

HOW MUCH COLLABORATION? BALANCING THE NEEDS FOR COLLABORATIVE AND UNINTERRUPTED WORK

Research paper

Lansmann, Simon, University of Muenster, Muenster, Germany,
simon.lansmann@wi.uni-muenster.de

Klein, Stefan, University of Muenster, Muenster, Germany,
stefan.klein@wi.uni-muenster.de

Abstract

The proliferation of collaboration platforms in organisations has benefits for knowledge workers in terms of access to knowledge and social resources. However, negative effects, specifically collaborative overload, have only recently been acknowledged and are still rarely considered by companies. Collaborative overload is a multi-faceted construct, which covers downsides, unintended or side-effects of collaboration platforms and their organisational use. To introduce and explore what we believe is an important phenomenon, we conducted a narrative literature review to contextualise collaborative overload and to provide a structured account of underlying root causes. Based on this, we propose an agenda for future research and derive an initial research framework to clarify and delineate collaborative overload. With this twofold contribution, we aim to provide a frame of reference for the discourse about this important syndrome of modern workplaces.

Keywords: Collaboration platforms, knowledge worker productivity, collaborative overload.

1 Motivation

Paul, an internal service clerk at a medium-sized regional financial services firm, is happy that he can use the Instant Messaging (IM) tool, which is part of a new collaboration platform, to coordinate internal processes more efficiently. For the communication with the field agents, however, he prefers email and phone. In contrast, Paul's colleague Anna uses IM for both, internal communication and communication with field agents to be able to respond quickly to their requests. As a result, Anna's communication volume has significantly increased, as the field agents constantly have urgent requests. Furthermore, her work rhythm has profoundly changed. She is spending much more time on communication with field agents and her work has become much more fragmented. Therefore, concentrated work on more complex tasks almost impossible during working hours and requires overtime since management has not yet responded to the transformation of her work pattern and workload.

Communication and collaboration platforms, also referred to as Enterprise Social Software (ESS), such as IBM Connections, Yammer or Jive (Gartner 2017), have been heralded as boosters of productivity (Chui et al. 2012; Fulk and Yuan 2013). These platforms foster teamwork by connecting people, affording closer ties, and thus support collaboration (Cross et al. 2013; Duhigg 2016; Gardner 2017). It is a common belief that more communication and teamwork is needed to leverage and improve collaboration but it also requires extended accessibility by team members (Breu et al. 2005; Tarafdar et al. 2011). As a result, the share of collaborative activities has been growing steadily (Bughin et al. 2017; Chui et al. 2012) and doubled over the last two decades (Cross et al. 2016). However, as the vignette illustrates, the effects of communication and collaboration platforms are diverse and often ambivalent, at times even paradoxical (Jarvenpaa and Lang 2005; Mazmanian et al. 2013). The very same

platform can be productive for some members of an organisation but detrimental for others. Yet, the downsides and possible negative consequences impacts of collaboration-intense environments, such as frequent interruptions or the rising amount of messages, primarily email, which can lead to occupational stress, are rarely considered when these platforms are introduced (D'Arcy et al. 2014; Kane 2015; Pirkkalainen and Salo 2016). On the contrary, some of these platforms are explicitly promoted as remedy against email overload.

The ambivalent outcomes reflect technical affordances but more importantly different work practices, work patterns, and organisational structures. Against the backdrop of two broad debates, one about new ways of working, reflecting changing work locations, new technological possibilities and employee-manager relations (Kok and Helms 2016; Lee 2016) and the other about occupational stress and overload (Eppler and Mengis 2004; Ragu-Nathan et al. 2008) the concept of *collaborative overload*, which specifically addresses downsides, unintended or side-effects of collaboration technology, has gained prominence (Cross et al. 2016; Cross and Gray 2013). In a recent article, Cross et al. (2016) popularised the phenomenon. The main finding is that the time managers and employees spent with collaboration can reach 80 percent of a whole work week. To structure the phenomenon, they introduce a typology of collaborative resources: informational, social, and personal resources. Whereas informational resources (knowledge and skills) as well as social resources (awareness and position in a network) can be shared and transferred to other individuals, personal resources (time and energy) are both scarce and in high demand. When employees draw too much on personal resources, e.g. by asking for advice, resource access or meeting attendance, collaborative overload can be the consequence, which can lead to *generosity burnout* (Grant and Rebele 2017). It describes a scenario in which individuals do not protect their own time and energy while supporting others. Oftentimes this happens when employees take advantage of generous colleagues and “collaborative overload creeps in: What you thought was a one-off request turns into an ongoing commitment” (Grant and Rebele 2017, p. 10).

