Verena Bader, Stephan Kaiser*

Autonomy and Control? How Heterogeneous Sociomaterial Assemblages Explain Paradoxical Rationalities in the Digital Workplace**

The implementation of new technologies, including business analytics, is commonly seen as a managerial technique to enabling employee control and standardization, i.e. to establish a prevalent way of thinking and reasoning within organizations (Kallinikos, 2011). Despite this purposeful "rationality engineering" (Cabantous & Gond, 2011), researchers acknowledge unforeseen and paradoxical effects of digitalization, involving, for example, both autonomy and control (e.g. Leonardi, Treem, & Jackson, 2010; Mazmanian, Orlikowski, & Yates, 2013; Sarker, Xiao, Sarker, & Ahuja, 2012; Stohl, Stohl, & Leonardi, 2016). For this reason, this paper aims to shed some light on the paradoxical rationalities that exist in the digital workplace. Following the assumption of digital materiality that characterized the materiality turn (e.g. Pink, Ardèvol, & Lanzeni, 2016) and the idea of technologies as "rationality carriers" (Cabantous & Gond, 2011) we conceptualize how humans and artifacts together enact paradoxical rationalities. We exemplify this with reference to the autonomy-control paradox and illustrate our arguments using empirical examples from existing literature on the use of mobile devices. More concretely, we examine three scenarios in which autonomy and control occur: (1) where they co-exist independently of each other, (2) where they hybridize on the level of individuals, and (3) where either autonomy or control prevails. As a result, we propose that heterogeneous, i.e. diverse and shifting, sociomaterial assemblages matter for the enactment of rationality. In addition, we suggest that the individual hybridization of paradoxes is rooted in materiality's capacity to act which is, in turn, overruled by collective norms. Our propositions can inform future research and practice for managers who seek to enact particular types of rationalities within their organizations.

Key words: **materiality, sociomateriality, practice, rationality, digitalization, paradoxes** (JEL: M10, M12, M15, O33)

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Introduction

New technologies such as mobile devices and decision support systems are considered to bring a specific rationality, i.e. a prevalent way of thinking and reasoning into organizations. Thereby, technologies have on the one side become a promising means to transform traditional businesses into well-organized humane working environments. Critics refer to the possible disadvantages of digitalization, including the shift of power towards IT specialists, growing inequality, and not least increasing health problems such as "technostress" (Ayyagari, Grover, & Purvis, 2011). Beyond the rhetoric of new technologies as *either* a blessing *or* a curse, research (e.g. Leonardi, Treem, & Jackson, 2010) increasingly points to the paradoxes and co-existing phenomena that occur following the implementation of digital technologies. In this context, autonomy *and* control are observed as a result of, for example, the implementation of mobile devices (Mazmanian, Orlikowski, & Yates, 2013) or knowledge management systems (Khalil & Dudezert, 2016). This is because these technologies enable self-management and flexibility for employees while at the same time new patterns of control and surveillance emerge. Similarly, business analytics entail transparency *and* opacity, because they make data more visible and accessible but likewise these data may be used selectively (Stohl, Stohl, & Leonardi, 2016). Researchers have acknowledged these paradoxes as unforeseen effects of digitalization (e.g. Mazmanian et al., 2013), but very little scholarly effort has been devoted to the question of exactly how new technologies can cause paradoxical rationalities.

For this reason, this paper aims to shed light on the paradoxical rationalities of the digital workplace. Following the assumption of the materiality turn of digital materiality (Pink, Ardèvol, & Lanzeni, 2016; Leonardi, 2011) and the idea of technologies as "rationality carriers" (Cabantous & Gond, 2011), we conceptualize how humans and artifacts together create paradoxical rationalities within organizations. In so doing, we view rationalities as products of sociomaterial practices (Cabantous & Gond, 2011; Pachidi, 2016), shaped by material (non-human) and interpretative (human) affordances (Faraj & Azad, 2012; Jarzabkowski & Kaplan, 2015) in specific temporal-spatial surroundings. In our understanding, "individual- or organizational-level rationality [...] is a normative ideal that gets instantiated through the practices of individuals intending to be rational as they make strategy" (Jarzabkowski & Kaplan, 2015, p. 538). We exemplify this with reference to the autonomy-control paradox that previous research has identified in relation to the use of mobile devices. More concretely, we examine three scenarios in which autonomy and control occur: (1) where they co-exist independently of each other, (2) where a hybrid rationality is produced at the level of individual users, and (3) where either autonomy or control prevails within an organization. We illustrate our arguments with empirical examples from existing literature.

