual landscapes in the IS literature. Similarly, Hafermalz et al. (2020) use Alvesson and Sandberg’s work to revise key assumptions underpinning research on mobile technology use. Rather than subscribing to the way Alvesson and Sandberg (2011) use the notion of problematization, we return to their theoretical point of departure; namely Foucault’s conceptualization of ‘analyzing the process of problematization’ (e.g. Foucault 1983/2001; 1984a) with a particular emphasis on the historical orientation and the philosophical, analytical
questions that guided his work. This leads to a historically oriented analysis of discursive commitments embedded in digital practices that shifts our attention towards how a practice under scrutiny commits to its own problems; how a practice ‘problematizes’ itself, rather than how we, as observers or researchers, could problematize or criticize implicit assumptions implied by a theoretical perspective.

Such critical aspirations may immediately come across as somewhat less than critical. Traditionally, critical IS research has been concerned with transforming “alienating and restrictive social conditions” (Myers and Klein 201: page 19). As such, the aim of critique is to challenge the status quo of technological applications, unmask harmful consequences and bring to our attention the dark side of a particular technological constellation. Prominent examples include Wood et al.’s (2019) analysis of how digital labor in the gig economy is being commodified as well as Zuboff’s (2015; 2019) diagnosis of how large-scale digitization has ‘gone wrong’. This type of academic scholarship is concerned with mounting normative resources for radical change.

The critical attitude of the problematization lens differs from a normative critical stance. The critical ambition of the problematization lens is not to transform per se, but to make transformation possible by bringing things back into their original openness to change (Foucault, 1980/1991). In doing so, Foucault argues, a critique does not per se have to conclude what needs to be done (ibid.). Instead, critique can serve as an instrument for those who fight to refuse ‘what is’. Contextualizing Foucault’s approach, when we as IS researchers work with the problematization lens, we are analyzing digital practices in their “various complexities, with the goal of allowing refusal, curiosity and innovation” (Foucault, 1980/1988: page 13). The critical attitude of the problematization lens adopted in this study aligns with Foucault’s project of shifting the focus of modern philosophy towards activities that explore how we may ‘think differently’ about the practices in which we take part (Foucault, 1980/1990). Rather than engaging in metaphysical questions about ontology and epistemology, Foucault advocated that we explicitly use history as a resource for philosophical inquiry that investigates, “the events that have led us to constitute ourselves and to recognize ourselves as subjects of what we are doing, thinking, saying” (Foucault, 1984b: page 46). This translates into the critical IS research agenda with the aim to dispel the natural, self-evident and current ‘truths’ about digital technology, and the practices they engender, using historical archives as resources for examining changing discourses and how technologies have been cast as solutions to certain problems that inhere from these discourses. By asking the question ‘what if technology development had taken a different pathway?’, the problematization lens allows for a critical yet constructive view of digital practices.

With the ambition of articulating alternative pathways for digital practices, and how they may be configured differently, we next outline the three analytical presumptions underlying our research strategy. The first presumption is that digital practices can be analyzed as contingent responses to problems. The second presumption is that these responses inevitably enact certain ideological and onto-epistemological commitments to questions of knowledge, power and subjectivity. Finally, the third presumption is that these commitments can be articulated by analyzing the evolution of discourses and the schematic configurations related to a given practice; in our case, the use of DPA.
3.2 Presumption #1: Practices can be Analyzed as Contingent Responses to Problems

Foucault (1983/2001) argued that the practices we engage in today have emerged on the backdrop of complex processes in which practices that were accepted at a given time in history come up against certain difficulties. Accepted practices become problematic as they raise discussion and debate that prompt a crisis, inciting new reactions that lead to the formation of new practices. Analyzing the process of problematization then becomes an analytical exercise of tracing the core problematics that have formed the practices we engage in by mapping their problem-response sequences (Gudmand-Høyer 2013; Koopman, 2013).

Importantly, the notion of ‘problem’ needs to be understood in a rather broad sense. When using the problematization lens in the context of IS research, problems refer to the ‘things’ that have made the emergence and use of a given digital technology possible, legitimate and relevant. Problems may for instance arise from events such as a pandemic, accelerating the development of technology that allows people to work remotely, which in turn leads to responses in the form of reconfigured organizational practices and policies (Leonardi, 2020). Problems can also arise from a combination of events. For instance, changes in legislation in the aftermath of 9/11 and the organizational challenge for Google to generate revenue from their free services have been described by Zuboff (2019) as ‘windfalls’ that made the proliferation of business models based on selling data possible. Moreover, problems can also arise from the emergence of a new technology, such as when innovators are searching for a domain where the technology can be applied. In these cases, the technology is, so to speak, ‘looking for a problem’. This paper provides an example of this. As detailed in our analysis, efforts to develop DPA were stimulated by the success of marketing departments’ use of big data, which occasioned innovators and managerial thinkers to look for ways to use big data technologies for HR purposes.

The interesting part of zooming in on these kinds of problem-response sequences is that several responses are often proposed to one single set of problematics (Foucault, 1983/2001), and hence variations illustrate the contingencies of a given practice. Consequently, the problematization lens presumes that the specific configuration within a given practice is not a causal “effect or consequence of a historical context or situation, but is an answer [structured by certain problematics] given by definite individuals [at a specific point in history]” (ibid. page 172). The analytical task becomes one of uncovering forgotten historical lineages in the form of problem-response sequences that might have led to entirely different instantiations of technology. This, in turn, becomes a way to imagine and propose instantiations that today seem ‘unthinkable’ in the face of naturalizing discourses about digital technologies that assume current technological instantiations to be linear extensions of necessity.

This first presumption links to the second one, which highlights the fact that practices enact contingent commitments to questions of knowledge, power and subjectivity.
3.3 Presumption #2: Practices Enact Contingent Commitments to Questions of Knowledge, Power and Subjectivity

Simply demonstrating that actual practices are contingent responses to historically embedded problems is not the end goal of using the problematization lens. Following Foucault’s conception of philosophy as an activity concerned with ‘thinking differently’, the aim of the problematization lens is to render current practices contestable. This can be done by providing empirical answers to how our engagements with certain practices imply commitments to philosophical and ethical worldviews. Foucault (1980/1990) argued that practices enact contingent yet specific epistemic rules, types of normativity and patterns for normalization, as well as contingent forms of the self. Just as practices can be analyzed as responses to problems, the problematization lens presumes that these responses inevitably imply contingent (but largely taken for granted) discursive commitments to philosophical questions of knowledge, power and subjectivity. When working with the problematization lens, we use these as our analytical points of departure.

Together, the first two presumptions raise the question of how IS scholars can identify discursive commitments embedded in digital practices. In Table 1, we translate the first two presumptions into four questions that help us articulate the discursive commitments embedded within a given digital practice. Next, we propose the third presumption that suggests how such discursive commitments can be articulated by analyzing the evolution of schematic configurations of practices.

<table>
<thead>
<tr>
<th>Presumptions</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Presumption 1: Core problematics</strong></td>
<td>What problems are digital technologies, and the practices that they are</td>
</tr>
<tr>
<td></td>
<td>embedded in, presented as a solution to?</td>
</tr>
<tr>
<td><strong>Presumption 2: Commitments to</strong></td>
<td>What epistemic rules are implied by the use of digital technologies?</td>
</tr>
<tr>
<td>questions of knowledge, power and subjectivity</td>
<td>What types of normativity and patterns for normalization are implied by</td>
</tr>
<tr>
<td></td>
<td>the use of digital technologies?</td>
</tr>
<tr>
<td></td>
<td>Which forms of the self are implied by the use of digital technologies?</td>
</tr>
</tbody>
</table>

Table 1: Analytical questions for articulating discursive commitments

3.4 Presumption #3: An Analytical Orientation towards Evolutions in Schematic Configurations of Practices

Foucault (1980/1991) characterized his analytical method as being concerned with analyzing the rational and theoretical schematics of practices. He specified that the target of his analysis was never institutions, theories or ideologies as such, but the explicit programs of conduct embedded in these, which in turn have both prescriptive and codifying effects of what can be said and done. Foucault further elaborated that when he maps these programs of conduct, what we in this paper refer to as the schematics of practices, he is searching for ‘analytical salients’. These analytical salients are uncovered by analyzing mutations in what Foucault called the technical models and their relation to particular situations and the broader evolution of theoretical ideas. This is notable in his famous exposition of the introduction of the panopticon prison architecture and its relation
to e.g., the formation of professional armies, new methods for the division of labor and the utilitarian conception of behavior (Foucault, 1977). Hence, we propose that the discursive commitments embedded in a practice can be identified by comparing how the schematics of a practice are configured differently over time.

Foucault (1984b) described this analytical approach to be “genealogical in its design and archaeological in its method” (page 46). Here, the term “genealogy” indicates that schematics are products of a contingent evolutionary process since past schematics reside in current practices. The term “archaeological” signifies that the empirical attention of the problematization lens is drawn towards archival materials related to a practice. Within an IS context, this material can include almost any conceivable type of text that reflects the schematics associated with a broad category of digital practices. These might range from patent applications, system specifications, reviews, marketing and training materials, to references in books, essays, articles, and popular culture artifacts (Nyman et al., 2021)

Notably, the analytical orientation towards archival material and schematics does not imply that the problematization lens is detached from reality. Foucault (1983/2001) noted that problematizations are responses to problems that are real. This implies that while the concept of practice is an analytical construct used to organize the analytical process (see Geiger, 2009), what we analyze is a real situation in its various complexities (Foucault 1980/1988). In an interview, in which Foucault attempted to clarify his methodological approach, he argued that schematic configurations deserve analytical attention, as there is correspondence between schemas and what people do and think. Foucault contended, for example, even if “Bentham’s Panopticon isn’t a very good description of ‘real life’ in nineteenth-century prison”, this does not entail that the schemas of the Panopticon are therefore utopian or imaginary. The schemas of Bentham’s Panopticon “[correspond] to a whole series of diverse practices and strategies” and they “act as grids for perception and evaluation of things” (Foucault 1980/1991, p. 81). Similarly, the way we perceive and evaluate digital technologies depends on the schematics we apply. An extensive body of IS research has shown that community discourses shape the evolutionary pathways of digital technology by providing common understandings of the types of applications for which a given technology is deemed relevant (Swanson and Ramiller, 1997; Gorgeon and Swanson, 2009; Pollock and Williams, 2011).

Having outlined its broader analytical strategy, we suggest that the problematization lens implies critical attention towards the reconfiguration of practices as well as three analytical presumptions: (1) that practices can be construed as responses to problems, (2) that practices entail commitments to questions of knowledge, power and subjectivity, and (3) that discursive commitments can be articulated by analyzing the evolution of schematic configurations. In the next section, we detail how we ‘recruited’ archival source material about the schematics of DPA, and how we have used the problematization lens to analyze this material.

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3 See Nyman et al. (2021) for further details of the three presumptions and how they have been developed from the work of Foucault.
4. Methodology

This section describes how we examined the discursive commitments embedded in DPA through a genealogical study of the Microsoft MyAnalytics application. First, we outline how we collected data, a process that we refer to as the ‘recruitment’ of source material. We then elaborate how we analyzed the recruited source material.

Alvesson (2012) notes that we should pay attention to our methodological metaphors. Using the metaphor of ‘recruitment’, we wish to indicate the serendipity involved in deciding which materials the analysis ultimately engages with. When using the problematization lens, there are near endless possibilities of finding relevant material, and it will always be a strategic choice which materials the researcher decides to confront. Instead of referring to the material as data, we borrow the metaphor of ‘source material’ from Koopman (2019). Koopman cites Ian Hacking, who argues that Foucault’s approach “is the very opposite of hermeneutics” (cited in Koopman, 2019: page 26). Hacking’s point is that Foucault’s work was never oriented towards identifying the ‘best’ or ‘right’ interpretation, as a hermeneutic approach would have as its ultimate goal. As we have argued, Foucault was looking for interpretations, ultimately to allow him to render things contingent and thus contestable. By applying the metaphor of ‘recruiting’ source material, we wish to signal that we work from an analytical orientation in which we do not aim to make uncontestably ‘objective’ interpretations of some underlying or obscured meaning within our material, and tell the ‘true’ story of MyAnalytics. Rather, we recruited the material strategically to map the evolution of MyAnalytics, and, in a more tactical move, used this map as a resource for mobilizing ‘new interpretations’ of what DPA could also be.

4.1 Tactics for Recruiting Source Material

We decided to use the case of Microsoft MyAnalytics as the point of departure for our analytical work because this application represents an archetypical example of DPA. As previously noted, when Winikoff et al. (2021) coined the label, Digital Productivity Assistants (DPA), they used MyAnalytics as a reference case. Furthermore, scholars and practitioners have referred to MyAnalytics as a prime example of how advances in algorithmic capabilities reconfigure managerial practices (Irwin, 2019; Rebele, 2019; Gal, Jensen and Stein, 2020). Like so many other technological artifacts, the MyAnalytics application has a chequered history. The data mining technology driving MyAnalytics was initially developed by the start-up company VoloMetrix, a company later acquired by Microsoft. Through its development, the people involved in VoloMetrix and MyAnalytics have actively promulgated their visions for using algorithms and digital data in the workplace in influential outlets such as Harvard Business Review and Wired magazine. Thus, the MyAnalytics application represents an accessible starting point for the recruitment of source materials that can help in articulating the schematics of DPA. Notably, in the fall of 2021, after we concluded our analytical work, MyAnalytics was once more rebranded to Viva Insights (Rewari, 2021). We comment on this development in the discussion section of the paper.
In our effort to map the evolution of MyAnalytics, we took inspiration from the ways in which Skog et al. (2018) used media aggregators and company blogs to recruit source material for analysis in their study of platform evolution. For our research, we recruited source material from the news aggregator Factiva, site-specific searches on Microsoft official blogs and archive.org’s Wayback Machine, as well as Google patent applications searches (see Appendix 1 for a detailed overview). We initially recruited more than 600 documents to develop a preliminary timeline of the evolution of MyAnalytics. In our first engagement with the material, we found that many of the news articles yielded limited insights into the commitments to the questions of knowledge, power and subjectivity we were interested in, as these were reporting on funding, acquisitions or people changing jobs. We decided to continue the analytical process by delimiting our original body of materials to better immerse ourselves into the chosen source materials through repeated readings, as advocated by Braun and Clark (2006). Hence, in later stages of our analytical work, we narrowed the original body of materials to articles that were authored by people involved in VoloMetrix and MyAnalytics, articles that included quotes from interviews about – or reviews of – the application, as well as company websites, official blogposts and patent applications (see Appendix 2 for an overview of the material selected for repeated readings).

4.2 Tactics for Analyzing the Source Material

As a specific methodological metaphor, Latour (2004) has urged social science researchers to approach analytical work by taking inspiration from how the perfume industry makes use of odor kits to hone an analytical ability to discern subtle differences between fragrances. Similarly, we approached the source material we recruited as an analytical ‘training kit’, which allowed us to become sensitive towards nuances in the discursive commitments embedded within DPA. We engaged systematically with the source material by using the analytical questions previously presented in Table 1 as our point of departure. We initiated the process by using the software NVivo to code sentences and paragraphs that presented MyAnalytics as a solution to a given problem or expressed commitments to questions of knowledge, power and subjectivity. For instance, the editor of Inc. magazine, John Brandon (2016), in his review of MyAnalytics, described how “the app watches ‘signals’ during your day”. We interpreted this quote as expressing a commitment to the question of knowledge since it mobilizes a certain epistemic metaphor (i.e. data as a ‘signal’ about work). Following the first round of coding, we clustered and re-clustered the quotes to form coherent codes for the various discursive commitments. For instance, the material contained numerous examples of quotes that – like the notion of data as signal – argued that digital trace data hold the capacity to render some previously opaque parts of work visible. We refer to Appendix 3 for more details on the analytical procedure (Appendix 3 provides an overview of the final codes as well as a list of all quotes used to generate two of the codes).

To better understand the context of these commitments, we created codes for key events in the history of MyAnalytics along with the technological configurations of the application. For instance, we observed that when VoloMetrix was first launched, the application featured a dashboard for managers. It was only after two years that the company added the personal
productivity dashboard for the individual knowledge worker (this personal productivity dashboard that Microsoft would later choose to rebrand as MyAnalytics). We used our codes to create a table with a visual representation of the evolution of MyAnalytics. The table enabled us to identify several epochs in the history of MyAnalytics, which we compared to analyze variations in the schematic configurations related to the emergence of DPA (see Appendix 4 for an excerpt of the table). By comparing the discursive commitments of each epoch, we identified a discursive shift in the schematics of DPA. The following section displays this shift by narrating the story of the emergence of MyAnalytics.

5. TWO PATHWAYS FOR DPA: TO NEGOTIATE WORKLOADS OR REFORM WORK PATTERNS

Abandoned technological pathways are not necessarily abandoned because they are inherently bad ideas or present unreasonable logics or uses. Left-behind pathways may instead, as we suggest, be the product of certain discourses that create schematics to dictate what is viable, productive, reasonable, profitable, ethical and so on. Based on our analysis of the evolution of MyAnalytics from its early iterations in the start-up VoloMetrix to its current form, this section tells the story of how MyAnalytics became the DPA we see today. It is, in parallel, the story of what DPA could also be, but did not become. The purpose of telling this story, and of including the schematics abandoned along the way, is to point towards alternative pathways for the use of digital trace data and ‘thinking differently’ about DPA.