The results of the studies have been taken up by the business press and public media (e.g. Feintzeig 2016; Schumpeter 2016) and resonate with practical problems (Fried 2016; Mankins and Garton 2017). However, the phenomenon remains underspecified: Why is it a distinct phenomenon and what is generally accounted for as ‘collaborative activity’? The metrics for intensity of collaboration vary across different studies. Some focus on time spent (Cross et al. 2016; Cross and Gray 2013) others on the extent of interruptions and fragmentation of work, exacerbated by real-time technologies and others’ expectation for immediate responses (Perlow 1999; Wajcman and Rose 2011).

We address this gap in two steps: First, we provide a contextualisation of collaborative overload and argue why this phenomenon is an important and distinct syndrome, i.e. a constellation of diverse symptoms, of modern workplaces. Currently, the phenomenon is too broad and unspecific, and not clearly delineated from related overload concepts like information overload (Eppler and Mengis 2004), email overload (Barley et al. 2011), communication overload (Stephens et al. 2017), or technology overload (Karr-Wisniewski and Lu 2010). Second, we analyse and synthesise underlying trends and related concerns. This is an important step since a reflection of possible root causes of overload on the organisational, technical, and individual or psychological level is needed before remedies can be suggested. Based on this, we propose a research agenda for collaborative overload to highlight current conceptual shortcomings, followed by a derived initial research framework depicting possible antecedents, moderators, and outcomes. The research agenda and initial research framework for collaborative overload are our two key contributions. The research questions we address are therefore:

- 1) *What constitutes collaborative overload and how can this phenomenon be delineated?*
- 2) *What are underlying causes of collaborative overload?*

A narrative literature review was conducted to answer the proposed research questions (Paré et al. 2015). Specifically, the hermeneutic approach of reviewing the literature is utilised (Boell and Cecez-Kecmanovic 2014). This approach was chosen due to the multidisciplinary nature of the phenomenon, i.e. the scope is broad and a diverse set of terms and concepts is used. Starting point of the narrative literature review was the work from Cross and colleagues (Cross et al. 2016; Cross and Gray 2013). We applied forward and backward search (Webster and Watson 2002) to be able to identify important

papers, also in other related research fields besides IS such as management, organisational studies or organisational psychology. In total, we identified 70 articles, which form the basis of our description of collaborative overload. Articles which are part of the result set of the literature review are marked with an asterisks (*) in the references.

In order to untangle the issue of *overload*, we refer to earlier work on IT use and knowledge worker productivity (Aral et al. 2012; Karr-Wisniewski and Lu 2010), which identified a u-shaped relationship: increasing IT use initially yields productivity gains, however, beyond a certain intensity of IT use, gains turn into losses. We conjecture a similar relationship between the intensity of collaborative activities and the resulting impact on productivity and, more broadly, well-being.

The focus of our analysis is individual behaviour in organisational communication and collaboration scenarios. The role of management and institutional constraints, such as organisational rules and culture (Leidner and Kayworth 2006), also needs to be considered. Technology is included from a perspective of communication (and collaboration) media repertoire (Watson-Manheim and Bélanger 2007). Nevertheless, the individual level is central since overload is subjective and thus perceived differently by employees (Fuller and Dennis 2009; Srivastava et al. 2015). Since negative effects only manifest over an extended period, we are interested in structural dimensions of collaborative overload and not in short-term overload episodes.

The remainder of the paper is as follows: In the next section, we provide a contextualisation of collaborative overload and describe why the phenomenon is important and distinct. In section three, underlying trends and concerns, which provide possible explanations for collaborative overload, are presented. In the discussion in section four, we propose a research agenda which summarises the current research gaps in the literature, followed by the derived initial research framework to structure our findings and tentative understanding of the phenomenon. In the last chapter, we conclude the paper.

2 Contextualisation of Collaborative Overload

2.1 The Psychology of Overload

The concept of overload has its roots in information theory (Shannon and Weaver 1949) and is mainly discussed in the contexts of individual and organisational decision making (Speier et al. 1999; Stephens 2017). Overload has been characterised as a situation in which demands exceed resources (O'Reilly 1980). Such an imbalance has profound negative impacts, e.g. employees feel a lack of control, frustrated, emotionally overwhelmed and burned-out, which will also affect job performance, specifically decision-making capability (Eppler and Mengis 2004; Stephens et al. 2017).