We build a case for the benefits of research on digital technologies based on sociomateriality. We evaluate the role of digital technologies in the generation of ratio-

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nalities that are requested by managers in organizations. As a result, we argue that these "inscribed" rationalities are "unscripted" (Jarzabkowski & Kaplan, 2015) by individuals in different temporal and spatial settings embedded in diverse and shifting sociomaterial assemblages. Further, we allege that both technologies and humans mediate the tensions between autonomy and control and that individual motivation and the power of digital materiality to act are both key elements of this process. Ultimately, we argue that the influence of collective norms, rules, and expectations cause particular rationalities to prevail because these norms, rules, and expectations overrule both the interpretations of individual users and any technological affordances that may favour opposing rationalities. Our propositions inform future researchers and the practice of managers. We begin by drawing attention to the current materiality turn in organization studies and to previous work on technologies as rationality carriers. Following this, we conceptualize the enactment of rationality against the backdrop of the existing literature. In so doing, we examine sociomaterial practices within socio-technical systems as locations where rationalities are enacted *ex post*. We then exemplify this with reference to the autonomy-control paradox that frequently accompanies the use of mobile devices. Finally, we set out our contribution to the current literature on tools as rationality carriers, the materiality turn, and paradoxes in digital working life.

Conceptual Background

Materiality in the Digital Age

Objects and technologies in organizations are often taken for granted and considered as discrete entities, yet they are at the centre of everyday work practices (Orlikowski & Scott, 2008). Furthermore, ubiquitous digitization and automatization result in the active interference of technologies in social life – e.g. the push functions of BlackBerries (Orlikowski, 2007) – and mean that digital technologies are almost impossible to ignore. For this reason, increasing numbers of scholars highlight the importance of research on the role of artifacts and how they influence and shape human actions (Jarzabkowski & Pinch, 2013; Jarzabkowski, Spee, & Smets, 2013; Zammuto, Griffith, Majchrzak, Dougherty, & Faraj, 2007).

The so-called "materiality turn" (sometimes referred to as the "material turn") (e.g. Vaujany, Mitev, Lanzara, & Mukherjee, 2015) has found its way into organization studies, meaning that material artifacts have become an essential explanatory factor for the emergence, persistence, and change of organizational routines (D'Adderio, 2014), strategies (Jarzabkowski & Kaplan, 2015; Whittington, 2014), innovations (Boxenbaum, Candace, Meyer, & Svejenova, 2014; Orlikowski & Scott, 2015) and organizing *per se* (Clegg, e Cunha, Rega, & Dias, 2012). Contemporary organizational research draws on the earlier work of theorists and sociologists such as Callon (1984), Heidegger (2010), and Latour (2005) who all emphasized physical materiality and technology. Intuitively, artifacts are identified by their physicality and em-

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bodied nature (Ekbia & Nardi, 2012). Currently, however, organization scholars are inspired by research on information systems (Orlikowski, 1996; Orlikowski & Barley, 2001) and increasingly apply this materiality rhetoric to the seemingly non-material objects that surround our digital working life (Leonardi, 2010; Pink et al., 2016; Yoo, 2012). This advanced definition of "non-material materiality" is grounded on physical materiality – of the desks, walls, elevators – that shapes our everyday practices in as much as these artifacts enable us to perform certain actions in a specific way while constraining us from performing others (Leonardi, 2012). Leonardi (2012) defines materiality as comprising digital and physical artifacts, stating that "[t]he arrangement of an artifact's physical and/or digital materials into particular forms that endure across differences in place and time and are important to users" (p. 31). In principle, this definition based on fixed properties applies to every materiality that individuals engage with in working life. Therefore, just as physical materiality has predetermined properties that influence how work is done in the digital workplace, so does digital materiality. Accordingly, there is a trend among scholars to assess non-material and digital materiality in use. Among the objects in focus are valuations and rankings (Orlikowski & Scott, 2014), software programs (Introna, 2016), and strategy tools (Jarzabkowski & Kaplan, 2015) used in everyday work activities.

Technologies as Rationality Carriers

Scholars of technologies in organizations to a great extent consider technologies as a means to achieve predefined human goals (Ekbia & Nardi, 2012; Orlikowski & Scott, 2008). In this context, technologies are considered as "carriers of rationality" (Cabantous & Gond, 2011), more specifically as *materialized* rationality whose substance emerged within a broader institutional and societal context (Kallinikos, 2011) and was translated into material artifacts. A number of technologies and information systems, such as tools for process automation and optimization, management control systems, or business intelligence software, are implemented or individually configured in order to determine human actions that align with a specific rationality that is to be translated into the organization (Cecez-Kecmanovic, Janson, & Brown, 2002). This so-called "script" approach (Jarzabkowski & Pinch, 2013), where technologies carry an inscripted rationality, resonates in studies that focus on materiality and regulation (Lanzara & Morner, 2005; Vaujany et al., 2015). Frequently, scholars emphasize the inscription of human agency into the material, for example, with the help of algorithms that are a "set of instructions used to solve a well-defined problem" (Introna, 2016, p. 21). Thus, technologies – inscribed with human agency – enlarge human competencies (Cabantous & Gond, 2011) and alleviate the bounds of rationality (March, 1978; Simon, 1978) and morality that "is now embedded in devices and artifacts that make us act morally" (Cabantous & Gond, 2011, p. 576). In this context, "technology could be seen as that generic social practice by means of which uncertain and ambiguous domains of work and

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living are progressively entangled, cleansed from ambiguities, and brought under its regulative reach" (Kallinikos, 2011, p. 43).