VoloMetrix was founded in 2011. On its website, the company promised to “increase the effectiveness of enterprise managers and knowledge workers through breakthrough visibility and insight” (VoloMetrix, 2011). The essence of the application was a dashboard that showed managers a set of patented operating metrics about organizational activities. These metrics were based on so-called “collaboration data” that were extracted from sent mails and calendars and then categorized as corresponding to one or more types of activity (Fuller et al., 2016).

In 2013, two years after its foundation, VoloMetrix added to their application a dashboard for team leaders and a personal dashboard for the individual worker. The personal productivity dashboard adopted versions of the same operating metrics that originally featured on the managerial dashboard. It displayed collaboration data on the individual level and compared this to organizational benchmarks and personal targets. VoloMetrix branded the personal productivity dashboard as a confidential personal report that would enable knowledge workers “to take control over their time” and empower “people and managers to align their goals” (VoloMetrix, 2014). Following its initial launch, VoloMetrix’s CEO, Ryan Fuller, explained that this new feature of the application was developed to empower workers:

“The more junior you are, the less control you have over where your time goes. Without hard data to back up your complaints, let’s face it, oftentimes, it’s just brushed off as an employee whining […] But with these kinds of reports, employees can say, ‘Look, I really am being pulled in a billion different directions, and let’s figure out how to address that so
I can be more productive and have better relationships.’ It can be very empowering” (Florentine, 2013)

According to Fuller, collaboration data can support a better dialogue about workloads between managers and workers. He repeated this message in an opinion piece published in the magazine *The Entrepreneur* a year later, describing how the VoloMetrix application “open[s] the door for meaningful conversations about workload, productivity and priorities” (Fuller, 2014a). In the period from 2013-2014, the vision portrayed of personal productivity dashboards was one in which digital trace data provided people with a way to voice concerns over workloads, working to support a better dialogue about distribution and prioritization of work tasks within an organization.

However, this focus shifted when Microsoft acquired VoloMetrix in 2015. With the acquisition, VoloMetrix’ personal reports interface was first integrated into Microsoft’s personal productivity tool Delve and later rebranded as MyAnalytics. The MyAnalytics application included so-called AI-powered recommendations and an email digest of knowledge workers’ activities, aimed at helping them “make good decisions” about their work (Microsoft, 2018). Yet, despite the added AI recommendation module, the core technological engine that powered the application remained remarkably similar. MyAnalytics essentially relied on the same data mining techniques and metrics as the VoloMetrix application. However, what did change was the role the personal productivity dashboard was envisioned to play in the workplace. Instead of sparking conversations about workload, productivity and priorities, the personal productivity dashboard was increasingly cast as a learning opportunity, enabling the individual knowledge worker to reform counterproductive work habits. For instance, the top banner of the MyAnalytics product site stated: “Explore your work patterns with MyAnalytics and learn ways to work smarter” (Microsoft, 2019). In an official blogpost promoting MyAnalytics, managing editor of Microsoft Workplace Insights Richard Tso argued: “When you have a more complete view into your own work patterns through data, you can begin to make changes in how you work to be happier, well-balanced and more productive” (Tso, 2017).

Table 2 summarizes the discursive shift we have described above. Column one in the table displays the analytical questions of the problematization lens. The second and third columns present the schematic configuration of VoloMetrix’s version of the personal productivity dashboard (covering the period from 2013-2015) and the schematic configuration of MyAnalytics’s personal productivity dashboard (covering the period from 2016-2019). We have chosen to highlight these two schematic configurations of personal productivity dashboards since they each present a distinct vision for DPA. The first row of the table displays the specific problematics that each of the schematics is structured around. From our source material, we observed that both VoloMetrix and MyAnalytics advanced to become relevant solutions to what we label the problematics of collaborative overload, the invisible nature of knowledge work, and a call for organizations to take advantage of data in optimizing their operations. The next three rows of Table 2 display how each of the two schematic configurations commits to questions of knowledge, power and subjectivity. Next, we examine the differences between these two schematic configurations.
### Analytical questions

<table>
<thead>
<tr>
<th>Schematic configuration of personal productivity dashboards in VoloMetrix</th>
<th>Schematic configuration of personal productivity dashboards in MyAnalytics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Core problematics:</strong> What problems are DPA presented as a solution to?</td>
<td>How can organizations take advantage of data to mitigate risks of collaborative overload?</td>
</tr>
<tr>
<td></td>
<td>How to manage knowledge workers in organizations where it has become impossible to ‘manage by walking around.’</td>
</tr>
<tr>
<td></td>
<td>How to manage knowledge workers in organizations when adopting ‘new ways of working.’</td>
</tr>
<tr>
<td><strong>Commitments to the question of knowledge:</strong> What are the epistemic rules implied by the use of DPA?</td>
<td>Data can serve as signals and indicators that render hidden aspects of work visible.</td>
</tr>
<tr>
<td><strong>Commitments to the question of power:</strong> What types of normativity and patterns for normalization are implied by the use of DPA?</td>
<td>Data make it possible to have meaningful conversations about workload, distribution and priorities. Challenges of collaborative overload are cast as a collective problem.</td>
</tr>
<tr>
<td></td>
<td>Data can help knowledge workers master the skills of focus and working smarter to improve their work patterns. Challenges of collaborative overload are cast as a problem for the individual knowledge worker.</td>
</tr>
<tr>
<td><strong>Commitments to the question of subjectivity:</strong> Which forms of the self are implied by the use of DPA?</td>
<td>Data can support organizational change by rendering knowledge workers accountable for their work activities to themselves, peers, and managers.</td>
</tr>
<tr>
<td></td>
<td>Data represent an opportunity, but also an obligation, for knowledge workers to reform counterproductive work habits.</td>
</tr>
</tbody>
</table>

**Table 2:** Overview of two schematic configurations of personal productivity dashboards

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### 5.1 Core Problematics

In 2011, when VoloMetrix was founded, the popular movie adaptation of Michael Lewis’ 2003 book *Moneyball* premiered. *Moneyball* describes how Oakland Athletics in 2002 utilized a rigorous statistical analysis to assemble a baseball team that could compete with the very best teams despite its small budget. This iconic story of Oakland Athletics has since been told and retold by numerous management scholars and consultants, as well as thought leaders in the field of management, to advocate for more data-driven approaches to HR (e.g. Davenport, 2006; Bock, 2015; Marr, 2018). In combination with use cases of big data analytics in areas of marketing, finance and other business functions, the Oakland Athletics story inspired companies like Google, P&G, Royal Bank of Scotland, Intel and Tesco to establish dedicated HR analytics groups. These groups aimed broadly to take “the guesswork out of employee management” (Davenport et al., 2006: page 55). When VoloMetrix launched in 2011, big data and data analytics were increasingly seen as approaches that could fundamentally transform the HR function. Josh Bershin, a Deloitte consultant, and an early evangelist of data-driven approaches to HR, noted that until 2011 the discussion around HR analytics had “stayed very tactical, focused on operational reporting and simply fixing the mess of incompatible HR systems we have.” However, Bershin recalled that
around 2011, the market shifted since “HR organizations realize[d] that they, too, could enjoy the wave of interest in *Moneyball* and Big Data” (Bershin, 2015).

In their marketing material, VoloMetrix explicitly committed to the claim that data can transform HR and management in the same way that data had transformed other business functions such as marketing and finance. For instance, Fuller expressed this commitment in one of his many contributions to *Harvard Business Review*:

“[…] many companies are utilizing sophisticated social intelligence algorithms to create a deeper understanding of their customers’ patterns and behavior. The next step is turning these analytics inward - harnessing the massive amount of email, calendar, and messaging data a company already has […]” (Fuller, 2014b)

Since its launch, ideas of new ways of working have attracted considerable attention within the public discourse. When Microsoft bought VoloMetrix in 2015, they announced the acquisition as a big step forward in Microsoft’s ambition to “reinvent productivity” (Jha, 2015). Subsequently, Microsoft has frequently linked DPA to discussions about new ways of working. When the journalist Melanie Burgess visited Microsoft’s Envisioning Center to report on future trends in the workplace, Microsoft representatives showed her MyAnalytics as an example of how digital applications increasingly take over managerial functions to improve efficiency (Burgess, 2019). Thus, what started as an aspiration to strengthen the HR function had become part of a radical movement to transform how work can and should be organized.

Regardless of whether data analytics are envisioned to redefine the HR function or support more radical transformations of how to organize work, the schematics of VoloMetrix and MyAnalytics both framed data as the solution to the so-called visibility problem. The visibility problem is introduced by the fact that it has become impossible to ‘manage by walking around’, as work and organizations have become more complex (VoloMetrix, 2011; Fuller et al. 2016). Chris Brahm, co-founder and chairman of VoloMetrix, co-authored an article in *Harvard Business Review* with two of his colleagues from Bain and Company in which they argue: “Companies now have time-management tools that weren’t available in the past […] this information can paint a vivid and revealing picture of an organization’s time budget” (Mankins, Brahm and Caimi, 2014: page 75-76). In the article, and in our source material, it is repeatedly argued that knowledge workers often spend their time in the wrong ways. The argument goes that instead of spending time on the things that matter the most, knowledge workers waste time on unproductive meetings and composing time-consuming emails. Fuller (2014) contends:

[…] to have an hour meeting with 50 people is just massive—and it’s really hard to imagine how you can get any decisions made quickly, and it’s hard to imagine how you can really develop good ideas and innovate in settings that are perhaps a little bit overly collaborative (Romano 2014).

This problematization of collaborative activities mirrors findings in IS, media and organizational studies. For instance, Mazmanian, Orlikowski and Yates (2013) find that digital collaboration tools provide the freedom to work anywhere and anytime, which paradoxically tends to turn into
an obligation to work everywhere and all the time. The problematization of collaborative activities continues in MyAnalytics. In the blog post mentioned above, Tso (2017) adopts the term “collaborative overload” from Cross et al. (2016) to describe how digital technologies have increased the number of collaborative activities at work to a level that in many cases negatively impacts knowledge workers’ productivity and wellbeing.

We propose that due to the commitment to the problematics of collaborative overload, the emergence of DPA can be seen as a response to the emerging critique of the paradoxical nature of digital collaboration tools and the invisible nature of knowledge work. We furthermore argue that DPA as a solution to these problematics has been rendered relevant due to growing attention to how organizations can take advantage of data. Next, we detail the philosophical and ethical worldviews to which this solution is committed.

5.2 Commitments to Questions of Knowledge, Power and Subjectivity

The section above elaborated the first row in Table 1 by demonstrating how the schematic configurations associated with VoloMetrix and MyAnalytics are structured around similar core problematics. In this section, we elaborate on the last three rows: how each of the two schematic configurations commits to questions of knowledge, power and subjectivity.

Our analytical work indicates that both of the schematic configurations commit to the idea that data extracted from mail and calendars can be used to render hidden aspects of work visible. In our source material, data are frequently referred to as signals (e.g. Brandon, 2016; Fuller et al., 2018) or indicators (e.g. Parkhurst, 2013; Fuller 2014a) that provide managers and employees with “visibility into what activities, time investments and other characteristics actually drive business results” (Fuller et al., 2016). In both schematics associated with VoloMetrix and with MyAnalytics, it is emphasized how managers should only use these signals and indicators to inform general managerial decision making, not to evaluate the individual worker. In this way, digital trace data can be used to enhance productivity without violating knowledge workers’ privacy. For instance, Microsoft representative Steve Clayton defended the collection of digital trace data in *The Economist*: “It doesn’t have that ‘big brother’ element. It’s designed to be more productive” (The Economist, 2018b). However, despite the fact that both schematics seem to suggest data should be mobilized to support the individual knowledge worker, they signify two very different forms of support.

As we have already seen, within the VoloMetrix schematic configuration, data were envisioned as supporting a dialogue about workloads and priorities. In MyAnalytics, the emphasis was on making work visible to the individual knowledge worker in order to optimize work patterns. This difference indicates how the two schematics are committed differently to the question of power. We argue that this difference signifies two different patterns for normalization prescribing how workers might legitimately and effectively be controlled. Each pattern implies a different notion of how workers are constituted as the moral subjects of their own actions. In 2015, Fuller highlighted the value of personal dashboards in the *Harvard Business Review* article ‘How to Finally Kill the Useless, Recurring Meeting’. He argued that organizations could foster a better
meeting culture by using collaboration data. According to Fuller: “The key is to engage all employees in a new way of thinking about time management and to encourage them to hold themselves and their colleagues accountable” (Fuller, 2015).

In MyAnalytics, the freedom and burden of handling the paradoxical nature of digital work practices has been passed on to the individual knowledge worker. We argue that the move from using data to support dialogue towards using it to improve work patterns, has reconfigured the problematics of collaborative overload from a collective issue into a challenge the individual worker must learn to navigate. The individualization of the problem of collaborative overload can be sensed by taking a closer look at a piece in the *New York Times*, where Neil Irwin linked MyAnalytics to the *Moneyball* narrative:

“The goal of all that analytics work [in baseball] was to help teams make better decisions. [Today] the ability to use this data is the key to success for players themselves. [In a similar manner, data] provide lessons that individual workers need to use to become the Joey Votto [star player of the baseball team Cincinnati Reds] of their own field” (Irwin, 2019)

According to Irwin, knowledge workers can use data as a “coach”, since data provide them with lessons on how to transform themselves. Irwin’s story illustrates how the original ambition of using data to inform managerial decision-making has mutated into the idea that data can be used to automate managerial functions. In the case of DPA, it is the managerial function of coaching and instructing workers on how they can and should organize their work that is supposed to be automated. In the source material, the automation of the managerial task of supervision is framed as empowering workers. In this way data represent an opportunity for knowledge workers to become better and more productive versions of themselves.

However, this opportunity swiftly becomes an obligation for the individual knowledge worker to reform him or herself. Instead of facilitating meaningful conversations about workload and job priorities, as envisioned with VoloMetrix (2014), MyAnalytics casts data as a vehicle for constant self-reformation. Within this logic of self-reformation, it is not the organization and its processes that are challenged, but the individual worker who must learn and adopt “ways to work smarter” (Microsoft, 2019).

### 6. From Unintended to Intended Consequences of DPA

The problematization lens does not predicate whether or not we should accept or reject a digital technology. It merely allows us to elucidate the assumptions we commit to when engaging with a given digital technology in a particular way. Metaphorically, we can describe this critical aim as elucidating ‘the price paid’ for engaging with a particular digital technology (Nyman et al., 2021). This opens up a space for considering whether the price seems reasonable.

From a leadership perspective, an understanding of the ‘the price paid’ allows managers better to decide whether they are prepared to endorse the discursive commitments entailed with the digital technologies they use and promote. By approaching digital technologies as responses to problems,
managerial decision makers become mindful of the potentially unintended consequences of digital work practices that shape organizational life. The critical potential of knowing ‘the price paid’ for uses of digital technologies in greater detail, is that it becomes possible – however, neither necessary nor obligatory – to refuse to pay up.

In our case, this translates to a concern about whether organizations that adopt DPA are willing to commit to what we have described as an individualization of the challenges of contemporary work life. Through our study of MyAnalytics we have shown how DPA cast data as a device for constant self-reformation of the knowledge worker. In doing so, DPA accelerates a logic of perpetual training. According to Deleuze (1992), the shift from schools to perpetual training functions is one of the many ways in which capitalism has mutated, with corporations replacing the factory as the dominant logic of production. This shift might “hold promising possibilities for autonomy, but at the same time entail extreme dangers of radical exclusion and isolation” (Johnsen and Sørensen, 2015: page 15). Viewed through the problematization lens, we cannot say that DPA is inherently good or bad. Instead, the analytical work should prompt managers to ask themselves whether the freedom and burden to navigate the challenges of contemporary work life should be passed on to the shoulders of the individual knowledge worker.

Importantly, refusing to pay the price of a given technological solution suggests neither that the problem nor that the technology should be rejected. The schematic associated with VoloMetrix indicates that the use of digital trace data could also be envisioned in ways that do not entail the ideal of constant self-reformation and individual optimization in the workplace. Instead, the use of data can be envisioned as a vehicle for facilitating mutual accountability and thereby become a medium with which to spark conversations about job priorities and workloads.

7. ALTERNATIVE PATHWAYS FOR THE FUTURE OF DPA

Efforts to automate work tasks, including the automation of the managerial functions, have been argued to negatively impact work-life quality by reconfiguring work environments (Riemer and Peter, 2020). Our engagement with DPA was initially motivated by a growing body of critical research alerting us to how DPA transforms the nature of employment relationships and management practices in ways that risk alienating workers and introduce concerns over manipulation.

The idea that information technology re-configures work is not new. Writing from the vantage point of ubiquitous work digitalization efforts in the late 1970s and 1980s, Zuboff (1988) contended that information technology holds a dual capacity to both ‘informate’ and ‘automate’ work. In Zuboff’s rendering, a storyline that emphasizes the role of technologies in “automating” work processes is more immediately compelling and relatable in the management discourse. However, the automation view also tends to gloss over the more complex (and often less visible or indeed manageable) stories of how digital technologies ‘informate’ work by providing “a deeper level of transparency to activities that had been partially or completely opaque” (Zuboff, 1988: page 9). According to Zuboff, this duality of technology was, and we may add continues to
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be, only appreciated to a limited degree. Thus, she suggests that we need to be increasingly mindful of the consequences of adopting particular orientations in understanding technologies and the roles they play in reorganizing work.