In order to explain the vulnerability of individual employees specifically with respect to collaborative overload, Grant (2013) is looking at the psychological profiles and behavioural patterns of 'givers', employees who intrinsically go 'the extra mile'. They put in the extra time and energy beyond what is normally done, and are keen to help other colleagues. These employees are supporting others without demanding anything in return. Two other types of people he identified are the opposite of givers: 'takers', who primarily care only for themselves, and 'matchers' who have the reciprocity style of quid pro quo. However, to be successful as a giver, people also need to take care for themselves, i.e. they need to have a high self-interest in combination with a high interest in others. When self-interest is high but others interest is low, people are acting selfish, the characteristic of takers. When both concerns are high, people acting *otherish* and tend to be more successful in their job. They care for others and help them, but are at the same time aware of their limited resources and can say no, or look for opportunities where they help people around them while managing their time and energy. Employees with high interest in others but low interest for themselves are acting *selfless* and are at risk of becoming overburdened, i.e. experiencing collaborative overload. While individual generosity is an important part of a company's culture, yet generous individuals are at a particular risk to be overloaded and overburdened, in other words to suffer generosity burnout (Grant and Rebele 2017).

2.2 Information and Social Media Overload

The most prominent and broadly investigated overload construct is information overload, which describes a situation when employees receive too much information, i.e. when the information processing requirements exceed the information processing capabilities (Eppler and Mengis 2004; O'Reilly 1980). The advent of sophisticated information and communication technology (ICT) like the Internet has intensified the discussion about the impact of information overload (Evaristo et al. 1995). This is further exacerbated by recent social media platforms like Twitter or Facebook, leading to social media overload (Gomez-Rodriguez et al. 2014; Koroleva et al. 2010; Maier et al. 2015).

As coping strategy, employees become more selective in trying to keep the important, to filter out irrelevant information and change their priorities of activities which in the end influences decision-making (Stephens et al. 2017; Weick 1970). Typical contexts in which information overload has been observed are (1) information retrieval, organisation and analysis processes, (2) decision processes and (3) communication processes (Eppler and Mengis 2004). Particularly, the last one is closely related to communication and collaboration technology.

2.3 Email Overload and Communication Overload

Email overload describes an imbalance between the number of received messages and the available time and resources to process these messages. In addition to the sheer volume, the constant inflow of emails is often perceived as distracting. Individuals typically have limited control over the amount of messages reaching their inbox and the overall volume of messages has increased over the past years (The Radicati Group Inc. 2014). According to Barley et al. (2011), this has three reasons: (1) emails are easy to send, (2) it is easy to make requests to others, and (3) they are often used inadequately, e.g. for not suitable tasks such as coordination or too many colleagues are copied. Paradoxically, the more emails a knowledge worker processes, the larger the feeling that this is an effective coping strategy (Barley et al. 2011). However, the quantity of messages alone is not sufficient for explaining email overload but how employees interpret and respond to the volume (Dabbish and Kraut 2006).

Looking beyond email and at communication more generally leads to communication overload. A key distinction between information overload and communication overload is that the former is the result of an active inquiry, while the latter refers to attention solicited by a third party and hence essentially not under own control (Karr-Wisniewski and Lu 2010). Communication overload consists of seven dimensions: (1) comprising message quality, (2) having many distractions, (3) using many ICTs, (4) feeling responsible to respond, (5) pressuring for decisions, (6) overwhelming information, and (7) piling up of messages (Stephens et al. 2017).

In their study about knowledge worker productivity in multi-project environments, Aral et al. (2012) identified a concave relationship, i.e. an inverted u-shaped curve, between the extend of communication and productivity. Based on detailed data of a recruiter firm, such as emails, accounting data and interviews, they provide evidence that more simultaneous projects, accompanied with more communication, are increasing productivity up to a point. Beyond this tipping point, productivity suffers. The second main finding is that more heterogeneous knowledge, accessible in and through social networks, on average diminishes productivity. Only when employees are working in settings where they deal with heterogeneous tasks, diversified knowledge leads to improved productivity. Aral et al. (2012) demonstrate how social networks create value and initially have a positive impact on knowledge worker productivity. However, when employees communicate and cooperate with colleagues too much and need to integrate too much heterogeneous knowledge, productivity declines at some point.