However, there is scholarly consent that the use of technologies *in practice* can differ from their originally intended uses (Cecez-Kecmanovic et al., 2002). Among the reasons that the intended rationality may go astray are: (1) there is no guarantee that the intended rationality will be directly translated into the features of the relevant technologies, (2) there is no control over how the technology will actually be used by others and (3) it is unclear the extent to which the consequences for the larger organization can be anticipated with accuracy (Feldman & Orlikowski, 2011).

A Conceptualization of the Enactment of Rationality

Based on the assumption that materiality in the digital workplace comprises physical as well as non-physical artifacts and that new technologies carry rationalities, in this section we conceptualize how rationalities are actually enacted. We first set the stage of *where* rationality is enacted – in sociomaterial practices within a socio-technical system – before we consider *how* rationality is enacted based on material and interpretative affordances and within specific temporal and spatial contexts. Finally, we synthesize these considerations in a short outline of how we understand rationality as an *ex post* product of the implementation of technologies.

Where Rationality is Enacted: Sociomaterial Practices within Socio-Technical Systems

In addition to the abandoning of technological determinism (Feldman & Orlikowski, 2011), scholars plead for a greater consideration of technologies and their use *in practice* where the human and the material engage and constitute each other (Orlikowski & Scott, 2008). This "constitutive entanglement" of the social and the material is what Orlikowski (2007, p. 1435) has coined the concept of sociomateriality, in which human and non-human are treated equally (Barad, 2003; Latour, 2005). In contrast, Leonardi (2011) emphasized more human-centred considerations in his comprehension of sociomateriality: with the notion of "imbrication" he describes material and human agency in a dynamic interplay that is continuously shaped by human goals. In both approaches, sociomateriality is in line with the ideas that marked the so-called "practice turn" in organization studies (Cecez-Kecmanovic, Galliers, Hendriffson, Newell, & Vidgen, 2014; Czarniawska, 2014; Gherardi, 2012; Nicolini, 2009). Sociomaterial practices are thus the locus where rationality is enacted (Pachidi, 2016). Accordingly, sociomateriality research builds upon "a performative approach [that] identifies the practices that are constitutive of and implicated in the world" (Orlikowski & Scott, 2014, p. 873). Sociomaterial practices exist in all empirical assemblages where the human and the material are interacting (Orlikowski & Scott, 2008). Leonardi (2012) defines each sociomaterial

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practice as a "technical subsystem" within a "socio-technical system" (p. 42) where the social and the technical shape and influence each other. Thus, a sociomaterial practice also entails a "social subsystem" such as communication networks, roles, and hierarchies (Leonardi, 2012).

How Rationality is Enacted: Time, Space and Affordance

Inscripted rationalities can be understood as the fixed properties of materiality, they are prevalent and independent from space and time (Leonardi, 2012) and they are the material affordances that enable or constrain human action. The concept of affordance is frequently used in information systems research (Pozzi, Pigni, & Vitari, 2014) and is a favoured approach for assessing sociomaterial practices in the workplace (Faraj & Azad, 2012; Jarzabkowski & Kaplan, 2015; Jarzabkowski & Pinch, 2013). While the term has been used increasingly, definitional variations and connotations have accumulated. However, researchers often draw on the work of Zammuto et al. (2007) and ask, "how the materiality of an object favours, shapes, or invites, and at the same time constrains, a set of specific uses" (p. 752; see also Faraj & Azad, 2012; Jarzabkowski & Kaplan, 2015; Orlikowski & Scott, 2008). With the notion of material affordance's "invitation to act", material agency, i.e. its capacity to act, becomes feasible (Withagen, de Poel, Araújo, & Pepping, 2012). In Leonardi's (2012) understanding, material agency, again is "activated, as humans approach technology with particular intentions and decide which elements of its materiality to use at a given time" (p. 42). In this context, emphasis is laid on technology's *interpretative* affordance, i.e. how actors use the technologies depending on the context and upon their own "creative and unpredictable" interpretation (Jarzabkowski & Kaplan, 2015, p. 539). Affordance, thus, is "relational" between human and material and it demands a reconsideration of the preferred assumption of the "generic user" and of "technology as a bundle of features" (Faraj & Azad, 2012, p. 255). Work practices, such as performance measuring or recruitment decisions, can differ in different places or times even if people use virtually the same technologies.

In this regard, time and space, on which interpretation is based, become vital for the enactment of rationality. Depending on these spatial, temporal, and interpretative dimensions, sociomaterial practices can have different qualities – or: "identities" (Sandberg & Tsoukas, 2011, p. 351). Human interpretation determines the extent to which the material's affordance is exploited. Albeit, human interpretation is tightly knit to social contextual factors such as habits, expectations, and roles, which are part of the superordinate socio-technical system (Kallinikos, 2011; Leonardi, 2012).