Sørensen (2017) describes how the technological development since the 1980s has sharpened the duality of automating and information by further extending the abilities for organizations to codify business processes. Burton-Jones (2014) urges IS researchers to revisit Zuboff’s seminal work and extend its ideas. Paraphrasing Zuboff (1988), we may say that the advent of DPA suggests the possibility to automate managerial tasks, replacing the gaze of a human manager with an application fueled by digital trace data. The challenge is now to consider to what ends should the capacity of digital trace data to informate work be diverted? Our work could be read as emphasizing an additional nuance to the idea of technological dualities. Not only does information technology hold a capacity to automate and informate work; digital technologies can also be diverted to inform either the reformation of workflows or the negotiation of workloads.

Similarly, Doolin (1998) highlights the potential of using information technology for negotiating work. In his case study of the implementation of patient management systems in a healthcare setting, he found that the system mobilized new categories for activities. While the intention among senior management was that the system would prompt a sense of resource efficiency among clinicians, Doolin’s study revealed that some clinicians were able to divert the system to their own ends by using it to argue for more resources. More recently, based on a series of participatory design workshops with hospital staff, the study by Holten et al. (2021) suggests that sensor tracking data provide a useful vocabulary for workers to gain voice in their workplace. For instance, in relation to a new hospital design, secretaries recognized the potential for using sensor tracking data to gain influence in the design process by demonstrating their need for more office space.

In a wider historical perspective on work, technologies of codification (i.e. technologies that in some way create an abstraction of activities) have exhibited similar dualities since the early days of industrial capitalism. For example, Glennie and Thrift (2009) have pointed out that “clock time has been as much a liberatory as an oppressive force” (page 13), and Thompson (1967) has detailed the intimate link between the diffusion of the clock and the birth of industrial capitalism. Thompson exemplifies this point by referring to Wedgewood’s invention of a primitive clocking-in system in the mid-eighteenth century and how he used a bell to summon workers, signal breaks, and mark the end of the workday. In Thompson’s work, Wedgewood’s bell serves to illustrate how the timetable became the template for society under industrial capitalism, thereby obligating people to live according to the rhythm of a mechanical clock rather than sunrise-to-sunset cycles. Later, however, the clock-based work cycle was challenged by the very same patterning of workdays afforded by clock time. When workers began to unite in the eighteenth century, a key demand for better work conditions was the right to “eight hours sleep, eight hours of work, and eight hours rest” (Halker and Halker, 1991). Workers, therefore, used the new societal templates that the diffusion of the clock provided to mobilize a new form of resistance. Today, with the proliferation of digital trace data in the workplace, the societal template is being altered once again.
For the past three decades, critical scholars such as Boltanski and Chiapello (1999/2018) have critiqued the way that managerial rhetoric has mutated since the birth of industrial capitalism to increasingly rely on workers’ ability to control themselves without recourse to compulsion, but by making everyone’s work “meaningful”. Gregg (2019) suggests that productivity tools such as DPA are meant to help knowledge workers free up time and energy for the most demanding and rewarding work, paradoxically creating increased expectations for productivity. Moore (2018), Wajcman (2019) and Zuboff (2019) warn that an accelerated collection of digital trace data increasingly commodifies the intimate spheres of workers’ personal life. In drawing attention to the possibility of mobilizing digital trace data to negotiate workloads, our archaeology and subsequent retelling of the story of the emergence of MyAnalytics highlights that technologies can be imagined and put to work in ways that enable workers to exploit the increasing digital codification of work to strengthen their bargaining power. As such, a genealogical reading and analysis of the history of MyAnalytics has allowed us to articulate two distinct pathways for DPA in the future. One pathway entails the continuation of the current schematics of DPA wherein data are cast as a learning opportunity, which we argued commits to the individualization of the responsibilities for navigating the paradoxical nature of digital collaboration tools and contemporary work life. Another pathway, one that we have seen rehearsed in earlier and now abandoned stages of the development of DPA, sees data as a means for helping knowledge workers voice concerns about excessive workloads and unrealistic expectations of productivity.

8. LIMITATIONS AND AREAS FOR FUTURE RESEARCH

Before concluding the paper, we find it appropriate to consider the limitations of our empirical work and draw up some contours for potential future research. We start with a comment on the limitations related to the selection of MyAnalytics as our analytical focal point. We have argued that MyAnalytics represents an archetype example of DPA. The application relies on digital trace data from application usage and presents data in a dashboard intended to help uncover unproductive work patterns of the individual worker. However, going further than simply generating insights on the basis of patterns of application usage data, researchers and practitioners have begun to collect data in the form of knowledge workers’ biosignals, exploring the use of a variety of wearable devices to optimize work and prevent burnout. For instance, Chodan et al. (2019) present a head-worn portable device with multiple sensors measuring biosignals known to be indicative of stress (e.g., pulse, spontaneous eye blink rates, breathing rate, brain activity and so on). Züger et al. (2017), Luo et al. (2018) and Schaule et al. (2018) showcase applications where such biosignals are used to identify optimal moments for breaks and interruptions from co-workers. Oddly, the focus on this increasingly granular mapping of behavior retunes the managerial attention to workers’ body, much like the manager who could ‘manage by walking around’ in industrial factories, surveying workers’ movements and behaviors (Deleuze, 1992). On the one hand, we sense from our readings of these works that the use of biosignals follows similar discourse commitments as MyAnalytics. On the other hand, future research is needed to further explore the conditions and consequences of this renewed managerial attention to the worker’s body.
Second, related to our selection of MyAnalytics as the analytical focal point, Davison and Martinsons (2016) argue that researchers often fail to reflect on the cultural context of their studies. Thus, it is relevant to highlight that MyAnalytics was conceived by top-tier management consultants from Bain and Company and born in a Western/North American context. Therefore, other pathways will most likely become visible when exploring examples of DPA emerging in different contexts and on the backdrop of different cultural expectations and structures.

Third, following these notes on the limitations of our choice of case, we want to conclude by drawing attention to the form of critique practiced with the problematization lens. In particular, we find it worth mentioning that the analytical focus on schematics and the use of archival material inherent to the problematization lens might tell us very little about how people actually use DPA. In light of the increased focus on sociomaterial configurations of practice in the IS field (Schultze et al., 2020), the idea of schematic configurations may appear rather old-fashioned to some scholars. Since Suchman’s (1987) influential exposition of the situatedness of knowledge production, some would likely consider it somewhat naïve to study practices without studying them in situ. For example, Barad, who is an intellectual reference point for sociomaterial orientations in IS, argues that Foucault’s work is constrained by not considering “[i]n what way the biological and the historical are ‘bound together’” (Barad 2013: page 808). Barad’s point is that by giving primary attention to the schematic configurations of practices, Foucault’s analytical approach is not sensitive towards how material conditions, in particular the role of the body, might alter practices.

While we find that Barad’s critique of Foucault’s approach highlights an important limitation of the problematization lens, we argue that scholars should remain attentive to the schematic configurations of practices. In a recent commentary, Bailey and Barley (2020) urged scholars to investigate further how “visions shape the outcome of technological change” (page 2). Kallinikos (2004) argues that “the study of technology and its social impact cannot be exhausted at the very interface upon which humans encounter technology” (page 237). He argues how even the interface of apparently simple software applications like word processing is supported by the history of writing techniques as well as other institutions and structures. Similar points have been made by Land (2010) and Stahl (2011) for whom historical knowledge is necessary to understand the complexity of IS phenomena. Moreover, Rowe (2018) has proposed that the unprecedented challenges of emerging digital technologies call for the IS community to further engage with philosophical activities in order to “break out of limitations that unduly restrict our theoretical imagination and our theoretical reasoning through metatheories and intuition” (page 380). As a historically and philosophically oriented research strategy, the problematization lens aspires to explore alternative pathways for digital technology that are otherwise ‘restricted’ by our common sense and theoretical imagination and reasoning, thereby enabling us to reconfigure their current pathway. In this way, the problematization lens, we believe, can work to complement other research methods and critical approaches. Moore’s (2018) and Wajcman’s (2019) ethnographic and ‘critical theory’ oriented work motivated our interest in DPA and our pursuit of alternative pathways. Now, further ethnographic work may be necessary for developing a better
understanding of how the individualization of the responsibility for navigating the paradoxes of increasingly digitalized work-life is situated and ‘lived’.

Lastly, DPA is an instance of algorithmic management in which workers are not necessarily disconnected from traditional employment structures nor directly aim at obtaining desired behavior through rewards or threats of replacement. Since we concluded our analytical work, Microsoft has rebranded MyAnalytics to Viva Insights (Rawari, 2021). In this new narrative, the schematics of individualization continues but the MyAnalytics technology is now embedded within a suite of personalized collaboration tools. With Viva, personal productivity dashboards are bundled with offerings such as a meditation app (Headspace) and an intelligent to do list (Cortana) to provide a more comprehensive package of productivity tools. Microsoft markets this bundle of productivity tools as an employee experience platform suitable for an era of hybrid work (ibid.). Future research is needed to examine this as well as future iterations of DPA and other instantiations of algorithmic management.

9. CONCLUDING REMARKS

In this paper, we interrogated the evolution of Microsoft MyAnalytics to explore alternative pathways for Digital Productivity Assistants (DPA). The study feeds into the larger discussion on the unintended consequences of algorithmic management practices by tracing the logic of individualization enacted within DPA. Using a problematization lens, we mapped the problematics that have structured the emergence of the MyAnalytics and how the rhetoric used to market the application implies discursive commitments to questions of knowledge, power and subjectivity. Our retelling of MyAnalytics’ story provides us with a sense of the contingencies of DPA by disclosing a possible but abandoned schematic configuration tracking digital technology practices in the workplace. This retelling introduces an additional nuance to the idea of technological dualities. It draws attention to how the capacity of digital trace data to ‘informate’ (c.f. Zuboff 1988) can be diverted towards multiple ends: in the case of DPA the reformation of workflows or the negotiation of workloads.

Importantly, even though our analytical work demonstrates potentially problematic aspects of how DPA are envisioned, we neither can nor should prematurely conclude that DPA are exploitive or necessarily prone to be repressive. However, the problematization lens can, so we argue, help recover the contours of abandoned and alternative pathways for digital technologies. This is not to say that DPA must now be envisioned as tools for a meaningful conversation about workload, but rather to bring to our attention that they could be seen as such. Problematization, then, is not simply about noticing, describing and analyzing certain configurations of the past. As we have suggested, it also provides opportunities for a critical yet constructive view of technological futures. Yet, unlike traditional critical IS agendas, the form of critique practiced with the problematization lens is not committed to any normative formulae for ‘the good life’ or ‘what ought we to do’. According to Foucault (1980/1991), problematizations are to be taken as ‘game openings.’ Problematizations enable us to ask the critical question, ‘what if…?’ In the case of DPA: what if the informing capability of digital trace data were mobilized to challenge the
organization of work? We might wonder why certain schematics are seen to disappear over time, but there is arguably no reason to believe that these schematics are irredeemably lost. Uncovering these lost schematics of digital technology, we might find that the technological *now* is not necessarily the peak of enlightened use, and that the past might indeed become a significant inspiration for the future.
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ESSAY THREE

FROM NUDGING AND ORGANIZATIONAL CHANGE TO AI-DRIVEN NUDGES

The third article of the dissertation, “The Birth of AI-Driven Nudges,” moves the site of analysis beyond material related to the MyAnalytics case. The article engages with material on nudge theory and its application to digital and managerial domains, which underpins not only the MyAnalytics application but the larger class of systems that I described as aspirational algorithmic control in the Introduction. The current essay prefaces the third article with a confessional account of the events that shaped the analysis and how it was presented in the article. The essay tells the story of how a chapter in a book about the quantified self, led me to reengage with my master’s thesis on nudging and organizational change. The essay also tells the story of my attempt to align with a track description for the 2023 Hawaii International Conference on System Sciences, where the third article was published, which forced me committing to a definition of the elusive concept of AI.

BEYOND MYANALYTICS

After we submitted the second article for review in the summer of 2021, I found time to pursue a goal that had been lurking in the background for a while: how to move my historical explorations beyond the MyAnalytics case. During the editing process of the second article, we cut out a section\(^1\) that I hoped could serve as starting point for my next article. The deleted section drew a connection between the rise of the quantified-self movement and the discursive shift I had observed in my work on the MyAnalytics application. The quantified-self movement comprises a community of people interested in monitoring and recording specific details of their lives in order to optimize themselves and share their expertise and experiences regarding this endeavor with other like-minded individuals. Moreover, the concept of the quantified self also refers more broadly to self-tracking practices (Lupton, 2016). I established the connection between MyAnalytics and the quantified-self movement from an opinion piece in Wired magazine authored by Ryan Fuller, the CEO of VoloMetrix (the start-up that developed the data-mining technology behind MyAnalytics). The article was written nine months before VoloMetrix was acquired by Microsoft, and was titled: “How Quantified-Self Will Redefine the Future of the Enterprise.” In it, Fuller predicts: “The data gleaned through feedback and people analytics technologies will provide unprecedented insights around workplace habits… empower individual employees, departments and companies to improve performance and efficiency” (Fuller, 2015).

\(^1\) We edited out this section to keep our argument lean. Kane (2022) describes research articles as stylized artifacts, which should only include the content most relevant to the core contribution. In the words of Kane: “the more you can cut away … the better off you’ll be” (p. 1079).
As detailed in my second article, as the *Wired* opinion piece was coming out, the narrative around the technology that became MyAnalytics had started to shift. Before the *Wired* article was published, data were cast as a means to open the door for conversations about workload. Following the publication of this opinion piece, data began to be envisioned as a feedback instrument for the purpose of reforming habits.

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It is likely not coincidental that it was in *Wired* that this shift was first articulated. *Wired*’s founding editor Kevin Kelly and journalist Gary Wolf popularized the term by hosting a number of quantified-self events in Silicon Valley. Tim Ferris was among the participants of the very first meetup held in Kelly’s home in 2008. One year later, Ferris published *The Four Hour Work Week*, where he presented a multitude of life hacks on how to get work done in more efficient ways. For instance, he argued that people should only check their email twice a day. Later, the computer science scholar, Cal Newport (2016) reiterated similar messages and Ferris’s life hack was eventually integrated into the MyAnalytics application.

Motivated to further explore connections between MyAnalytics and the quantified self movement, I picked up a book that had been gathering dust on my bookshelf. The book, authored by Phoebe Moore, is called *The Quantified Self in Precarity: Work Technology and What Counts*. At the time, Moore was one of the few scholars who had conducted an empirical study on a technology resembling MyAnalytics. From 2015 to 2016, Moore followed a group of Dutch office workers carrying out an experiment they called *The Quantified Workplace Project*. In the project, the company offered its employees the opportunity to receive a Fitbit Charge activity tracker and install the RescueTime app on their computers in order to improve their well-being. Like MyAnalytics, RescueTime uses metadata from application data to map activities. Thus Moore’s observations were naturally of interest to me. While the employees initially had positive opinions about the project, over time, they started to exhibit high levels of disengagement and resistance. In many ways, her analysis echoes Wajcman’s (2018) and Zuboff (2019)’s work, hinting at the extensive concerns about the ability of digital tracking technologies to invade and commodify increasingly intimate parts of life.

**Towards a Historical Perspective on Algorithmic Control**

Since I had already drawn on Moore’s argument in my work on MyAnalytics, I was excited to learn what additional perspectives her book might bring. I was far from disappointed in this regard. The second chapter of the book features a historical tour de force in the evolution of managerial thought, detailing lineages between datafication practices in the workplace and past managerial schools of thought. Her analysis takes onset in Barley and Kunda’s (1992) influential historical review of managerial discourse. According to Barley and Kunda, contemporary

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2 Described in Ferris (2013).
3 When presenting users with focus hour metrics, MyAnalytics forwards Ferris’s advice, recommending that users limit their email activity to designated time slots (e.g. Microsoft, 2019).
American managerial discourse is the result of five consecutive waves, which began in the 1870s and have alternated between normative control logics (industrial betterment, human relations, organizational culture, and quality) and rational control logics (scientific management, systems rationalism). Based on Barley and Kunda’s work, Moore argued that beginning in early 2000, a sixth wave had emerged in which normative and rational control practices were merged. This merge intensified the management responsibilities depicted in the rational tenets of managerial discourse while simultaneously placing well-being at the center of the employment experience (as the case with normative tenets of control). Building on this argument, Moore proposed that we can understand the movement toward quantified work as a response to this merger between the rational and normative logics of control.

Moore’s analysis connected some important dots in my work and thinking. When I was about six months into my PhD studies, Katherine Kellogg, Melissa Valentine, and Angèle Christin published a literature review synthesizing the maturing body of literature on algorithms at work (i.e., computer-programmed procedures that transform input data into desired outputs for employers). The authors argue “that organizational scholarship has not kept pace with the ways that algorithmic technologies have the potential to transform organizational control in profound ways” (Kellogg et. al., 2020, p. 367). In order to update our vocabulary, the authors propose what they called six algorithmic control mechanisms by which employers can use computer-programmed procedures to steer workers. One mechanism, algorithmic recommending, describes how employers use “algorithms to offer suggestions intended to prompt the targeted worker to make decisions preferred by the choice architect” (p. 372).