2.4 Technology Overload and its Organisational Context

The combination of information and communication overload and technology, more precisely a multiplicity of system features, adds up to technology overload itself. Karr-Wisniewski and Lu (2010) define it as "a phenomenon that occurs at the point in which a marginal addition of new technology reaches the point of diminishing marginal returns" (p. 1061). Based on their model, the authors dis-

covered that knowledge workers experience decreased productivity when they suffer technology overload. Specifically, knowledge workers can leverage ICT to improve productivity up to a specific point. After this, ICT usage becomes counterproductive (Karr-Wisniewski and Lu 2010). Looking solely at collaborative technology, an interrelated outcome can be collaboration tool overload. To support teamwork, organisations introduce numerous collaborative tools, which tend to overburden and alienate knowledge workers since they have too many ways to get in touch with their colleagues, which causes additional coordination efforts (Greene 2017; Mankins 2017).

Mankins and Garton (2017) argue that time, talent and energy rather than money are the truly scarce resources for organisations in the 21st century. The results of their surveys show, that the bottom three quartiles of the studied organisations lose 24 percent of their productivity due to unnecessary communication and collaboration, which they refer to as organisational drag. Even in the top quartile, the productivity losses amount to 13 percent. The dark side of Metcalfe's Law posits that the decreasing costs of modern communication networks lead to an exponential growth in overall interactions. These related costs for the organisation can exceed the overall network's value. They estimate that the number of interactions for a manager has grown to 50.000 interaction a year in the current collaboration-centric decade; a steep increase from 25.000 interaction in the previous email-centric decade. In a typical workweek, a manager loses 16 hours due to unnecessary emails (technical cause) and meetings (organisational cause), leaving only eleven hours for individual work. One approach to reduce these unproductive times, are zero-based budgets for meetings and new guidelines for email and other collaboration systems. For the former, only new meetings can be scheduled when an old, unnecessary one, is cancelled. For the latter, the 'reply all' function in email systems should be removed or only used for careful defined scenarios (Mankins and Garton 2017).

Another approach to mitigate the "epidemic of over-collaboration and over-communication" (Fried 2016, p. 2) is to employ 'library rules'. In dedicated periods, one afternoon or a whole day, no meetings or other physical interruptions are allowed, perhaps even no talk at all. This principle can also be applied to the electronic equivalent, for example by using more asynchronous communication so that the conversation can be owned by the receiver and not the sender (Fried 2016).

An example how these principles can work, is the research of Perlow and colleagues (Perlow 2012; Perlow and Porter 2009) with Boston Consulting Group (BCG). The consultants were trapped in a cycle of responsiveness leading to long work weeks characterised by constant interruptions. By setting the goal of predictable time off (PTO), i.e. each consultant would have one uninterrupted evening off, the BCG teams changed the way they work. They rethought how work can to be done more sustainable and experimented with different work practices. The initial results which yielded the expected positive outcome, i.e. a better work-life balance of the consultants and improved team productivity, were expanded to the whole firm and are still used today (BCG 2017). The goal of PTO can be adjusted for every company's need. For instance, in combination with the suggestions of Mankins and Garton (2017) and Fried (2016), PTO can be modified to PTU: predictable time uninterrupted (Perlow 2014).

These examples do not only show technical, but primarily organisational causes of overload in environments, where employees rely on collaborative technology. Besides, they also provide hands-on examples of how these instances of overload can be addressed.

2.5 Collaborative Overload

Collaborative overload combines the described overload constructs, while putting the focus even more on social aspects. The share of collaborative activities in typical workdays such as meetings, phone calls, emails or time spent on social collaboration platforms, has increased up to 80 or even 95 percent of working hours, leaving less time for necessary individual work (Chui et al. 2012; Cross et al. 2016). As stated above, collaborative resources employees depend on can be broadly classified into informational (knowledge, skills), social (awareness, access, and position in a network), and personal resources (time and energy). The first two can be shared more easily, as opposed to the third. However, recent research shows sharing informational and social resources can also lead to severe negative effects (Maier et al. 2015; Ouardi et al. 2016). When employees draw too much on colleagues' personal

resources, largely reinforced by social technologies, those colleagues are at risk of being burdened with too much work: to suffer collaborative overload (Cross et al. 2016; Cross and Gray 2013).