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Ex Post Rationalization after Technology Implementation

Organization scholars (e.g. Cabantous & Gond, 2011; Cecez-Kecmanovic et al., 2002) continue the work on rationality, which has long evoked interest and controversies among theorists and researchers (e.g. Habermas, 1984; March, 1978; Simon, 1978; Weber, 1978). Opening up the human-material dichotomy, however, current scholarly considerations go beyond the classical controversies on rational choice theory or bounded rationality. Cabantous and Gond (2011), for instance, refer to the "distributed rationality" (p. 583) between humans and artifacts. Cecez-Kecmanovic et al. (2002), similarly, develop a "rationality framework" (p. 218) on the implementation of information systems (IS) and argue, that "[o]f particular importance for the analysis of the roles of IS is how the potential of communicative rationality can be achieved in social interaction" (p. 218). In their framework, they break down rationalization on the individual (subject-centred reason) and collective level (reason situated in inter-subjectivity) (Cecez-Kecmanovic et al., 2002). In sum, we consider rationality as an *ex post* product of social and material interaction on the individual and collective level. In workplaces humans engage with physical and digital materiality that carry wittingly or unwittingly inscripted rationalities. Therefore, technologies and their use *in practice* account for an *ex post* rationalization that is often unforeseen at the point of implementation.

Mobile Work: Employee Autonomy and Control

Mobile devices, such as smartphones and tablets, significantly shape how work is done in the digital age. They disarrange the conventional workplace of the office by changing the temporal, spatial, physical, and social surroundings of workers. While traditionally work was exclusively carried out in the office, mobile devices afford flexibility in that they allow people to work anywhere and at any time (Gregg, 2011). Mobile technologies enhance the "individualization of work" (Beck, 2000, p. 55). The use of mobile devices enables work contexts to switch frequently so that work may be situated in different locations, and a particular location may be used for work many times, or as little as just once (Gellersen, Schmidt, & Beigl, 2002). Mobile or "telework" (Bailey & Kurland, 2002) is frequently carried out in "distributed work arrangements" (Leonardi et al., 2010) and entails "distributed work practices" (Pritchard & Symon, 2014) between individuals and teams. In this context, mobile technologies alter expectations and habits in organizations. Scholars have largely examined their use in relation to the mobility – connectivity nexus (e.g. Gregg, 2011; Symon & Pritchard, 2015) and have addressed issues regarding how collective norms governing the appropriate use of mobile technologies have progressively evolved.

A central topic of this research is how mobile devices allow employee autonomy (Symon & Pritchard, 2015). Autonomy, in general, is defined as the "degree to which the job provides substantial freedom, independence, and discretion to the in-

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dividual in scheduling the work and in determining the procedures to be used in carrying it out" (Hackman & Oldham, 1976, p. 258). Ambiguously, research on the use of mobile devices has emphasized their role in employee control and in reducing the time of recovery for employees after work (Derks & Bakker, 2014; Fairweather, 1999). In addition to the literature on employee surveillance concerned with technologically supported monitoring in the workplace and which thus relates to "control" in a much narrower sense (Ball, 2010; Lane, 2003), there is a substantial amount of research that addresses the implementation of digital technologies as a means for standardization, regulation, and control in a broader sense (Kallinikos, 2011). Motivation research suggests that autonomy enhances intrinsic motivation and control deteriorates motivation (Deci, Schwartz, Sheinman, & Ryan, 1981; Ryan & Deci, 2000). An individual's perception of whether their use of mobile technologies empowers them to engage autonomously in their work, or whether mobile technologies provide the momentum for further control and regulation, therefore, is linked to the individual's level of self-determination and intrinsic motivation. Intrinsic motivation affects the acceptance of the technology as well as user behaviour (Venkatesh, 2000).

In general, autonomy and control are paradoxical because the existence of control prevents the existence of the main characteristics of autonomy, including self-determination and privacy (Sewell & Barker, 2006). In our examples, the paradox emerges from tensions between the rationality of autonomy, in which mobile devices offer greater flexibility, self-management, and efficiency to employees on the one hand; and on the other hand, the rationality of control, in terms of mobile devices being used to monitor the professional commitment of employees, blur work-life boundaries, and create work overload due to their overly abundant use (Mazmanian et al., 2013; Orlikowski, 2007; Sarker, Xiao, Sarker, & Ahuja, 2012; Yun, Kettinger, & Lee, 2012).

Rationality in Practice: Three Scenarios of the Autonomy-Control Paradox

In this section, we examine existing empirical studies on the professional use of mobile devices in order to assess the autonomy-control paradox. Although different digital technologies have different functions and can foster different organizational habits and expectations, the use of mobile technologies is foundational in contemporary digital working life. Mobile devices, such as smartphones, laptops, and tablets, enable phone calls, emails, and office programs and can be considered a form of remote access to the office. For this reason, we discuss the example of the use of mobile devices, which has been an issue in various studies (e.g. Mazmanian et al., 2013; Middleton, 2008; Orlikowski, 2007; Perlow, 2012). We consider three scenarios where the autonomy-control paradox is dissolved in the workplace, namely where autonomy and control (1) co-exist in different temporal or spatial domains, (2) hybridize on the level of individual users, and (3) where either autonomy or control prevails over the other on a collective level. We illustrate our theoretical

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arguments with empirical examples from existing literature and use propositions to conceptualize the role of humans and materiality in the enactment of rationalities (Fulmer, 2012).