Over the course of my PhD studies, the six mechanisms have been widely adopted by the IS research community (see Heinrich al., 2022 for a recent review of the algorithmic management literature). However, I had always had mixed feelings about the six mechanisms, which made me hesitant to adopt the framework as a means of labeling and articulating my empirical interest. On the one hand, the coffee delivery drone and emails with suggestions for how workers might improve their work habits could easily be cast as an algorithmic recommending system. On the other hand, in their review, Kellogg et al. stated that they only considered rational forms of control in which employers “try to obtain desired behavior from workers by appealing to workers’ self-interest [e.g., Taylor, 1911]” and thus treat “normative control … [as] suggestions for future research.” (Kellogg et al., 2020, p. 369). They developed their review by contrasting algorithmic control systems with past technologies associated with assembly lines and bureaucratic structures. For instance, they described how algorithmic recommending systems, much like assembly lines and bureaucratic structures, embed prescriptions for workers to implement in technology design (Kellogg et al., 2020, p. 372).

4 Employers can direct workers by using algorithmic technology to restrict and recommend actions. Employers can also elicit desired behaviors from workers by using algorithmic technology to record and rate workers’ behavior and output. In addition, employers can also discipline workers through the threat of swift replacement—algorithmic technology can be used to automatically fire underperforming workers and replace them with substitute workers. Employers can also discipline workers by using algorithmic technology to interactively and dynamically reward high-performing workers with more opportunities, higher pay, and promotions (Kellogg et al., 2020).
To me, email prompts and efforts to analyze optimal moments for a break definitely draw lineages to forms of rational control. But at the same time, I also found that Kellogg et al.’s (2020) assembly line and bureaucratic structure comparisons do not fully account for the tensions emerging when, for instance, systems like MyAnalytics aspire to help workers work smarter and avoid burnout. As described in the Preface, the class of systems that I would later refer to as *aspirational algorithmic control* (described in the Introduction) calls for work theorizing the interplays between normative and rational forms of control. My reading of Moore’s (2018) historical view on workplace quantification initiatives caused me to ponder how to conceptualize algorithmic control—not just as a form of rational control but as a space where rational and normative forms of control are also sometimes blended. This led me to revisit my master’s thesis project. As described in my first essay, my master’s thesis project examined the historical lineages of nudging and how nudging came to be adopted as a managerial strategy. Inspired by Moore’s work I set out to further develop the analytical work that I started with my thesis partner Andreas five years earlier.

**Revisiting My Master’s Thesis**

Similar to Moore’s historical examination, my master’s thesis (Mogensen & Christiansen, 2017) posed the argument that the discourse of nudging in the managerial domain blended arguments of rational and normative control logics. My thesis partner and I observed that when managerial scholars and practitioners promote nudging as a managerial strategy, they generally invoke ideas of Taylorism, human relations, and human resource management. Based on this observation, we argued that nudging as a managerial strategy is appealing in that it offers a thought system where well-established dichotomies can coexist, which then makes new, alternative ways of managing self-managing employees possible.

One text that we kept returning to was Gideon Kunda’s iconic study of managerial practices in a technology company in the 1980s. The company was admired for its innovative way of managing a self-managing workforce by carefully engineering its corporate culture. Kunda described how employees referred to their relationship with the company as a marriage and talked of the company as a family (Kunda, 1992). However, when Kunda visited the company again 10 years later, he noticed that something has changed. He observed how waves of downsizing, outsourcing, and layoffs had changed the organizational structure. Over time, a growing number of technical and managerial positions had been filled by short-term contract workers and the rhetoric of communities and culture had been replaced by the rhetoric of markets: “The imagery of love and marriage fades into obscurity, replaced by an imagery of temporary, short-term affairs or one-night stands” (Kunda & Van Maanen, 1999, p. 73).

Rendered through a Foucauldian lens, Andreas and I argued that this shift in the organizational structure observed by Kunda and Van Maanen (1999) invoked a crisis in managerial thinking. Further informed by Michael Reed’s (2011) work on control hybrids, we argued that coaching-

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5 Described in the Introduction.
based managerial ideals, which had gained ground in the 1980s and 1990s, now found themselves in crisis. Over the years, a growing body of evidence and experience made it clear that the idea of managers as coaches and other relics of postmodern management thinking (e.g. fluid work organizations) come with their own challenges. For example, scholars caution that postmodern ways of organizing often invoke ambiguity, instability, social polarization, intensified work programs and responsibilities (Boltanski & Chiapello, 1999/2018; Castells, 1996; Clegg, 1990), calling the established ways of managing the self-managing employee into question (e.g. Raastrup & Pedersen, 2013). More closely related to our focus on change management, we detected how the discourse of change management had started to call for alternatives to the postmodern vision-based approach. Traditional change management tools such as workshops and identifying organizational endorsers (described by e.g. Kotter, 1996) were depicted as ineffective, costly, and incapable of delivering transformation at scale (e.g. Aronowitz, 2015; Bock, 2015; ).

Recognizing this crisis, we suggested that in a world of constant change and growing ambiguity, the theory of nudging excels because it delivers an approach that satisfies the ambition of scientific management to granularly measure and prescribe the most efficient way to conduct a task while also making it theoretically possible to preserve worker autonomy (emphasized as a core factor for success by the human relations and human resource movements). As such, we argued that nudging became attractive because it offers an ideological system and framework in which it is both possible and legitimate for a managerial body to influence choice while preserving workers’ autonomy.

**Toward a Genealogy of AI Nudges**

One of the things that I felt we did well in our master’s thesis was grounding our analysis in an assembled body of text that explicitly argues for how and why nudging can support change management efforts. I had previously considered engaging more explicitly with nudge theory since Microsoft described MyAnalytics as a nudge when they first launched it (2018). Moreover, Kellogg et al. (2020) referred to the algorithmic nudging of algorithmic recommending systems and both Wajcman (2018) and Zuboff (2019) cast nudging as the overarching ideology of digital productivity apps and surveillance capitalism. However, I was also hesitant to place nudging at the center of my work. I felt that in order to motivate the analysis of digital nudges to enhance productivity, I needed more examples where nudge theory was explicitly used to develop digital managerial applications.

One day I saw a *Harvard Business Review* article by Mareike Möhlmann titled “Algorithmic Nudges Don’t Have to Be Unethical.” I remember the satisfaction I felt when I first saw the title, as it gave me the perfect way to motivate an updated version of my master’s thesis work. The article inspired me to search further for other articles explicitly adopting the notion of nudging to describe algorithmic recommending systems. To my great excitement, my searches yielded several additional works. For instance, I came across a McKinsey article with the title “How AI-Driven Nudges Can Transform an Operation’s Performance.” Similar to the arguments that
Andreas and I had encountered about why the field of change management needed to adopt nudge theory, a group of McKinsey consultants claimed:

> Coaching and training interventions are usually infrequent, limited in scope, and delivered using a one-size-fits-all approach. … In some organizations, entrenched cultures and habits have proved difficult to shake off. In others, the use of generic and repetitive feedback has left staff disillusioned about learning and development. (Amar et al., 2022).

The article presents an archetypical critique of postmodern/bureaucratic and normative managerial rhetoric. But I found it rather interesting and in some way paradoxical that the article simultaneously mobilizes the same normative rhetoric that it aims to disrupt. For instance, it describes how “personalized approaches are now inspiring innovation in AI-driven employee engagement” (Amar et al., 2022).

Gradually, I built a corpus of material to motivate the analysis. As I found more and more work explicitly referring to nudge theory as a basis for the development and legitimization of digital work systems (e.g. Bersin & Enderes, 2021; Mele et al., 2021), I felt it was time to start writing up a first draft of an article. When I initiated this work, I planned to deliver a submission within a couple of months. Boy was I wrong! Perhaps a bit ironically, my estimate suffered severely from what the nudging literature theorizes as the “planning fallacy” (Kahneman, 2011). Writing the article ended up taking seven months.

At the beginning of the writing process, I quite quickly realized that I would need to further develop the analysis significantly. To condense and strengthen the analysis, I started to read and reread a wide range of old and recent research articles and books on the evolution of managerial thought (e.g. Boltanski & Chiapapello; 1999/2018; Gregg, 2018; Lemov, 2018, Rudin, 1972; Wajcman, 2015; Zuboff, 1988). My training in philosophy taught me the value of engaging with original texts. Thus, when Andreas and I wrote our master’s thesis, we spent significant time engaging with Taylor’s original work *The Principles of Scientific Management*. This exercise allowed us to bask in Taylor’s work—or, in Foucauldian language, it helped us understand the problematics that structured the emergence of scientific management. Following a similar logic, I ordered a bunch of Elton Mayo’s original work to theorize the normative tenets of algorithmic control and to understand how normative and rational control logics were combined in algorithmic recommending systems.

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As the analysis progressed, I started looking for a place to publish my work. Together with my supervisors, we agreed that the Hawaii International Conference on System Sciences would be an interesting place to present my work. I located a track called AI, Organizing, and Management as a good fit. The track description called for research on how “software tools based on artificial intelligence (AI) methods … used within a variety of organizational routines and practices,

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6 I here use the term nudging literature to ease reading. I acknowledge that to some this may come across as a bit simplistic, as what I am indeed referring to is a broad field of behavioral economics research, which the concept of nudging builds upon.
new types of human-machine configurations” (Lindberg et al., 2022). Since McKinsey referred to digital nudges as an “AI coach” (Amar et al., 2022), I reasoned that it could be interesting to position my work as a theorization of a logic underpinning an emerging human-machine configuration. Since I had also had interesting conversations with one of the track chairs at ICIS in Austin and because my supervisors also thought the track sounded promising, I decided that the track represented a great fit for the article I was writing.

To align myself with the track, I titled the article “The Birth of AI-Driven Nudges.” The choice to explicitly align my article with AI nudges called for work specifying how I used the term AI. To aid me in this task, I drew upon a commentary in MIS Quarterly that we had discussed in a reading circle among the PhD students in our department. The commentary described AI as a moving concept that in many regards characterizes “the frontier of computing” (Berente et al., 2021). The commentary resonated with me in that it referred to AI nudges as covering a myriad of advanced digital technologies such as wearables, speech recognition software, and machine learning-based chatbots (e.g. Mele et al., 2021), as well as simpler forms of computational technology including MyAnalytics. To handle the question of how to define AI, I took a stipulative approach. Instead of defining what makes something AI, I recruited text that declared that itself to be about AI nudges.

However, I must also confess that had it not been for the track description, I would have preferred to align myself more closely with the algorithmic control literature and talk about algorithmic nudging instead of AI nudging. To me it was not the AI label in itself that was interesting but how computational techniques were being used to target workers with recommendations with much greater precision than ever before. Nevertheless, I maintained the AI focus and the reviewers accepted the paper following a minor revision. I thus went to Hawaii to present my tour de force on managerial history, showing how a historical perspective may help us to better understand the dilemmas and concerns that emerge when organizations use digital nudges to alter the conduct of workers (managing workers).
BIBLIOGRAPHY


ARTICLE THREE

THE BIRTH OF AI-DRIVEN NUDGES

By Stig Nyman

Abstract

AI methods allow for a multitude of new forms of managerial control. One is algorithmic nudging, in which organizations use AI methods to control workers through targeted recommendations. Drawing upon Michel Foucault’s analytical strategies, the paper examines the intellectual heritage and ideological roots of AI-nudges. Scholars have commented on the resemblance between algorithmic nudging and Taylorist scientific management. However, as this paper shows the discourse of AI-nudges also shares significant linages with other subsequent opposing managerial paradigms. Building on the analysis of AI-nudges linages, the paper discusses how their use implies three contestable presumptions 1) that work can be codified, 2) that workers require autonomy over their work, and 3) that there is no existing conflict of interest between workers and the organization.

Keywords: Nudging, Algorithmic control, Algorithmic management, Genealogy, Critical IS research

1. INTRODUCTION

Influential managerial outlets have started to promote the idea that organizations should use so-called “artificial intelligence (AI)-driven nudges” to manage their workforce. For instance, McKinsey’s website features an article describing how:

Companies are combining behavioral-science insights with the latest AI technologies to create a new kind of tailored coaching experience for their employees. […] these new “smart AI coaching” systems combine multiple sources of data […] to select timely, context-specific nudges, delivered via the employee’s computer or hand-held device, with intelligent, deliberate repetition.” (Amar et al., 2022)

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1 The article was first published in the proceedings of of the 56th Hawaii International Conference on System Sciences (HICSS), 2023 as part of the track: AI, Organizing, and Management, (pp. 5252-5261).
https://hdl.handle.net/10125/103276
The notion of AI-driven nudges (AI-nudges) describes a new type of human-machine configuration where software assumes the role of a human manager, directing workers towards organizational goals. Research on algorithmic management practices has documented how software tools using machine-learning and AI methods have created the basis for the emergence of a plurality of new algorithmic control practices (for a review of this topic, see Koukouvinou & Holmström, 2022). At platforms and incumbent firms, AI methods and tools are used to monitor, sanction and reward worker’s behavior (Kellogg et al., 2020). However, as McKinsey’s article illustrates, AI methods and tools are increasingly also being used by organizations to direct their workforce in more subtle and informal ways (Burr et al., 2018), offering workers targeted recommendations on how to work and live effectively (Kellogg et al., 2020).

Information systems (IS) and organizational scholars caution that such AI-nudges can be manipulative. AI-nudges risk overriding the worker’s own ideas about their well-being and can encourage them to act in ways that are not in their own interest (Burr et al., 2018; Gal et al., 2020; Kellogg et al., 2020; Zuboff, 2019). The crowdwork platform Uber has delivered one of the most iconic cases of an ethically questionable use of AI-nudges. In 2016, Uber received critical attention because an article in the Atlantic revealed how the firm had harnessed insights from nudge theory to manipulate workers to drive longer work hours (Gino, 2017). Furthermore, scholars warn that AI-nudges promulgate a neo-liberal and exploitative work ethic (Moore, 2018; Wajcman, 2019). Moreover, scholars contest that the opacity of learning algorithms behind AI-nudges introduces issues of discrimination, mistrust, and lack of accountability and skill development (Berente et al., 2021; Faraj et al., 2018; O’neil, 2016).

Yet, AI-nudges “does not have to be unethical”, as Möhlmann (2021) contends in a Harvard Business Review article. Recognizing the challenges and pitfalls of AI-nudges, Möhlmann advocates that companies might be able to leverage these systems to create beneficial circumstances for workers and the organization. The tensions outlined by Möhlmann display how the debate on AI and algorithmic-management practices has tended to oscillate between two poles of dystopian and utopian views of technology (Koukouvinou & Holmström, 2022).

This paper brings forward an affirmative critique that seeks to provide nuances to the dystopian and utopian views of the managerial practices involving AI-nudges. The paper draws on a problematization lens (Nyman et al., 2021) to examine the intellectual heritage and ideological roots of AI-nudges. This historical perspective allows us to ask: What are the assumptions that proponents are implicitly committed to when arguing for the benefits of AI-nudges.

The paper contributes to the growing research streams on how AI-human symbiosis reconfigures work and organizational practices (Koukouvinou & Holmström, 2022). The literature of algorithmic control has often commented on the resemblance between AI-nudges and concepts from Taylorist scientific management (e.g. Altenried, 2022; Jarrahi et al., 2021; Kellogg et al., 2020; Wang et al., 2020). However, as this current paper shows, managerial practices using AI-nudges also share significant ideological and intellectual lineages with other subsequent managerial paradigms, which oppose the principles of scientific management.
Informed by genealogical accounts of the evolution of managerial thought, this paper analyzes seminal texts related to the discourse of AI-nudges. Through this work, the paper traces the differences and similarities between the discourse of AI-nudges and the four managerial paradigms that have dominated managerial thinking in the twentieth century; that is, scientific management, human relations, systems rationalism, as well as organizational culture and quality (Barley and Kunda, 1992).

From this analysis of the intellectual and ideological linages of AI-nudges, this paper articulates three assumptions that proponents of AI-nudges implicitly commit. These assumptions are formulated as questions that managers must accept as points of departure for the assessment of the meaningfulness and ethical defendability of AI-nudges. These questions can be used by researchers and managers to undertake a critical evaluation of how and when to promote or discourage the use of AI-nudges.

2. BACKGROUND

Thaler and Sunstein (2009) first coined the term ‘nudge’ to describe how public and private institutions could adopt methods and theoretical insight from behavioral economics as an alternative to traditional regulatory approaches. They illustrated this alternative by detailing how even mundane choices such as the organization of a buffet in a canteen can influence what people eat. Thus, if you want people to eat healthier, you do not need to ban unhealthy food or incentivize healthy eating, you could simply start by placing the salad first in the buffet. According to Thaler and Sunstein, the canteen case illustrates that when authorities (public or private) pay attention to how environments shape decisions and actions, they can “influence people’s behavior”, while they simultaneously “maintain or increase freedom of choice” (ibid. p. 5).

Soon after the publication of Nudge, the concept started to gain traction among managerial scholars and practitioners. Google was one of the early firms to explore how to adopt nudging as a managerial strategy. In his account of Google’s innovative HR practices, Google’s former head of people operations, Lazlo Bock (2015), detailed how Google used nudges to promote healthy life-style choices for their employees, and improve security protocols and onboarding processes.

Since Google’s early nudge experiments, the digital transformation of work and technological advances has widened the potential scope and efficiency of managerial nudges. Mele et al. (2021) describe how wearables, machine learning platforms and conversational agents allow for the incorporation of real-time data and dynamic personalized predictions and recommendations into the design of a nudge. In their influential review of algorithmic management practices, Kellogg et al. (2020) draw on the concept of nudging to characterize the form of managerial control exercised when organizations use AI methods to prompt the workers with targeted recommendations. Following a general tendency in the literature on algorithmic management practices and algorithmic control (e.g. Gal et al., 2020, Möhlmann, et al., 2021), Kellogg et al. (2020) use the concept of nudging to highlight the ethical and tensions concerns introduced by controlling workers with algorithmic recommendation systems.
Despite the criticisms, as McKinsey’s article indicates, the concept of nudging continues to serve as inspiration for the development of a wide range algorithmic recommendation systems in the workplace. According to Wajcman (2019) and Zuboff (2019) nudge theory has provided the overarching ideology to promote and legitimate algorithmic recommendation systems and the novel form of control that these systems afford. The critical aim of this paper is to articulate the assumptions that are being made when using nudge theory to promote and legitimate the use of algorithmic recommendation systems to control workers.

3. Methodology

3.1 Towards an affirmative critique of AI-nudges

Critical research that challenges prevailing assumptions in the development, use and impact of digital technology has emerged as an important research agenda in the IS community (Myers & Klein, 2011; Rowe, 2018). We have learned from an extensive body of IS research that discourse plays a central role in the diffusion of emerging technologies because it provides a common sense understanding for the emerging technology’s reason d’entre and legitimizes the deployment of the technology (Swanson and Ramiller, 1997). This paper uses the problematization lens as a critical IS research strategy to challenge the prevailing assumptions underpinning the use of AI-nudges in the workplace.

The problematization lens has been developed from Michel Foucault’s analytical strategies, particularly his genealogical method (see Nyman et al., 2021 for an elaborate introduction to the problematizations lens). From the works of Foucault (1984; 1990), we learn that when we engage with technology, we implicitly commit to certain historical contingent assumptions concerning our philosophical worldviews. Consequently, when we promote and use a given technology, we inevitably commit to certain assumptions of: 1) what we can and cannot know, 2) what we believe constitutes legitimate and praiseworthy modes for governing (or managing) others, and 3) how we assume ourselves and others to be moral subjects. This paper aims to shed light on the discursive assumptions that inevitably are made when promoting and using AI-nudges.

Similar to other lines of critical IS research, the problematization lens has an emancipatory aspiration (Myers and Klein, 2011). However, its critical aim is not to challenge the status quo of technological applications and unmask its harmful consequences. Instead the critical aim is of the problematization lens affirmative. It does not aim to provide answers and solutions but rather aims to redescribe and ask new questions. Paraphrasing Foucault (2008), this paper does not aim to say, “look how oppressive AI-nudges is,” but instead it aims to bring to light the conditions that had to be met for a discourse on AI-nudges to be possible. Drawing inspiration from Foucault’s analytical approach, this paper articulates the conditions that one needs to commit oneself to for the use of AI-nudges to constitute a meaningful and acceptable managerial practice.

As outlined in the introduction, the debate on AI and AI-nudges have tended to oscillate between two poles of a dystopian and utopian view of the impact of algorithmic recommending systems.
It is hoped that by engaging in an affirmative form of critique, we may be able to recognize the challenges of AI-nudges while maintaining that the fact that since a discourse on AI-nudges continue to prevail suggests that the concept has its merits.

3.2 Scoping the concept of inquiry
Before further detailing the analytical strategy of the paper, a brief remark on its empirical scope. Thaler and Sunstein’s original work defines nudging broadly stating the term refer to: “any aspect of choice architecture that alter people’s behavior in a predictable way without forbidding any options or significantly changing their economic incentives” (2009, p. 6, emphasis added). Notably, this broad definition has allowed the concept of nudging to be applied to a wide range of context and purposes. In this paper, we are interested in nudge theory only in so far as nudge theory is being used to support the development and implementation of AI based systems in the workplace with the specific aim to steer workers behavior using target recommendations (Kellogg et al., 2020). Similar to nudging, the concept of AI is rather broad. According Berente et al. (2021): “AI is not a single, discernable thing” nor set of technologies” but a concept that is used in public and academic discourse to describe the “frontier of computational advance” (p. 1435). Consequently, we approach AI-nudges not as a single technology or set of technologies but as a discourse that is used to promote and legitimize the use AI based software, with the aspiration of steering workers behavior but without using rewards or sanctions. As such, the paper’s empirical concern is the discursive logic that underpins managerial control practices that involve the use of computational techniques to prompt workers with targeted recommendations.

3.3. Strategies for training the analysis
The paper elicits the assumptions embedded in the discourse of AI-nudges through in-depth readings of seminal- and key texts related to AI-nudges (as advocated by Alvesson and Sandberg, 2011). By the nature of the analytical approach, the selection of texts is eclectic (Koopman, 2019). The texts have been selected for their ability to display the discourse of AI-nudges. They have been identified by looking at references in existing research (particularly commentaries and review articles), blog posts and Wikipedia. In addition, texts have been identified from teaching activities and informal talks with colleagues. The body of seminal texts that are chosen for analysis includes Thaler and Sunstein’s original works (2003; 2009), texts introducing nudging into the managerial and digital domain (e.g., Bock, 2015; Möhlmann, 2021), as well as literature reviews and commentaries discussing AI-nudges and its related concepts (e.g. Kellogg et al., 2020; Mele et al., 2021).

The texts have been read repeatedly. Informed by the problematization lens, the paper asks, according to the discourse on AI-nudges: 1) what kind of knowledge is required for AI-nudges to be possible? And, what kind of knowledge does AI-nudges implies a skepticism towards? 2) When is AI-nudges a praiseworthy and legitimate form of control? And, when is it not? 3) What notion of human kind underpins AI-nudges? (see Hacking, 2007, for an elaboration on the concept of human kind)?
Unraveling the assumptions that have shaped our theoretical imagination and our theoretical reasoning requires critical reflection (Rowe, 2018). Commentators such as Land (2010) and Stahl (2011) encourage us mobilize historical knowledge to cultivate our capacity for critical reflection. Taking inspiration from the historical orientation in Foucault’s work, we used a historical perspective to map the assumptions of AI-nudges. Thus, our analytical work has been supported by records of the history of behavioral economics and nudge theory (e.g., Bruni & Sugden, 2009; Thaler, 2016). Moreover, as we are interested in the use of AI-nudges for managerial purposes, the analytical work has been guided by modern classics that conceptualize the evolution of managerial thought (Barley & Kunda, 1992; Boltanski & Chiapello, 2018; Zuboff, 1988) as well as recent genealogical investigations of workplace datafication (Moore, 2018).

Building upon these works, the next section analyzes similarities and differences in the discourse of AI-nudges with past linages of managerial thinking to elicits its assumptions.

4.1 HISTORICAL LINAGES OF AI-NUDGES

Drawing upon Barley and Kunda’s (1992) analysis of the evolution of managerial thinking, Moore (2018) shows how this shift in managerial discourse merges the assumptions and persuasions of several periods in the history of management. Using Barley and Kunda (1992) as a guiding structure, the following section details how managerial practices involving the use of AI-nudges shares significant ideological and intellectual lineages with the four managerial paradigms that have dominated managerial thinking in the twentieth century.

4.1.1 Scientific management Commentators often compare algorithmic management practices to the managerial thinking of Taylorism and scientific management that proliferated in the early-twentieth century (e.g. Altenried, 2022; Jarrahi et al., 2021; Kellogg et al., 2020; Wang et al., 2020). As a form of algorithmic management, managerial practices using AI-nudges shares an interest in using technological advancements to measure and modulate worker’s behavior with the pioneers of scientific management. The founding father of scientific management, Frederic Taylor, argued that managerial analysis of work processes was needed because workers could not both observe their work and operate the machine simultaneously (Taylor, 1911). Therefore, workers needed managers to teach them how to carry out their work in the best possible way. AI-nudges enters today’s workplace with a similar conviction. For instance the McKinsey article, featured in the introduction, states:

Complex performance management systems with numerous metrics make it difficult for workers and their managers to identify and focus on the issues that matter most. (Amar et al., 2022)

According to the discourse of AI-nudges, modern work has become so complicated that humans need machines to assist them in figuring out how they should carry out their work. To guide workers on how to carry out their work efficiently, the human engineer in scientific management and today’s algorithmic management practices both relies on codifications of work. Zuboff (1988) describes how scientific management was driven by a vision of truth, placing the managerial
function on a footing of objectivity. This vision was made possible by technology. In scientific management, stopwatches and cameras allowed a transfer of workers’ implicit knowledge to systematic list, flowcharts, and measurements.

Similarly, the application of nudge theory in the managerial domain implies a systemization of implicit knowledge. For instance, nudging design frameworks (e.g. OECD, 2019) specify that the first step for developing a nudge is defining measurable behaviors that lead to attractive outcomes. When nudge theory is combined with AI, managers use sensors and computational technology to transfer knowledge from a lived work environment into data, detailing behaviors leading to attractive outcomes for the organization (Kellog et al., 2020).

However, an important difference between the discourse of AI-nudges and scientific management is their different visions for how these codifications should be used. Whereas the codifications of work are used to develop more fair pay schemes in scientific management, managerial practices involving AI-nudges aims to steer the workers’ behavior by re-configuring the environment in which the decisions are made. The difference can be ascribed to contrasting understandings of what constitutes human nature. Taylor experienced great resistance from workers in implementing the changes that he invented to optimize work processes. He observed how the traditional piece-rating systems of his time involved “a permanent antagonism between employers, and a certainty of punishment for each workman who reaches a high rate of efficiency” (cited in Rudin, 1972, p. 76). Influenced by his training as an engineer, Taylor viewed workers as calculative actors with instrumental orientations to work. According to this logic, managers can only overcome the workers’ resistance to technological change if the interests of workers and managers are aligned.

4.1.2 Human relations At Taylor’s contemporary, new advanced reward systems did not vanquish workers resistance (Kunda & Barly, 1992). In the 1920s, the rational view of human nature came into question. Elton Mayo raised one of the most influential critiques based on his iconic Hawthorne studies. From observing anomalies in attempts to rationalize work processes, Mayo (1935) concluded that social dynamics is a chief determinant of industrial outputs. Thus, “if explicit attention is not given to this informal organization, the plans of management will miscarry” (ibid. p. 214). The Hawthorne studies were part of a greater shift in managerial thinking. They became the example per excellence in the human relations movement. They illustrated why managerial attention should be geared towards influencing the social dynamics of workplace (Barley & Kunda, 1992).

The discourse of AI-nudges rehashes Mayo’s critique of the rational view of human kind. The academic discipline of behavioral economics, which nudge theory is based upon, emerged from researchers observing a series of anomalies in individual decision-making processes, firm behaviors, and market prices (Thaler, 2016). These researchers argued that the anomalies question the fundamental assumptions of the rational view of human kind that underpins classical economic thinking. According to nudge theory, the rational view of human kind is limited because it fails to recognize how the worker’s behavior is not only influenced by economic incentives but also by social norms, emotions and so on.
Translated into the debate of algorithmic control, nudge theory implies skepticism towards practices involving ratings, rewards and monitoring of employees (Cram and Wiener, 2020), which find their legitimization in the rational view of human kind. In contrast, control practices, using AI-nudges, positions software based on AI methods “to play a collaborative role” (Winikoff, 2020), indicating that the view of human nature assumed in discourse of AI-nudges aligns closer with Mayo than Taylor.

4.1.3 Systems rationalism Despite Mayo’s and the behavioral economists’ critiques, the rational view on human kind continued to influence some trajectories of managerial thinking. In the early-1950s, the rational view of human nature started to proliferate once again as a diverse group of intellectuals and managerial thinkers started to revitalize ideas from scientific management. Barley and Kunda (1992) refer to this shift in managerial thinking as systems rationalism. The notion describes a broad group of thinkers—spanning from cybernetics, operations research, and management science. Proponents of system rationalism adopted metaphors from the emerging technology of computers to envision organizations as systems which managers are able to control by manipulating its structures. Workers were conceived as programmable entities and the manager’s job was to ensure that the workers were “programmed” to work in ways that contributed to the organization’s overall goals.

Peter Drucker is one of the influential representatives of systems rationalisms. He observed how manufacturing work was increasingly being automated and how work in general became more knowledge intensive. According to Drucker (1954), the rising complexity of work generated new demands for workers to engage in the coordination of work and become self-controlling—or as he later framed it, self-managing. To be self-managing require that workers are awarded certain degrees of autonomy over their work (Drucker, 1999). For a self-managing work workforce to be effective, Drucker (1954) argued that workers need to clearly understand the organizational goals and that workers should be measured based on their contributions to these specified goals. He labelled this idea management by objectives (MBO). In many ways, MBO can be understood as an abstracted version of Taylor’s piecemeal system. MBO follows Taylor’s ambition of aligning interests between workers and the organization. However, instead of specific measurements of concrete work tasks, MBO holds workers accountable for the overall outcome by measuring contributions and performance on an abstract level. This abstraction grants workers autonomy because it is now up to the workers rather than the managers to decide how to perform their work as it decentralizes decision making and managerial authority (Boltanski & Chiapello, 2018).

When platforms and firms use algorithmic ratings to control workers, they draw a direct linage to MBO. Cast as an alternative to algorithmic distributed ratings, rewards and sanctions, the paper argues that the discourse AI-nudges is committed to a different logic of control than MBO. Moreover, the discourse of AI-nudges also differs from MBO in its similarity to Taylorism, due to the attention given to the worker’s specific behaviors over abstracted measures of contribution. Bruni and Sugden (2009) have argued that we can view the project of behavioral economics as the attempt to reverse the shift in economic thinking towards abstract, mathematical, and theoretical modelling. Their analysis suggests that we may view practices involving AI-nudges as representing a reversal of decentralized decision-making starting with systems rationalism.
Yet, the reversal is not a complete return to Taylorism. An integrated element of nudge theory is an insistence on the possibility that organizations can shape behavior in a paternalistic way without limiting individual autonomy. Prior to publishing *Nudge*, Thaler and Sunstein (2003) presented this idea in a conference paper titled: *Libertarian Paternalism Is Not An Oxymoron*. In this paper, they argue that libertarianism and paternalism are often thought of as juxtapositions in the sense that *libertarianism* is the freedom to choose and *paternalism* is limiting the freedom and autonomy of the choice. However, citing research from behavioral economics, Thaler and Sunstein argue that this juxtaposition is not necessarily the case. Thaler and Sunstein (2003; 2009) elaborate on two principles for these juxtapositions to be possible. First, the intervention (i.e., the nudge) “will make choosers better off, *as judged by themselves*” and the intervention “must be easy and cheap to avoid” (2009: pp. 5-6). When Google first introduced nudging to the managerial domain, they celebrated the concept’s ability handle the inherent tension in knowledge work between the need to steer workers and preserve their autonomy. “The goal is not to supplant decision-making, but to replace […] poorly designed structured […] without limiting freedom (Bock, 2015, p. 292). As such, we argue that the appraisal of nudge theory in the managerial domain derives from the nudging’s ability to offer an alternative strategy for managing self-managing workers.

The principles of libertarian paternalism inherent to the concept of nudging have been extensively contested in the debate on the ethics of nudging. Critics characterize nudges as manipulative while its proponents continue to defend nudging by referring to the principles of libertarian paternalism as guidelines for ethical nudges. According to this defense: if a nudge is manipulative in the sense that it is exploitive or overrule people possibility to choose, then it does not live up to the principles of libertarian paternalism and thus by definition is not a nudge (for details on this argument, see Wilkinson, 2013).

However, when we enter the arena of the workplace, the question of what makes people better off takes a different tone. If we understand the project of scientific management and systems rationalism as exercises in aligning workers’ and organizational interests, then the question for an ethical, non-manipulative use if nudge theory becomes: how is a managerial intervention in the interests of the workers? Proponents of AI-nudges may argue that they should only be used in situations where the interests between organizations and workers are aligned. This logic of argumentation mobilizes managerial ideas stemming from the wave of managerial thinking that replaced systems rationalism.

**4.1.4 Organizational culture and quality** From around the 1970s, managerial discourse started to shift. Endeavors to rationalize organizational processes started to be conceived as creating inhumane machines. Control mechanisms such as MBO were critiqued for being too static and unable to deliver the required flexibility called for by rapid technological developments and waves of outsourcing (Boltanski & Chiapello, 2018). This led managerial thinkers to re-explore ideas from human relations. Firms started to intentionally engineer corporate culture as a mean to ensure the worker’s full commitment, offering elaborate scripts for the cognitive and emotional life of the employee (Barley & Kunda, 1992). This period continued the trajectory of decentralizing managerial authority because these elaborate scripts freed workers from the bureaucratic snares
of MBO. Rather than crafting structures, the managers were told to become coaches and leaders. The managerial job description included tasks such as helping workers to discover their full potential and formulate inspiring visions, ensuring the worker’s commitment without recourse to compulsion (Boltanski & Chiapello, 2018).

Portrayed as a tailored coaching experience (Amar et al., 2022), the discourse of AI-nudges owes to this period of managerial thinking the idea that the worker’s full commitment could be guaranteed, even in situations where there is no direct financial incentive. According to nudge theory, the roots of many organizational problems is not a lack of motivation, but because environmental and contextual conditions prevent workers from working optimally. For instance, Dan and Chip Heath (2010) argue that corporate change programs often fail because they neglect that “what looks like a people problem is in fact a situation problem” (p. 183). The discourse of AI-nudges, embody this logic. One example nudging inspired software Microsoft MyAnalytics, described as:

An emerging class of intelligent tools […] that aims to help knowledge workers make better-informed decisions around their productivity and work-life balance. (Winikoff et al., 2020)

The idea that managerial technology can work as a helping hand only makes sense when assuming that an organization already have a dedicated workforce interested in improving their productivity. As such, if AI-nudges should not be deemed manipulative, their use rests upon the presumption that some sort of alignment of interests has already taken place, justifying that a change of behavior can be both in the interest of the worker and in the interest of the organization.