(1) Independent co-existence of autonomy and control

Paradoxical forces can co-exist when they are separated in different temporal or spatial domains (Jarzabkowski, Lê, & Van de Ven, 2013; Poole & Van de Ven, 1989). Research on the use of mobile phones frequently highlights the resulting decentralization and individualization of work (Beck, 2000; Deuze, 2007). Similarly, the autonomy and control that come with the use of mobile technologies can co-exist paradoxically but independently from each other in different industries, organizations, professional groups, or for different individuals. Empirical studies have already outlined the importance of emails and home office possibilities for young mothers who manage their responsibilities at work and in their private life autonomously (Frizzo-Barker & Chow-White, 2012; Martinez, Aguado, & Tortajada, 2012). In addition, there is scholarly work on the use of mobile devices in the creative industries (Deuze, 2007) where much more autonomy is seen than in professional knowledge work organizations (Pritchard & Symon, 2014).

In Figure 1, we illustrate the scenario where autonomy and control occur separately from each other. We assume four employees working at different times (during working hours versus after work) and places (home office, corporate office, client's office, home). In our example, employee 1 enjoys autonomy as a result of being able to work from home whilst still being informed about relevant work issues, because the smartphone allows to remain part of the organization. For employee 1, this changes into a rationality of control in the evenings or after work at home. On the contrary, employee 2 works in the corporate office and uses the smartphone. In this context, other work-related sociomaterial surroundings, such as meetings with colleagues, knowledge management systems, and conference rooms, might influence the employees' activities, and the additional use of the smartphone might cause stress, resulting in work interference and a control rationality. Employee 3, who works in the client's office in our case, might be afforded autonomy because the mobile device allows to be contacted, requested, and to make decisions. Employee 4 uses the smartphone after work and it affords pressure and control when it relays work-related information after the employee has left the office, meaning that the employee has no opportunity to recover from the working day.

The outlined reflections show that rationality is enacted in sociomaterial practices that entail both material affordances and interpretation by the individual. Moreover, the enactment of particular rationalities is strongly linked to *individual perception* in specific temporal or spatial surroundings. Still, the interpretative affordance of individuals can change with different contexts, i.e. in another time and place. On the basis of these theoretical considerations, we state the following proposition:

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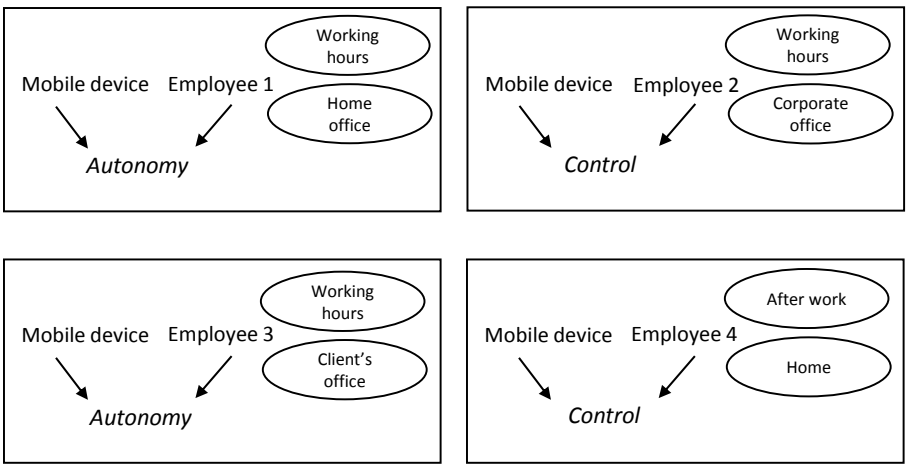
Proposition 1: *Rationality is enacted within diverse and shifting sociomaterial assemblages. Within these assemblages, individuals interact with various other individuals as well as with different technologies that afford multiple rationalities. In various temporal, spatial, and sociomaterial settings, an interaction of different individuals with the same technology can enact one or the other paradoxical rationality eclectically.*

Figure 1: The independent co-existence of autonomy and control



(2) Hybridization of autonomy and control

Research on paradoxes in the workplace has suggested that individuals actively manage tensions by balancing them (Jarzabkowski, Lê, & Van de Ven, 2013; Poole & Van de Ven, 1989; Sundaramurthy & Lewis, 2003). In this context, the two sides of the paradox hybridize and individuals using mobile devices frequently experience control as well as autonomy when they use their mobile devices.

Gregg (2011) assessed how working with new media technologies and mobile devices impacts the professional and private life of employees. The study is based on repeated interviews with 26 home workers from major companies, self-employed persons, or entrepreneurial workers. She describes how work from home is perceived ambivalently by interviewees. One interviewee was Claire, a 33-year old marketing professional who worked part-time because she had a son. She described how grateful she was to be able to work only three days a week and for the autonomy to decide when to "catch up", which frequently occurred after putting her son to bed. Sitting together on the couch with her husband, both working with their laptops, was considered "relaxing" and wireless connection even allowed her to be up-to-date with her work when she played outside on the street with her son (Gregg, 2011, p. 50).

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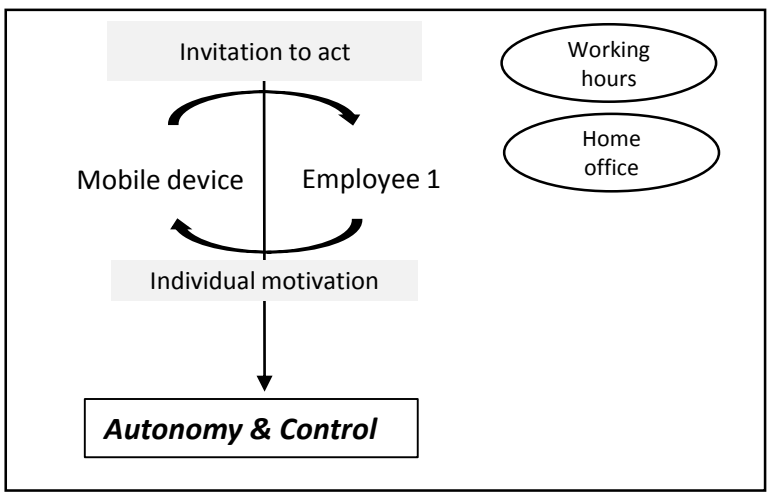
On the other hand, Claire experiences the "connectivity imperative" when the presence of her laptop "in the home is a material reminder of work's potential, and this reminder is occurring in a growing number of places around her house" (Gregg, 2011, p. 50). Gregg (2011) further describes this as a "coerciveness of communication technologies in their capacity to enhance a pre-existing psychological connection to the job, just as the convenience of the devices allows work to take place in more and more places" (p. 50).

We illustrate the hybrid scenario in a more abstract version in Figure 2. In this example, employee 1 works in the home office during official working hours where both autonomy and control occur. As mentioned in the previous scenario, the rationality of autonomy emerges, for example, from being able to respond and being connected. Similarly, mobile devices afford employee 1 the ability to respond to work-related information at their individual convenience, i.e. for example only after cooking for children. At the same time, however, the affordance of being connected permanently, e.g. when looking at the smartphone or laptop, can prompt the employee to check emails while cooking, so that the control rationality comes into effect.

Figure 2: Hybridization of autonomy and control



The example shows that mobile devices can afford both autonomy and control for an individual; the individual interacts with the technology (materiality) and its affordance and the resulting rationality can change on the basis of place and time and, similarly importantly, on the basis of the user's intention or motivation (Leonardi, 2011). In accordance with their intentionality or motivation, humans solve the resulting conflicts through "situated improvisation" (Leonardi & Barley, 2010), where they selectively interpret material affordances, and thus paradoxical

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rationalities are hybridized and performed. This momentum of *individual motivation* is crucial for how the interpretative affordance contributes to the enactment of one or the other rationality. However, there are "mobile intimacies that develop, and the diverse practices and meanings that people attach to their mobile phones through an engagement with their materiality" (Horst, 2016, p. 162). Equally, the example highlights the *inherent capacity of materiality* to invite or to prompt specific actions. On this basis, we state the following propositions:

Proposition 2: *Technologies and humans both mediate the tensions between autonomy and control in hybrid settings.*

Proposition 2 a: *Individual interpretative affordance, motivation, and intentions, account for the situational enactment of paradoxical rationalities.*

Proposition 2 b: *The capacity of materiality to act maintains paradoxical rationalities and impedes individuals from dissolving paradoxes in one or the other direction.*

(3) Prevalence of either autonomy or control

Paradoxes are frequently dissolved when they are reframed by their context on the macro-organizational level (Jarzabkowski, Lê, & Van de Ven, 2013; Poole & Van de Ven, 1989). In this scenario, one paradoxical rationality becomes prevalent on the collective level. Empirical examples in this context mainly confirm the prevalence of the control rationality due to pressure to be "always on" and technology addiction (Kakabadse, Porter, & Vance, 2009).

Mazmanian et al. (2013) published a study on the use of mobile email devices among professional knowledge workers. Based on repeated interviews with 48 professionals from different organizations, they focused on the use of mobile email devices on the individual level and argued that professionals engage in an "ongoing navigation of the tension between their interests in personal autonomy on the one hand and their professional commitment to colleagues and clients on the other" (Mazmanian et al., 2013, p. 1337). More specifically, they refer to the dynamics of "escalating engagement" and "diminishing autonomy" (Mazmanian et al., 2013, p. 1350) as an interplay between patterns of individual use of mobile email devices, the collective consequences of this use, and the individual and collective responses to these consequences. Individuals moved from regularly checking emails to diminishing reaction times. This was a response to the increasing email volume on the collective level, as well as the growing commitment to each other among communication partners, and a change in collective perceptions regarding the kind of response behaviour that was acceptable and expected.