4.2 DISCURSIVE COMMITMENTS OF AI-NUDGES

According to Barley and Kunda (1992) managerial thinking have developed in waves alternating between rational (scientific management and systems rationalism) and normative (Human relations and organizational culture) managerial discourses. Next, we use the three analytical questions introduced in section 3.3 to summarize the findings and show how the discourse of AI-nudges transcends the historical established dichotomy between rational and normative managerial discourse.

First, we have seen that AI-nudges, similar to scientific management, assumes that workers’ implicit knowledge can be codified. Second, whereas scientific management utilize codifications of work to design better incentive structures, the discourse of AI-nudges position itself as an alternative to managerial control practices involving formal mechanisms of algorithmic control. Similar to Organizational culture and quality the discourse of AI-nudges portray managers and AI-based software as coaches. Thus, assuming that the worker’s full commitment can be guaranteed, even in situations where there is no direct financial incentive. Third, the difference between formal forms of algorithmic control and AI-nudges, derives from two competing views of what constitutes human nature. Whereas system rationalism assumes organizational problems is rooted in a conflict of interest between workers and managers due to its rational view on human
nature, the discourse of AI-nudges, aligns closer with the view of human relations and Organizational culture and quality. Similar to these paradigms, AI-nudges expand the area of managers attention to social and structural dynamics of the workplace. The summarization suggests that the discourse of AI-nudges merge ideas from seemingly competing linages of managerial discourse in paradoxical ways.

5. DISCUSSION: PLACING A PRICE TAG ON AI-NUDGES

Informed by genealogical accounts of the evolution of managerial thought, the paper has provided an analysis of the some of the conditions that had to be met for a discourse on AI-nudges to be possible. This analytical work does not predicate whether we should accept or reject AI in the workplace. It merely allows us to elucidate the assumptions that we commit to when using AI-nudges for managerial purposes. Metaphorically, we can describe the aspiration of this form of critique as stating ‘the price paid’ controlling workers using AI-nudges (Nyman et al., 2021). The paper concludes by presenting three ‘price tags’ on AI-nudges and discusses how critiques of AI-driven nudges can be understood as an unwillingness to pay this price.

5.1 Are you willing to codify behavior?
In their literature review on algorithmic aversion, Burton, Stein and Jensen notice that “a significant proportion of existing research that addresses algorithm aversion and augmented decision making has uncritically adopted the view of the heuristics-and-biases program” (2019, p. 226). The authors argue that this has restricted the development of AI-decision aid systems from including other views of human decision-making such as the notion of ecological rationality advocated for by for example Gigerenzer.

Gigerenzer has been one of the central critical commentators of nudge theory. His work questions the assumption of nudge theory that complex computational models outperform the human capacity to make accurate inferences outside of the experimental designs (Goldstein & Gigerenzer, 2002). Moreover, he cautions that nudging “requires a technocracy of experts” (Gigerenzer, 2015, p. 366). Thus, for AI-nudges to be possible, we must assume that technical experts can in fact effectively codify behaviors for how work should be done. Even though computational components arguably allow managers to partly outsource the work involved with systemizing implicit knowledge to technology, AI methods continues to depend on a human writing the first lines of code. As pointed out in the analysis, the discourse of AI-nudges shares the assumption that codifications of work are possible with scientific management. Hence, AI-nudges can be cast as a reversal of the trajectory towards decentralizing managerial authority that have been dominating managerial thinking since the 1950s.

This reversal is not unproblematic. We may read the growing literature on algorithmic aversion as resistance towards the codification of workers behavior. Faraj et al. (2018) express this concern of codification when describing organizational practices using AI methods as reductionist. Increasingly, we have come to understand that codifications are never perfect since biased training
data may lead to discriminatory models and false recommendations (O’Neil, 2016). On that backdrop, the opacity of AI is highlighted as one of the key concerns for algorithmic management practices (Berente et al., 2021; Lebovitz et al., 2022). We can understand the scepticism towards the opacity of algorithms in the context of work as a violation of our conception that it is workers, not managers who are capable of knowing how work should be planned and carried out. In that light, the problem of the opacity makes it impossible for workers to follow the logic and rationale of the nudge. Hence, since practices involving AI-nudges inevitably implies that a human manager needs to provide some form of input to the machine, we can view scepticism towards AI-nudges as directed towards limitations in managers’ ability to codify behaviors and procedures.

5.2 Are you willing to preserve workers’ autonomy

Somewhat paradoxically, in the discourse of AI-nudges, the trajectory towards decentralizing managerial authority is never fully reversed. According to the principles of libertarian paternalism, to count as a nudge, workers need to be given the opportunity to opt-out of the nudge. Hence, managerial practices using AI-nudges are positioned as an alternative to practices using AI to restrict information and behaviors of workers. For instance, this happens when platforms use AI methods to narrow available jobs or when organizations create artificial limitations for the available time to conduct a given task (Kellogg et al., 2020). Since nudges do not forbid or mandate actions, practices involving AI-nudges commits to a different set of managerial norms then controlling workers with algorithmic restrictions. As suggested in the analysis, one way to read the emphasis of autonomy in the discourse of AI-nudges relates to the managerial norms of a self-managing workforce.

However, it is not so that the use of AI-nudges are the only form of algorithmic control affording the autonomy that self-managing practices require. In the analysis, we further described how algorithmic rating practices draw inspiration from system rationalism. Algorithmic rating practices relies grant workers autonomy by rewarding workers based on abstract measurements of contribution rather than specific actions. Nevertheless, rating practices have also been a contested form of control (e.g. O’neil, 2016). With its image of AI as a coaching tool (Amar et al., 2022), the discourse of AI-nudges aligns to the critique of rating practices being too static to deliver organizational flexibility; originally presented in the discourse of organizational culture and quality. An important take-away of differentiating managerial practices involving AI-nudges from algorithmic control through restrictions and ratings is that the concerns of these practices are not identical. Kellogg et al. (2020) caution that when organizations follow Taylor’s principles, breaking down jobs into ‘micro’ tasks and then use AI methods to restrict, sanction and reward workers, the consequences are likely a shift towards more precarious job roles. Since nudging per definition never involves the use of sanctions and rewards, the use of AI-nudges does not directly contribute to the shift towards more precarious work conditions. Rather the concerns of AI-nudges center around a question of whose interest the nudge nurtures.
5.3 Are you willing to accept that there is no conflict of interest?

As described in the analysis, the central problem for managerial thinking in the twentieth century has been how to ensure a dedicated workforce. According to scientific management and systems rationalism, a lack of alignment between workers’ and the organizations’ interests is the key driver for organizational problems. According to human relations and organizational culture and quality, organizational problems arise when workers are not aligned with organizational community, goals and values. However, according to nudge theory, the alignment interests and organizational goals and values is not enough. Viewed through the lens of behavioral economics, organizational problems are argued to be rooted in a misaligned context. Workers need nudges, not because incentives are not aligned nor because they are not aligned with organizational goals and values. Instead workers need nudges because the context in some way or the other prevents them from acting in ways that aligns with their own and the organization’s interest.

From the analysis, we learn that the assumption that workers’ and organizations’ interests are aligned is contestable. When we today accept that there is no inherent conflict between workers and organizations, this is to a large extend the product of the shift in managerial discourse taking place under discourse of organizational culture and quality. However, as demonstrated by a long tradition of critical work this rendering commits to a neoliberal ideology, hiding the often exploitive nature of contemporary capitalism (e.g. Boltanski & Chiapello, 2018). Following a similar argumentation, recent investigations of algorithmic management practices show that AI-nudges do not always promote the interest of workers. One example is Altenried (2022), noticing that when the parcel deliver firm UPS’s started to use AI to nudge drivers work more effectively, it led to an intensification of their work. The paper suggests that Altenried’s critique can be conceptualized as a concern for the lack of alignment of interest between workers and the organization.

6. Concluding Remarks

The paper has taken a discursive view to provide an affirmative critique of managerial practices involving the use of AI-nudges. Importantly, this discursive view does not consider how AI-nudges are being used and resisted. Rather it is an examination of the ideology underpinning its use (see Nyman et al. for an elaboration of the analytical limitations of the problematization lens). The paper has examined the intellectual heritage and ideological roots of AI-nudges. This work contributes to the literature on algorithmic control by showing how managerial practices involving AI-nudges transcends the historical established dichotomy between rational and normative control. Consequently, when examining algorithmic management practices, researchers must be careful not to reduce these practices to a simple form of digital Taylorism.

Developed from the historical examination, the paper presents some of the assumptions that the use of AI-nudges implies. These assumptions may offer a starting point for future research. For instance, future research may examine how the tensions between codification, autonomy and alignments of interest are handled in meetings between human workers and managerial recommending machines. The paper presents the identified assumptions as three questions which
can help managers better decide if AI-nudges are relevant to their practice. The three questions can be seen as price tags in the sense that they help managers understand the tacit assumptions that they must be willing to accept for AI-nudges to constitute a meaningful and acceptable control technology. Managers need to be aware of these assumptions since unwillingness to commit to them foreshadow the inherent concerns related to the use of AI-nudges.
7. BIBLIOGRAPHY


CONCLUSION
EMPOWERED, BUT DIVIDED

With this dissertation, I throw down the gauntlet, challenging the IS community to expand our vocabulary of algorithmic management and control. A groundswell of scholarship has alerted us to the fact that advances in computational analytics technologies, as well as the wider tendencies of workplace datafication and digitalization, are offering managers and organizations unprecedented options for algorithmically managing and controlling the workforce (Kellogg et al., 2019; Benlian et al., 2022). Algorithmic control comes in many configurations. One is managerial practices that aspire to enhance the productivity of workers by using dashboards, algorithmically generated recommendations, and other forms of digital nudging.

Since most research on algorithmic management and control has predominantly focused on issues around the platform economy (Heinrich et al., 2022), uses of digital nudges to manage workers in traditional work arrangements have received relatively little public and scholarly attention. One telling example is UNI Global’s (2020) report on algorithmic management. The report highlights the dangers of recruiting algorithms and algorithms that automate managerial decisions such as work schedules and task allocation and algorithms used to measure and access performance. However, the report does not discuss issues of algorithmically generated recommendations, and other forms of digital nudging. Hence, this emerging class of digital technology continues to be difficult to grasp, appreciate, and contest. To quote Zuboff (2019, p. 61): “Taming … [the unprecedented] must begin with careful naming.”

Through the process of writing this dissertation, I have explored several options for describing efforts of managers and organizations to alter the conduct of workers using digital productivity nudges. In the research articles presented in this dissertation, I described my empirical interest as digital productivity assistants or AI-driven nudges before I finally coined the term algorithmic aspirational control (AAC), which accentuates how this particular algorithmic control practice blends instrumental/rational and value-oriented/normative forms of control.

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It is my hope that my work provides a better understanding of the assumptions and dilemmas emerging in AAC practices. This research agenda aligns with recent calls for more problematization oriented research that examine and question the fundamental assumptions of emerging technologies (e.g. Gkeredakis & Constantinides, 2019; Monterio et al. 2022; Rivard, 2014). The critical ethos of problematization oriented research draws direct linages to the works of Michel Foucault and his analytical approach of analyzing the process of problematization (described in Foucault, 1983/2001, 1984, 1984/1990; the linages between Foucault’s work and problematization research is described in Alvesson & Sandberg, 2011).

However, the analytical tactics, including the historical orientation, guiding Foucault’s work, have so far only received limited attention from IS scholars (see article 1 for further elaboration). When
I learned this, I immediately felt that history represented a missed opportunity for IS problematization oriented research (paraphrasing Land, 2010). Thus, I decided that my PhD project should involve efforts to develop an analytical strategy for conducting historically oriented problematization on information systems. As such I hope the work presented in this dissertation to make a dual contribution. First, a contribution to the literature on algorithmic management and control. Second, a methodological contribution that offers examples and guidance for how IS researchers can engage with archival material to map the assumptions conditioning the design and use of digital technologies.

Following of Foucault’s analytical approach, I began to explore the historical backdrop of AAC systems, and the practices in which they are embedded. This work has been anchored in two empirical focal points. First, I traced the origins of Microsoft’s MyAnalytics application, which is an emblematic example and a shaping force for the wide category of AAC systems and the broader discourse of workplace datafication. Second, I engaged with literature on nudge theory and the evolution of managerial thought to disclose the broader intellectual lineages of AAC systems.

Combining these two empirical focal points suggests that while scholars have commented on the resemblance between algorithmic management and the principles of scientific management (e.g. Altenried, 2022; Jarrahi et al., 2021; Kellogg et al., 2020), we must be careful to not reduce all algorithmic management practices into a form of digital Taylorism. As discussed in the third article, using digital technologies to nudge workers constitutes a form of control that is very different from using digital technologies to monitor or sanction workers. Similar to Taylorism, using digital technology to alter the conduct of workers via sanctions often implicitly assumes that organizational problems are rooted in a misalignment between workers’ interests and the employer’s interests. In contrast, AAC systems, assume that organizational problems are rooted in cognitive limitations of the human brain such as short attention spans and narrow bandwidth for digesting new information (Amar et al. 2022). Consequently, algorithmic recommendations and other forms of digital nudging can be established as a meaningful and effective way to manage workers because they can help workers overcome the biases that presumably prevent them from acting in rational ways that support both their own and their employer’s best interest.

Since AAC cannot be characterized as a form of digital Taylorism, the stakes of AAC are also different and do not align with workplace datafication that subjects workers to the constant surveillance of an “other.” Rather, this dissertation suggests that when accessing AAC systems, researchers, policy makers, societal actors (e.g. trade unions), and organizational decision makers should pay attention to how AAC systems are built on and enact a conundrum between empowerment and individualization.

The conundrum plays out in the following way: AAC systems promise to empower workers in that digital data and analytics technology can presumably provide irrational and biased workers with tools they can use to become better versions of themselves. However, due to human biases, it could be argued that organizations would be better off removing humans from the equation.
altogether. For instance, as work is becoming increasingly digitally mediated, it has become possible to inscribe action restrictions in work systems (Kellogg et al., 2020), which constitute a form of algorithmic control that is distinct from AAC. The German automobile manufacturer VW provides an example of imposing algorithmic control through restrictions, which is closely related to the MyAnalytics case. Addressing the problematics of collaborative overload (Cross et al., 2016), VW disabled employee access to email on their work phones outside of normal working hours (Jacobs, 2023). However, this approach to restricting actions came with its own challenges and made flexible work arrangements much more difficult (Jacobs, 2023). In contrast, MyAnalytics and AAC systems follow a different control pathway to address the problematics of collaborative overload. While the MyAnalytics application suggests and sometimes even automatically books focus hours, workers are granted autonomy over the schedule and can answer emails and conduct meetings whenever they wish.

The use of AAC systems aligns with the values of preserving the autonomy of workers, the importance of which has been firmly established over the last seventy years of managerial research. Proponents of AAC recognize that it is inherently difficult for a manager or a machine (or a combination thereof) to define and specify work tasks, particularly regarding knowledge-intensive work (Drucker, 1999). Notably, this suggests the formation of an ambiguous epistemological status of data analytics and the insights the technology can generate. Based on a humanmade algorithmic input, AAC systems forecast and recommend actions while (at least in principle) maintaining workers’ autonomy—workers are free to opt out at any time (recognizing the limitations of the ability of human managers or autonomous intelligent machines to effectively codify work). In order to manage the ambiguous epistemological status of data analytics, AAC systems place freedom and responsibility squarely on the shoulders of the individual worker.

Metaphorically, we may think of the conundrum of ACC as a bargain between workers and employers. Workers are given tools of empowerment but, in return, they must accept individual responsibility for handling the challenges of contemporary work life. It thus becomes worthwhile to consider how the proliferation of AAC systems may reinforce already existing tendencies toward individualization (Deleuze, 1992; Johnsen & Sørensen, 2015, Maravelias, 2007). As such, this analysis of AAC shines a light on an underrecognized dilemma of digital productivity nudges: while the system may work as intended—i.e., by helping workers navigate the paradoxical nature of fluid work arrangements—the deployment of the system simultaneously threatens to conceal systematic issues, exploitative employment relationships, and potential conflicts of interest between workers and their employers (Gregg, 2018; Moore, 2018; Wajcman, 2018).

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Importantly, I highlight this concern about individualization tendencies not to condemn AAC systems but to disclose the philosophical and ethical values that these systems enact. Returning once again to the works of Foucault (1980/1988, p. 12), the goal is not “to tell people what they should do … [but] to allow [emphasis added] for refusal, curiosity, and innovation.” I find this critical attitude to be fruitful, as it allows us to engage in a critical inquiry into an emerging technology that insists on remaining sensitive to the very things that made the technology relevant
in the first place. In the case of AAC systems, I find it important that we remember that an application like Microsoft’s MyAnalytics was built to address problems that people experienced and continue to experience, namely the fluid nature of work arrangements and a growing tendency of knowledge workers to feel strangled by too many emails and meetings. As such, MyAnalytics has become one among several possible answers to the daunting problematics of contemporary work life.

I hope that my work will encourage people to remain curious about what workplace datafication can offer and motivate them to entertain the idea that algorithmic control systems are not inherently bad. While my work gestures toward the risks of AAC systems, I also pursue a critical form that allows for the possibility that for some people in some contexts, designing systems that empower individual workers through dashboards and digital nudges might be suitable and praiseworthy. Thus, I wish to emphasize that in some contexts and according to some value standards, the individualized responsibility enacted by AAC systems is perfectly reasonable, fair, and acceptable. It might perhaps even be considered a good bargain.