We offer a theoretical example on how the rationality of control dominates over its paradoxical counterpart of autonomy in Figure 3. In our case, employee 1 benefited

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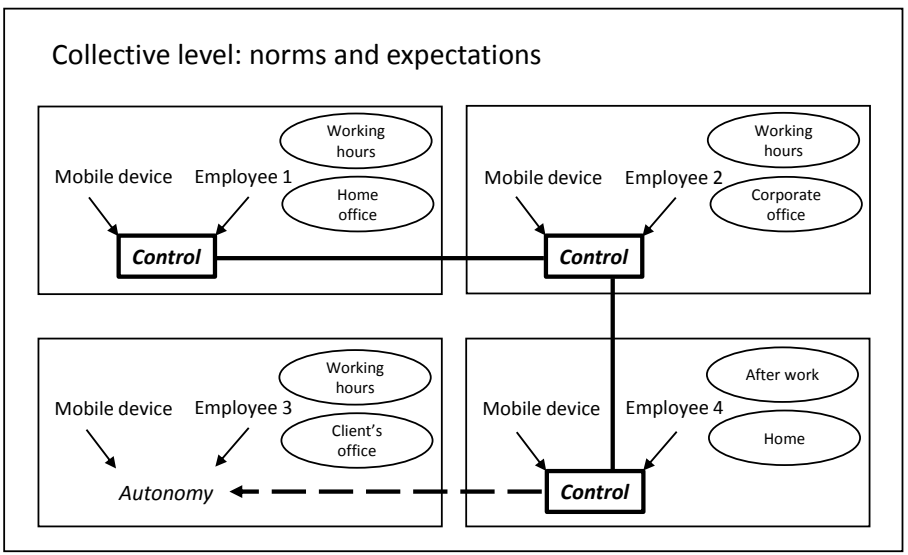
from what the mobile devices afforded: working from home, monitoring work-related information, and answering at personal convenience. The collective consequences of this might include escalating engagement, stress, and control, which are then again reinforced on the individual level and become dominant rationalities in the workplace – be it in the corporate, home, or client's office. Hence, whereas on the individual level, interpretative affordance and individual motivation might emphasize a positive rationality (here: autonomy), norms and expectations on a collective level can reinforce the negative (here: control) and make it the dominant normative ideal.

Figure 3: Prevalence of control over autonomy



In this scenario where one paradoxical rationality is dominant, rationality is enacted *beyond* single sociomaterial practices. Research has already hinted at how technologies as rationality carriers have more pronounced consequences on the collective level (Cecez-Kecmanovic et al., 2002; Mazmanian et al., 2013) and are shaped by *collective norms and expectations*. We argue that if different users interpret the same materiality in a similar way and one rationality is thus simultaneously enacted in various places and times, this rationality can become dominant on the collective level. More concretely, if the identities of sociomaterial practices are similar or nearly identical, rationality is enacted on a more superordinate level within the sociotechnical system. In this regard, rationality is distributed (Cabantous & Gond, 2011) within a net of identical sociomaterial practices and the collectively "preferred" rationality guides individuals in the direction necessary to dissolve occurring paradoxes. Accordingly, we propose the following:

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Proposition 3: *Collective norms, rules, and expectations influence the individual's interpretation of the technology insofar that they overrule the paradoxical rationalities that materiality affords.*

Concluding Discussion

In this paper, we asked how paradoxical rationalities such as autonomy and control can occur upon the employment of new technologies. In so doing, we brought into question the widespread assumption that technologies are carriers of specific rationalities that can be translated easily into organizations. Our first contribution thus relates to the literature on technologies as "rationality carriers" because we examine how technologies *can* but do not necessarily *have to* establish specific desired rationalities within organizations. Inscripted rationality can appear in reverse and unexpected forms. The enactment of rationality, in our conceptualization, is an *ex post* product rather than an inscripted or pre-defined outcome. For this reason, we shed some light on the limits of inscribed rationality based on the actual (technical) affordance of materiality and the interpretative affordance on the part of humans. We build upon research that has raised the idea that rationality is enacted within sociomaterial practices (Cabantous & Gond, 2011; Cecez-Kecmanovic et al., 2002; Jarzabkowski & Kaplan, 2015). More specifically, we argue that rationality's "permanent making" (Cabantous & Gond, 2011, p. 577) occurs within sociomaterial practices involving both humans and technologies, which are embedded into a superordinate socio-technical system comprising collective social norms and expectations. We provide a more elaborated proposition in which we illustrate that there is a "distributed rationality" (Cabantous & Gond, 2011, p. 583) among diverse and shifting sociomaterial assemblages. We argue that rationality is a product of sociomaterial practices that are embedded in and influenced by the superordinate sociotechnical system, which also comprises the organizational context, e.g. roles, expectations, and habits. Crucial for the enactment of rationality is that individual interpretation, motivation, and intentions account for the situational enactment of paradoxical rationalities (Proposition 2 a). However, we propose that paradoxical rationalities cannot finally be dissolved by individuals in one direction or another, because of materiality's capacity to prompt interpretations that enact the opposite rationality (Proposition 2 b).