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Remaining open to the possibility that AAC systems have something to offer is particularly important, considering the type of empirical material that my work is based on. This dissertation concerns itself with analyzing the schematics of AAC systems, disclosing common sense and theoretical imagination, and outlining the possibilities that we as researchers, organizational leaders, policy makers, etc., have to make sense of AAC. While I argue that AAC systems enact a particular form of individualization, I wish to emphasize that I do not make any claims regarding the actual use of AAC systems in situ. As argued in the articles, analyzing the process of problematization should be conceived of as complementary rather than substitutive for other critical forms. Thus, I hope my dissertation motivates future research examining how individualized worldviews shape specific organizational practices.

At the same time, I hope that my work will be conceived as complementary to the emerging body of scholarly caution about the risk of AAC systems overriding workers’ sense of well-being (Kellogg et al. 2020) and preventing them from pursuing personal outcomes (Gal et al., 2020) in that such systems configure work in a way that ultimately renders all aspects of life into capitalistic activities (Moore, 2018; Wajcman, 2018). According to Foucault, it is only by encountering specific alternatives to our current way of thinking that we become capable of “grasp[ing] the points where change is possible and desirable” (Foucault, 1984, p. 46) Building on Foucault’s approach, I posit that it is only by understanding that digital data can be used to address the challenges of contemporary work life in many ways, that it becomes possible to refuse current approaches and innovate new ones. To that end, the story of MyAnalytics indicates the contours of alternative pathways for future uses of digital data and algorithmic technology in the workplace.
Uncovering the linages and past configurations of AAC systems, this dissertation suggests that the informing capacity of information systems (detailed by Zuboff, 1988) could potentially be used by workers to voice concerns about excessive workloads and unrealistic productivity expectations. As such, my work allows us to ask a series of generative questions. For instance, as researchers engaged in critical examinations of information systems, we might ask ourselves: *What if* we refused to accept that the responsibility of navigating the challenges of contemporary work life should be placed on the shoulders of the individual worker? *What if* we approached technology-enabling aspirational algorithmic control with renewed curiosity and explored alternative use cases? *What if* researchers and entrepreneurs started building data analytics tools for workers and not their employers, thereby reconfiguring AAC systems to challenge the organization of work? However, since answering these questions is beyond the scope of my PhD project, these questions mark a place where one journey is concluded and a new journey has just begun.

Asking these questions led me to further explore alternative pathways for the use of digital data in the workplace. For instance, I came across the website Turkopticon which rebalances the information asymmetry inherent in digital gig work by allowing workers on the Amazon Mechanical Turk platform to review job requesters (Irani & Silberman, 2013). The project illustrates how algorithmic technology designed and used for purposes of control can be reconfigured to support workers’ goals. I learned about Turkopticon from Vera Khovanskaya and Phoebe Sengers (2019), who suggest that data analytics represents an underutilized resource for labor unions to advocate for the goals of workers.

However, drawing parallels to how American unionists in the 1940s mobilized techniques from scientific management to advocate for workers’ goals, Khovanskaya and Sengers also highlight that using digital data to advocate for workers’ goals comes with its own challenges. For instance, Khovanskaya and Sengers argue that data-driven advocacy for workers’ goals calls for reflection on how to ensure consensual and democratic data management. Along the same lines, a group of researchers developed an open source app called WeClock, which allows workers to collect data about their work using their phones and share it with their labor unions (Calacci, 2022). However, researchers involved in the development of WeClock observed that labor unions often lack the infrastructure for responsible and legally compliant data governance and the skills and capacity to analyze the data (Calacci, 2022).

I believe that these challenges offer interesting and relevant avenues for information systems research. In reviewing the landscape of IS research, Clarke and Davison (2020) found that our field tends to privilege the perspective of businesses while devoting less attention to the interests of customers, employees, society, and the environment. I hope that this dissertation, as well as my future work, can help us recognize alternative perspectives and thereby support efforts to think differently about the wider tendencies of workplace datafication and digitalization.
APPENDIX 1

APPENDIX 1: ELABORATION OF THE STRATEGY FOR RECRUITING SOURCE MATERIAL

In the table below, we elaborate on the strategy we used to recruit source material about the evolution of MyAnalytics.

<table>
<thead>
<tr>
<th>Source</th>
<th>Recruitment strategy</th>
<th>Number of documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factiva</td>
<td>We used two search strings to identify news articles mentioning MyAnalytics, Delve and VoloMetrix (period 1 January 2011-16 October 2020)</td>
<td>566 articles were identified. 126 articles were excluded as they were either duplicates of other articles, referred to another app called MyAnalytics, or used the verb “delve” without referring to the Delve app (search performed 16 October 2020 and 3 January 2021)</td>
</tr>
<tr>
<td></td>
<td>Search string 1: MyAnalytics OR “Microsoft Delve” OR VoloMetrix</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Search string 2: Delve. Results were limited to results for Microsoft Corporation (period 2014-2016)</td>
<td></td>
</tr>
<tr>
<td>Techcrunch</td>
<td>We used VoloMetrix’s profile on Techcrunch to collect background information about VoloMetrix and to identify news articles about VoloMetrix</td>
<td>52 articles were identified (accessed 16 October 2020)</td>
</tr>
<tr>
<td>Microsoft’s blog</td>
<td>We used Google to conduct a site-specific search on Microsoft’s blog sites (blog.microsoft.com; insights.microsoft.com; microsoft.com/en-us/itshowcase)</td>
<td>67 blogpost were identified. Out of these we excluded 41 posts as they used the verb “delve” without referring to the Delve app (search performed 16 and 19 October 2020)</td>
</tr>
<tr>
<td></td>
<td>We conducted the search with two search strings: Search string 1: MyAnalytics OR Delve Searchstring 2: MyAnalytics</td>
<td></td>
</tr>
<tr>
<td>Google patents</td>
<td>Search term: VoloMetrix</td>
<td>2 documents (search performed 30 October 2020)</td>
</tr>
<tr>
<td>The Wayback Machine.org &amp; Microsoft.com</td>
<td>We used the Wayback Machine search engine to access historic versions of the VoloMetrix, Delve, and MyAnalytics websites. We used the function “changes” to locate periods where the website changed We searched for the following URLs: <a href="http://www.Volometrix.com">www.Volometrix.com</a>; <a href="http://www.products.office.com/en-us/business/explore-office-delve">www.products.office.com/en-us/business/explore-office-delve</a>; <a href="http://www.products.office.com/en-us/business/myanalytics-personal-analytics">www.products.office.com/en-us/business/myanalytics-personal-analytics</a>; <a href="http://www.docs.microsoft.com/en-us/workplace-analytics/myanalytics/use/mya-elements">www.docs.microsoft.com/en-us/workplace-analytics/myanalytics/use/mya-elements</a> We downloaded the most recent version of websites related to MyAnalytics from Microsoft.com</td>
<td>12 different websites with additional subsites</td>
</tr>
<tr>
<td>Harvard Business Review articles featured on Fuller and Brahm’s LinkedIn profiles</td>
<td>We used the LinkedIn profiles of VoloMetrix’s founders, Ryan Fuller and Chris Brahm, to identify a number of Harvard Business Review articles authored or co-authored by employees of VoloMetrix and Microsoft</td>
<td>17 articles</td>
</tr>
</tbody>
</table>

Table 1: Overview of the strategy for recruiting source material

1 The appendix displays the analytical process related to the work on Microsoft MyAnalytics. The material displayed has previously been published as supplementary material for article 2. https://journals.sagepub.com/doi/full/10.1177/02683962231181602#supplementary-materials.
APPENDIX 2: DOCUMENTS SELECTED FOR IN-DEPTH ANALYSIS

In later stages of the analysis, we narrowed the focus to better immerse ourselves in the source material through repeated readings, as advocated by Braun and Clark (2006). We limited the original recruited body of material to include only articles that were authored by people involved in VoloMetrix and MyAnalytics, articles that included quotes from interviews on - or reviews of - the application, as well as company websites, official blogposts and patent applications. Below we share an overview of the material selected for in-depth analysis.

Company Websites


Patent Applications


Articles and Blogposts

Appendix


APPENDIX 3: CODEBOOK

To provide transparency into the analytical process and provide a possibility for readers to evaluate the coding process, the table below presents an overview of the final version of the codes we created to map the core problematics and commitments to the questions of knowledge, power and subjectivity. To indicate the type of material forming the code, the table is followed by all citations related to one of the codes concerning core problematics (take advantage of data) and code concerning the discursive commitments (Uses of data allow visibility into previously hidden aspects of work).

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core problematics: To what problems are Volometrix, Delve and MyAnalytics presented as a solution?</td>
<td></td>
</tr>
<tr>
<td>Take advantage of data</td>
<td>Commitment to the idea that HR functions and managers need to utilize the opportunities afforded by data. Failing to do so will harm the organization’s ability to stay competitive</td>
</tr>
<tr>
<td>Collaborative overload</td>
<td>Commitment to the idea that information technology has intensively increased collaborative activities over the last two decades. Yet, the amount of collaborative activities have now risen to a level that in many cases hurts employees’ productivity and well-being</td>
</tr>
<tr>
<td>The invisibility of (knowledge) work</td>
<td>Commitment to the idea that it is impossible to manage knowledge workers by walking around</td>
</tr>
<tr>
<td>New ways of working</td>
<td>Commitment to the idea that managers need to update their toolbox since digital collaboration tools bring profound changes to how people work</td>
</tr>
<tr>
<td>Habits and work patterns</td>
<td>Commitment to a narrative that digital collaboration produces a wide range of counterproductive habits</td>
</tr>
<tr>
<td>Commitments to the questions of knowledge: What are the epistemic rules implied by the use of DPA?</td>
<td></td>
</tr>
<tr>
<td>Uses of data allow visibility into previously hidden aspects of work</td>
<td>Commitment to the idea that digital data hold the capacity to render some of the previous opaque parts of work visible. Data is argued to function as signals of how work gets done. These signals provide a better understanding of work processes, and sometimes data reveal a more trustworthy picture of work activities.</td>
</tr>
<tr>
<td>Commitments to the questions of power: What types of normativity and patterns for normalization are implied by the use of DPA?</td>
<td></td>
</tr>
<tr>
<td>Uses of data as a tool to inform managers</td>
<td>Commitment to the idea that digital data can be used to inform managerial decision-making (NB: the material coded relates to managerial dashboards)</td>
</tr>
<tr>
<td>Uses of data as a tool to negotiate workloads</td>
<td>Commitment to the idea that digital data can be used to spark conversations about workloads</td>
</tr>
<tr>
<td>Uses of data as a learning tool</td>
<td>Commitment to the idea that digital data can be used to help the individual knowledge worker master the skills of focus and working smarter to improve work patterns</td>
</tr>
<tr>
<td>Uses of data require respect for privacy</td>
<td>Commitment to the idea that data should be collected and analyzed with respect to the individual knowledge worker’s right to privacy</td>
</tr>
<tr>
<td>Commitments to the questions of subjectivity: Which forms of the self are implied by the use of DPA?</td>
<td></td>
</tr>
<tr>
<td>Uses of data to enhance collective accountability</td>
<td>Commitment to the idea that digital data can be used to support cultural change within organizations by increasing collective accountability</td>
</tr>
<tr>
<td>Uses of data to support self-reformation</td>
<td>Commitment to the idea that digital data can be used by the individual knowledge worker to reform counterproductive electronic communication habits</td>
</tr>
</tbody>
</table>

Table iii: Final version of analytical codes

Citations Related to the Code “Take Advantage of Data”

Below we share all the quotations from the code titled “take advantage of data”:

“Enterprises are dealing with major disruptions in the way they work, with the proliferation of mobile devices, the explosion of data, a growing number of millennials in the workforce, and the ever-evolving landscape of threats to data security” (Schuster, 2016).
Ubiquitous digital data about human behavior has the power to reshape the workplace over the next few years for the better. As company-specific examples show, digital communication that’s seen as a burden may turn out to be a blessing for employees and organizations” (Nielsen, 2016).

This invisible revolution has only become possible because of technologies that didn’t exist a decade or so ago, such as massive cloud computing centers and recent discoveries in the field of artificial intelligence. But fundamentally, the problems it will solve are ones that humans have struggled with forever” (Linn, 2016).

While many existing network analysis models rely on surveying employees about who they interact with the most, new methodologies like analyzing anonymous email and calendar metadata are helping HR departments and researchers paint a more complete picture of a company’s network graph and influence” (Tso, 2017).

According to a release, the new analytics application helps sales leaders more clearly understand what is happening in the field and focus sales resources on the right customer opportunities without any additional data collection or activity tracking” (Close Up Entertainment, 2012a).

As CEO and founder Ryan Fuller explains, VoloMetrix doesn’t want to be a big brother type of application. The startup aims to replace the data gathering process that consultants often have to go through in order to help their clients (e.g., tons of interviews, surveys, etc.)” (Rao, 2012).

‘This kind of enterprise social analytics technology is a hot commodity right now as enterprises look for new ways to leverage these social connections for business,’ says Glenn O’Donnell, principal analyst, Infrastructure and Operations Professionals at Forrester Research” (Florentine, 2013).

‘They already see value in Facebook, LinkedIn, even Twitter’s proprietary algorithms that can see connections and then infer what people are interested in, can see how they’re connected with other folks, and make sense of your network,’ O’Donnell says” (Florentine, 2013).

‘There are all kinds of business questions you can answer that you couldn’t even ask before,’ said VoloMetrix CEO Ryan Fuller” (Parkhurst, 2013).

The market landscape is changing rapidly and new nimble competitors are popping up left-and-right. Your company’s continued success depends upon your ability not only to identify the next big opportunity, but to proactively evolve your organization to adapt to new realities and—above all—to execute ” (VoloMetrix, 2012).

CEO Ryan Fuller said, ‘Prior to this technology, managers could quantify results but not the actions that drove those results. VoloMetrix’s technology gives companies access to the most powerful data they own – their time – to objectively evaluate the connection between employee activities and performance. This is poised to revolutionize how we structure organizations, improve coordination, and promote employee engagement” (Close Up Entertainment, 2012b).

“Five or six years ago, companies realized that they were sitting on a wealth of data about their own employees” (Lam, 2015).

“People started to realize, ‘Wait a minute, there’s a lot of data in here that we’re not using. Some of it is wrong. It’s not very clean,’ says Josh Bersin, the founder of Bersin by Deloitte, an HR research and advisory arm of Deloitte. ‘But if we look at it like we look at customer data, we could probably make much better decisions about who to promote, where they should be in the company, what role they would be successful at’ ” (Lam, 2015).

“Since then, the people-analytics industry has emerged, with companies using algorithms and Big Data to recruit and assess employees” (Lam, 2015).

“By now, there are a handful of startups armed with software and surveys to measure a wide range of employee statistics. For analytics on employee engagement, there’s Culture Amp, BlackbookHR, and RoundPegg. Companies such as BetterWorks game-ify goals at work. Retailers and banks have developed models to predict which employees are on their way out of the company. One company, Sociometric, measures physical proximity between team members and crunches productivity numbers” (Lam, 2015).
“The typical approach is an annual engagement survey where employees are effectively asked, through various types of questions, to rate their own level of engagement. Assuming honest survey responses, this approach provides good input into the employee attitude side of the equation (for example, how engaged they perceive themselves to be), but, unfortunately it doesn’t do a good job of gathering objective data on just how engaged employees actually are (for example, discretionary effort). While knowing what employees think certainly has value, this data suffers from the same challenges of any other survey-based effort: it becomes dated quickly, there’s availability bias from respondents thinking of only recent events, and potentially gamed results — people telling you what they think you want to hear rather than what they really think” (Fuller, 2014a).

“Most advice about managing time focuses on individual actions. Coaches tell us to reassert control over our e-mail, be far more selective about which meetings we attend, and so on. Such recommendations are worthwhile, but executives often discover that their best intentions are overwhelmed by the demands and practices of their organization […] Some forward-thinking companies have taken a different approach entirely. They expect their leaders to treat time as a scarce resource and to invest it prudently. They bring as much discipline to their time budgets as to their capital budgets. These organizations have not only lowered their overhead expenses; they have liberated countless hours of previously unproductive time for executives and employees, fueling innovation and accelerating profitable growth […] Companies now have time-management tools that weren't available in the past” (Mankins, Brahm and Caimi, 2014: page 74 - page 76).

“Just as consumer self-quantification technologies empower individuals to make healthier decisions, data assembled by people analytics technologies allows both individual employees and entire enterprises to invest time more strategically and predict overall performance based on real-time data. While many enterprises already use big data technologies externally, the workplace of the future will apply these analytics internally” (Fuller, 2015).

“People’s fascination with their own data is seemingly insatiable. As emerging technologies empower individuals to make healthier daily decisions, people analytics and big data will help employees invest their time in ways that propel individual performance forward and drive business outcomes. In the future, the workplace will be the next frontier for self-performance technologies” (Fuller, 2015).

“To address this visibility problem, companies will sometimes conduct surveys or interview processes to manually gather data on employee activities and relationships to address similar things. The survey/interview approach of manually gathering data is labor intensive, expensive, results in low quality self-reported data, disrupts the culture and provides only a one-time Snapshot which is only marginally useful. More comprehensive analysis of the activities cannot be performed using manual processes while also providing timely results” (Fuller et al., 2016: page 1).