Second, we contributed to the existing literature on the "material turn" (e.g. D'Adderio, 2011; Vaujany, Mitev, Laniray, & Vaast, 2014) in organization studies. The current trend is for research to build on the acknowledged materiality of nonmaterial and digital artifacts, in order to study digital technologies from a sociomaterial perspective. The majority of these studies address the use of single technologies. Yet, in our conceptualization of rationality enactment and through our examples on the use of mobile devices, we also take into account that sociomaterial assemblages change, i.e. individuals interact with different kinds of technologies and

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other individuals in different settings (Proposition 1). We further argue that diverse or switching sociomaterial assemblages enabled by mobile devices account for the enactment of paradoxical rationalities. In our paper, we thus make a case for the role of "materiality as assemblage" (Ekbia & Nardi, 2012; Fayard, 2012). In line with Leonardi (2011; 2012), we conceptualize sociomaterial practices from a human-centred perspective, asking how rationality is inscribed and unscripted, and how people interact with materiality on the basis of their own interpretations as well as on time and space. However, based on our exploration of how paradoxes can occur in hybridized forms at the individual level, we propose that humans and materiality *both* mediate paradoxical tensions (Proposition 2).

Third, we shed light on emerging paradoxes in the digital working life. We build on existing research on digital working life that acknowledges that paradoxical rationalities emerge as unforeseen effects of digital technologies (Mazmanian et al., 2013; Stohl et al., 2016; Tilson, Lyytinen, & Sørensen, 2010). We add an explanation of *where* and *how* multiple rationalities emerge and *why* paradoxes can occur. We first use existing literature on paradoxes (Jarzabkowski, Lê, & Van de Ven, 2013; Poole & Van de Ven, 1989; Sundaramurthy & Lewis, 2003) to identify three scenarios in which the autonomy-control paradox appears: (1) where it co-exists in different temporal or spatial domains, (2) where a hybrid emerges on an individual level and (3) where either autonomy or control prevails over the other on a collective level. Upon the implementation of technologies, paradoxes can exist independently from each other when they are spatially and temporally separated. Still, hybrid forms of rationality may emerge when individuals selectively and intentionally use technologies to such an end. Finally, one rationality can become prevalent on the basis of collective norms and expectations.

Implications for Research and Managerial Practice

The theoretical suggestions in this paper have implications for future research and for managers in practice. First of all, a perspective based on sociomaterial practices is considered more fruitful than a deterministic view when assessing the digital working life and it is more appropriate for understanding how people really engage with new technology rather than how they are intended to. The vast extent to which we interact with technology in contemporary organizations demands research on how this interaction is performed and what its consequences are (Zammuto et al., 2007). In this context, future research should include in-depth empirical case studies on how different and especially younger technologies such as analytical software are used and how they influence roles, habits, and expectations in organizations. Thereby, scholars should focus on both the users and the technology. The majority of existing studies take on a human-centred perspective on technologies in use (Leonardi, 2011). In this context, more research concentrating on material agency, i.e. materiality's "capacity to act", is needed in order to understand the integration or intrusion of digital technologies in the workplace (Orlikowski,

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2007). Furthermore, paradoxes in the digital workplace need deeper reflection. Our considerations on how paradoxical rationalities are hybridized (scenario 2) can be used as a starting point for research in this direction. Specifically, unpacking the inherent material properties of physical and virtual workspaces, i.e. office rooms and online forums, for instance, and how employees interact with(in) these may help to understand how rationalities co-exist, hybridize, or prevail. Human-specific considerations could build on the relationship between new technologies and user motivation. We specified that the autonomy-control paradox is closely linked to employee motivation (Deci et al., 1981; Ryan & Deci, 2000; Venkatesh, 2000). While autonomy entails empowerment, it is equally linked to the fostering of motivation among employees. Control and surveillance, on the contrary, have a strong negatively influence on the intrinsic motivation of employees. Further considerations of the paradoxes that occur around the use of technology and how they relate to employee motivation are needed.

We argue that space and time are relevant for the enactment of different rationalities. It would be worthwhile analysing their roles in greater depth (Fayard, 2012). Specifically, in this context, we regard it relevant to explain the use of digital technologies in different industries such as the creative industries or accounting firms. In addition, different forms of labour and employment such as contract or crowd workers, i.e. freelancers taking over micro-jobs on the internet, could be taken into account.

Finally, taking materiality and its inherent rationalities into consideration is no less important for practitioners. We propose that collective norms and expectations can tip the balance in favour of the enactment of one side of a paradoxical rationality in an organization (Proposition 3). A new technology can therefore only bring about a specific rationality when there is collective consent on the use of that technology. Rules, communication measures, and training, should thus accompany the implementation of technology in the workplace. We also emphasize that workers engage with diverse and shifting material and non-material technologies. Thereby, future research should take into account the variety of artifacts that employees engage with in their digital working life – be it in the company or home office.

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