“VoloMetrix’s anonymous behavioral profiles improve workforce planning in ways that were not previously possible. Our metrics have been shown to predict attrition and various performance outcomes that dramatically affect employee engagement” (VoloMetrix, 2014).

Citations Related to the Code “Uses of data allow visibility into previously hidden aspects of work”

Below we share all the quotations from the code titled “Uses of data allow visibility into previously hidden aspects of work”

"Effective managers maintain large internal networks across their company. We measure the size of a person’s network based on the number of connections to other employees that they actively maintain. The primary algorithm we use to define a connection has both a frequency and intimacy threshold. Put more simply, in order to qualify as a connection, one must interact with another person at least twice per month in an email or meeting with five or fewer participants. This allows us to get a reasonably accurate view of the number of people an employee actually works with on a regular basis. We have consistently found that larger networks are correlated with a number of different positive business outcomes.” (Fuller and Nina Shikaloff, 2016)
"We can quantify actual time managers spent in one-on-one meetings with direct reports based on calendared meeting invitations. In the companies we analyzed, the average manager spent 30 minutes every 3 weeks with each of their employees.” (ibid.)

"In Office, we have billions and billions of data points. As our users interact with our products, they are signaling us. When I share a document with you, Brent, that's a signal. If I email -- if somebody sends me an email and I dwell seven or eight minutes on that email versus my typical minute or two, that's a signal. And all these signals and all the data, what we do with Office 365 is we treat them as the customers' data and customers' signals.” (CQ FD Disclosure, 2016)

"So, then what do we do? Now, we've got lots and lots, billions of endpoints of data and signals. Then, we bring in machine learning and AI techniques and natural language processing to give back to the end user or the customer unique insights. (New Vision, 2016)

Let me give you a couple examples. Let's say you're editing a document in Word. And you're preparing a report and then you think, "'Maybe I want to reuse a chart from a report I had seen somewhere in my work group.'" And you didn't quite remember who had shared this with you, but you want to reuse one of those charts. (ibid.)

So, what we have today as a feature now in Office 365 is called Word Tap. So you're literally one tap onto the ribbon and we use the AI technique to bring all the relevant documents that you've seen in the past that may be interesting to the content that you're writing now. And we auto-bring those things into your right pane. You can scroll in the right pane. You can tap on the chart that you see and, boom, it's in your Word document. And so, instead of going, leaving Word, going and doing a search, trying to filter your search, trying to remember who sent you that thing, the AI signals brings it back into Word.” (ibid.)

"Microsoft MyAnalytics is a personal productivity dashboard, and it’s awesome. In a demo this week, Microsoft reps showed me how the app watches "signals" during your day. The app uses machine learning to see that you’re typing up emails in Outlook during a meeting and that both you and that project manager in marketing attend the same meetings every day. It provides a quick snapshot of where you spend your time all week. For example, MyAnalytics lets you pick important people at your company (or outsiders who don’t even use Office) and track how often they respond to your emails and how long that takes. The dashboard looks like a set of gauges in your car. It’s a smart way to find out, really quickly but using real-time data, whether you’ve been sitting at meetings all week.” (Brandon, 2016)

"What Mr. Ostrum and the analytics team did wasn't a one-time dive into the numbers. It was part of a continuing process, a way of thinking that enabled them to change and adapt along with the business environment. The key is to listen to what data has to say — and develop the openness and interpretive skills to understand what it is telling us.” (Irwin, 2019)

"Seattle startup VoloMetrix has built a technology that anonymously scans employee's emails, instant messages and enterprise social networks to determine how people are spending their time while they're at work. The idea is that it will help companies find efficiencies and discover places to cut costs.” (Parkhurst, 2013)

"Often, the CEO is under pressure and turns to managers to figure out what's gone wrong. But when those managers say everything in their departments is going well, there hasn't been a way to test that, Fuller said. "Financial results are lagging indicators that reflect what (workers) actually did. By the time the financial metrics come out, it's usually too late," Fuller said.” (ibid.)

"Identify silos and hubs. VoloMetrix network maps show connections between people and teams so that you can identify collaboration hot spots and dead spots. This data can be used to better connect teams with important shared resources (for example, between corporate sales and marketing leads and their counterparts in the field) and identify teams that aren’t getting the support that they need.” (VoloMetrix 2012)

"VoloMetrix addresses these challenges by showing you and your teams exactly where time and energy is being allocated and provides transparency that enables you to better align resources around the most important priorities.” (ibid.)
"Diagnose the root causes of inefficiency. Quickly drill down on collaboration data to find the root causes—the internal groups and topics that are consuming the most of your teams’ resources.” (ibid.)

"Measure and manage the true cost of IT service delivery. Realizing that IT service costs to support the smallest internal business group are bigger than the costs for supporting the largest group? Want to have an early warning system that alerts you to significant IT issues? Need the right data to inform a more strategic re-alignment conversation? Feeling like your IT org is serving your vendors instead of them serving you? Inside the enterprise, this list of questions is just the beginning, and it’s always growing. But with VoloMetrix, you can quickly see whether your team is churning on deployment issues, determine if internal customers are seeing performance issues with a specific application, and understand the true IT service costs associated with supporting internal business groups as well as external vendors and partners.” (Ibid.)

"CEO Ryan Fuller said, "Prior to this technology, managers could quantify results but not the actions that drove those results. VoloMetrix's technology gives companies access to the most powerful data they own - their time -- to objectively evaluate the connection between employee activities and performance. This is poised to revolutionize how we structure organizations, improve coordination, and promote employee engagement.” (Close-up Media, 2014)

“Facing a fragmented and distracted workforce, many companies turn to corporate restructuring around key initiatives, such as Microsoft’s “One Microsoft,” which sought to create more streamlined teams. However, these decisions are often made with little hard data around how critical teams actually work together. Harnessing data on actual employee behaviors is an essential tool to inform corporate restructuring and empower employees to be more productive.” (Fuller, 2014a)

"1. Objectively evaluate the effectiveness of current policies. By synthesizing multiple strains of data, people analytics helps leaders understand how policies impact efficiency. For example, data may highlight that employees are spending almost no time collaborating, despite the fact that collaboration has been proven to promote innovation and increase worker satisfaction. Conversely, data could illuminate that employees are spending more than 25 percent of their time in meetings in which their presence is not crucial, helping leaders more strategically decide who attends which meetings.” (ibid.)

"While the potential of people analytics is indeed promising, it is not a panacea. Organizations are complex and dynamic entities that require thoughtful contemplation. To be truly impactful with people analytics, companies need to garner data and interpret it in context, taking into account changing market conditions or the learning curve associated with a new initiative. Additionally, companies that utilize people analytics should factor in a period of adoption, as people determine how to use the data and its specific value for their organization.” (ibid.)

"VoloMetrix software works by sourcing data from a company’s e-mail server, meeting calendars, instant messaging, and collaboration tools to determine what exactly employees or groups of employees are doing: How much time do they spend in meetings, and with whom do they meet? Who do they email most frequently? How strong are their internal networks? How fragmented is their work day?” (Romano, 2014)

"But that doesn't mean companies aren't going to try. On the Big Data front, the company VoloMetrix mines calendar and mailbox data to determine over a hundred predictive indicators. From those indicators, the company works with clients to determine how to solve a given problem, from determining what makes a great salesperson to how emails can be more efficient.

"There are several different types of clients who work with VoloMetrix," says Ryan Fuller, the company's CEO and co-founder. Fuller says that VoloMetrix's clients either have a specific issue they want to employ data mining to solve, or hire the company to look more generally at how to save time. "Once the people analytics data is available, firms can immediately begin making data-driven decisions to improve efficiency and performance,” says Fuller.
Some of the surprising results VoloMetrix has found from client datasets challenge conventional workplace wisdom. For example, for a client that wanted to know when the best time of the day was to have meetings, VoloMetrix looked at how disengaged employees were by seeing how many emails they were sending during meetings. At 9 a.m. meetings, roughly 8,500 emails were sent, while meetings at 6 p.m. were only slightly better at 7,000 emails. Meanwhile, employees in meetings between 10 a.m. to 2 p.m. didn't send very many emails—so the company rescheduled for the middle of the day.” (Lam, 2015)

"Assuming honest survey responses, this approach provides good input into the employee attitude side of the equation (for example, how engaged they perceive themselves to be), but, unfortunately it doesn’t do a good job of gathering objective data on just how engaged employees actually are (for example, discretionary effort). While knowing what employees think certainly has value, this data suffers from the same challenges of any other survey-based effort: it becomes dated quickly, there’s availability bias from respondents thinking of only recent events, and potentially gamed results — people telling you what they think you want to hear rather than what they really think.” (Fuller, 2014c)

"The amount of work that occurs outside of normal working hours (e.g., evenings and weekends). This is a good indicator of discretionary effort.

• The number of network connections and time spent with people outside of immediate team or region. Building of broad networks beyond core team is a sign of high engagement.

• The percentage of participation in ad-hoc meetings and initiatives vs. recurring meetings and processes. Participation in only highly structured events can be an indicator of low engagement.

• Time spent collaborating directly with customers outside of normal scope of work. This and other measures like it can indicate people are highly engaged enough to help their colleagues even though they might not get credit for it.” (ibid.)

"This approach allows you to measure actual engagement rather than self-perceived engagement. Further, you can deploy a number of additional metrics to understand what may actually be driving these engagement levels. Some metrics we have found to be valuable are.” (ibid.)

"While people analytics can be incredibly powerful for revealing patterns, I want to caution that it is not a panacea. In the end, effective management still requires the perspective of an experienced leader to ensure the data is viewed in context, taking into account factors like changing market conditions or the learning curve associated with a new initiative. In addition, companies that use people analytics should factor in a period of adoption, as people determine how they can best use the data and define the value of the analytics for their specific organization.” (Fuller, 2014b)

Managers in organizations often have limited visibility into what activities, time investments and other characteristics actually drive business results and are forced to make many decisions blindly or overly biased by a few anecdotes which may not represent what is actually happening. (Fuller, Grus, Nielsen, Crain, and Trandev, 2016)

"According to one embodiment of the present invention, in a method for deriving entities and metrics from collaboration data from a plurality of computing systems, collaboration data is extracted from sent mails and calendars at the plurality of computing systems of a plurality of collaborators.” (Ibid.)

In one aspect of the present invention, the following are configured: one or more activity entities for one or more collaboration activities corresponding to the sent mails and the calendars at the plurality of computing systems; one or more person entities corresponding to one or more persons involved in the one or more collaboration activities; and one or more group entities corresponding to the one or more persons involved in the one or more collaboration activities. (ibid.)
The most important assets to a business are its people. In 40 hours per week, each person makes decisions that collectively determine every company outcome. Yet, historically there has been no data-driven way to connect employee behavior to business outcome. (Volometrix, 2014)

"Data you can't get anywhere else. Learn how your organization actually works. Gain new metrics to connect the dots between employee activity and business results. Use new tools to drive organizational change for better results" (ibid.)

"Volometrix extracts and analyzes anonymized, aggregated header-level data from your corporate communication systems. Without compromising employee privacy, this data provides insight into the subject, timing, and format of collaboration, as well as an understanding of the role and geographic location of individuals involved. Together, People Analytics data provides a holistic map of your company's communication and collaboration behavior.” (ibid.)

“Because a large part of work today involves the sharing of information with colleagues, managers, and team members, the office graph helps unearths communication trends that help employees better understand individual and team collaboration. For example, the MyAnalytics dashboards offered in the E5 version of Office 365 provide employees with valuable insights that help employees identify who they collaborate with the most and how much time they are spending each week in email and meetings and with whom […] For example, your personal dashboard may reveal that you spent 6.5 hours last week working with a particular colleague and that person responded to your emails within 0.3 hours. This indicates you likely have a very strong rapport with this individual — they clearly value the relationship and are attentive to your questions or ideas. Moving forward, you might seek this person’s input a bit more often or else try to shift your communications to another team member to further enhance team collaboration and engagement. Let’s say your top 3 contacts are all in different departments like sales, marketing and engineering. That may indicate you are what Rob Cross refers to as a boundary spanner, your network acts as an important bridge to others in the company.”(Tso, 2017)
APPENDIX 4: TIMELINE

To provide transparency for how we engaged with the source material, we share an excerpt of the table we created to gain an overview of the evolution of MyAnalytics. In the table below, we divided the history of MyAnalytics into a number of epochs. The excerpt shows the final version of two epochs related to VoloMetrix, including information about key events, the design and the broader technical iterations of the application.

<table>
<thead>
<tr>
<th>Epoch</th>
<th>Events &amp; activities</th>
<th>Technological configurations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>VoloMetrix:</strong> 2011-fall 2013</td>
<td>VoloMetrix founded by Ryan Fuller and Chris Brahman (Rao, 2012)</td>
<td>A dashboard for managers that uses meta-data from email and calendar usage (Volometrix, 2011; 2012)</td>
</tr>
<tr>
<td>Launch and product development</td>
<td>Raised $1.6M from Shasta Ventures (Rao, 2012)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Introduction of a module specifically focused on sales organizations (Parkhurst, 2013)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Raised $3.3M from Shasta Ventures and Alliance of Angels (Parkhurst, 2013)</td>
<td></td>
</tr>
<tr>
<td><strong>VoloMetrix:</strong> Fall 2013-2015</td>
<td>Release of an update for the application, which includes three modules: organizational diagnostics, manager dashboards and personal dashboards (Information Management, 2013)</td>
<td>A dashboard for managers, employees and teams. The dashboard uses meta-data from email and calendar usage.</td>
</tr>
<tr>
<td>Growth and publich attention</td>
<td>Raised $12M from Split Rocket Partners and Shasta Ventures (Romano, 2014)</td>
<td>The dashboard for employees includes a feature that emails weekly updates from the dashboard to employees as well as a feature that allows employees to set goals and compare their data with benchmarks from the organization (Volometrix, 2011; 2012; Fuller, 2014b; Fuller et al., 2016)</td>
</tr>
<tr>
<td></td>
<td>Filed patent application (Professional Services Close Up, 2014; Fuller et al., 2016)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Data from VoloMetrix featured in published studies from Bain on time Management (Mankins, Brahman and Caimi, 2014)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fuller published an opinion piece connecting VoloMetrix to the quantified-self movement (Fuller, 2015)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Increased critical attention in the press on workplace tracking in general. In many articles VoloMetrix is used as a case example of workplace tracking (e.g. Johnston, 2015; Khazan, 2015; Lam, 2015; Silverman and Waller, 2015)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Microsoft acquires VoloMetrix (Rajesh Jha, 2015; Stewart, 2015)</td>
<td></td>
</tr>
</tbody>
</table>

Table ii: Excerpt from the overview of the evolution of MyAnalytics
<table>
<thead>
<tr>
<th>Titel</th>
<th>Afsnit</th>
<th>Forfatter</th>
<th>Beskrivelse</th>
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<tbody>
<tr>
<td>Internet-based Electronic Marketplaces and Supply Chain Management</td>
<td>1.</td>
<td>Martin Grieger</td>
<td>2004</td>
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<tr>
<td>LIKENESS</td>
<td>2.</td>
<td>Thomas Basbøll</td>
<td>2004</td>
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<tr>
<td>Organizing Consumer Innovation</td>
<td>4.</td>
<td>Lars Bo Jeppesen</td>
<td>2004</td>
</tr>
<tr>
<td>En empirisk investigation af kognitiv segmentation og effekter af integrering af en TM system i oversættelsesprocessen</td>
<td>5.</td>
<td>Barbara Dragsted</td>
<td>2004</td>
</tr>
<tr>
<td>Sociale partnerskaber</td>
<td>6.</td>
<td>Jeanet Hardis</td>
<td>2004</td>
</tr>
<tr>
<td>System Dynamics in Action</td>
<td>7.</td>
<td>Henriette Hallberg Thygesen</td>
<td>2004</td>
</tr>
<tr>
<td>Strategisk Økonomistyreting</td>
<td>8.</td>
<td>Carsten Mejer Plath</td>
<td>2004</td>
</tr>
<tr>
<td>Knowledge Management as Internal Corporate Venturing</td>
<td>9.</td>
<td>Annemette Kjærgaard</td>
<td>2004</td>
</tr>
<tr>
<td>De profesjonelle i endring</td>
<td>10.</td>
<td>Knut Arne Hovdal</td>
<td>2004</td>
</tr>
<tr>
<td>Industriel forskningsledelse – på sporet af mønstre og samarbejde i danske forskningsintensive virksomheder</td>
<td>12.</td>
<td>Lars Frode Frederiksen</td>
<td>2004</td>
</tr>
<tr>
<td>The Rhetorical Strategies of Danish TV Advertising</td>
<td>14.</td>
<td>Lars Pynt Andersen</td>
<td>2004</td>
</tr>
<tr>
<td>The Social and Economic Dynamics of Networks</td>
<td>15.</td>
<td>Jakob Rasmussen</td>
<td>2004</td>
</tr>
<tr>
<td>– a Weberian Analysis of Three Formalised Horizontal Networks</td>
<td>16.</td>
<td>Sof Thrane</td>
<td>2004</td>
</tr>
<tr>
<td>Engaging Personas and Narrative Scenarios – a study on how a user-centered approach influenced the perception of the design process in the e-business group at AstraZeneca</td>
<td>17.</td>
<td>Lene Nielsen</td>
<td>2004</td>
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<td>Organisationsidentitet</td>
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