The work by Cross et al. (2016) is based on more than two decades of empirical research and consulting with more than 300 companies. The authors propose two main ways how personal resources can be protected: (1) streamlining and redistribution of collaboration and (2) rewarding effective contribution. For the former, managers and employees should be encouraged to say ‘no’ or at least should have more control over the incoming information and collaboration flow. Moreover, the necessity of meetings must be challenged. Next to leveraging modern technology to make informational and social resources more transparent, which might lead to lower dependence on experts’ implicit knowledge, structural changes like reorganising decision-rights could be used. For the latter, rewarding effective contribution, organisations should keep track of ‘assists’, i.e. who helped whom to solve problems in the past, and must include these metrics in promotions and incentive programs. In this way, organisations do not just facilitate more collaboration but also reward individual contributions and performance. The authors call for more managerial attention on the demand and supply for collaborative resources, especially the time and energy of employees.

In an earlier article, Cross and Gray (2013) provide a richer account of their empirical base. They collected data from 2006 until 2013, employing organisational network analysis for quantitative data plus qualitative data, such as interviews, observation, and document analysis. They analysed 14 organisations with workforces ranging from 300 to 6.000 employees. The authors describe the two most common pitfalls encountered by organisations which aimed at improving or enhancing collaboration. The first pitfall is over-relying on formal structures. Formal networks are used as baseline for measuring collaboration, whereas the informal network is the real driver of productivity. Over-relying on technology is the second pitfall. Experts become even more pressured due to social technology and reduced opportunity costs for advice seeking. They describe seven structural and ten behavioural best practices which can be applied to reduce collaborative overload (Cross and Gray 2013, p. 10). Next to this, the authors provide examples how rebalancing collaboration demands, improving personal collaboration skills and eliminating routine decisions can be applied to counter collaborative overload.

In sum, Cross and colleagues have looked at a broad range of pitfalls of medium to large organisation with respect to improving collaboration. However, the phenomenon of collaborative overload remains underspecified. The authors do not provide a distinction from related overload constructs and do not provide further conceptual details other than the typology of collaborative resources.

2.6 An Integrated View on Overload

Does collaborative overload constitute a distinct phenomenon and is not merely a new label for already known problems? We extend the work from Cross and colleagues and argue that it is a distinct phenomenon. While well-established technologies, e.g. groupware or email, have inherent constraints, collaboration platforms intentionally offer a broad set of *affordances*. They have been designed to facilitate collaboration, to nudge individuals to spend more time using these tools, sharing information and following the information that has been shared (McAfee 2009). Regularly, emails are sent to signal the platform users new content or remind them to update and expand their profile and to post information. The platform designers try to mimic Facebook, which was developed with the objective to make people spend as much time as possible on the platform (Solon 2017; Stewart 2017). When more work is depended on collaboration platforms, employees automatically spend more time on these platforms (Bughin et al. 2017). One of the consequences of this intense use is that *employees are much more visible* in the organisation, e.g. by making the associations in the network observable (Leonardi et al. 2013; Treem and Leonardi 2013). Thereby, it becomes easier to assess *who knows what* and *who knows whom* (Leonardi 2014). When employees, for instance, publish a blog post or participate in a discussion on a platform, they become visible as an expert or as a ‘go-to person’ in this domain in the organisation. This can result in more messages asking for more details and new requests to help other colleagues in projects but also daily work where the expertise is badly needed. If organisations and specifically management do not provide guidelines, set examples and, most importantly, account for

the efforts that collaboration platforms require, collaborative overload appears like the collateral damage of a system, which aims at nudging a behaviour of knowledge sharing and collaboration. Until today, only few organisations budget employees time spent on emails, meetings, collaboration and collaboration platforms more generally (Cross et al. 2016; Mankins and Garton 2017).

Collaborative overload is at the intersection of research in Information Systems (IS), management, organisational studies and organisational psychology. The phenomenon and the related research can be described as multi-faceted and multi-layered since societal trends, organisational structures, team as well as individual facets are at play. Moreover, the research is multi-method, for example, ethnographies, experiments, and social network analysis are used. In the IS discipline, collaborative overload can be seen as an extension of earlier work on information overload. The common denominator is the growing complexity of communication media repertoires (Watson-Manheim and Bélanger 2007). Moreover, collaborative overload can also be seen as a subset of the research stream of technostress with respect to communication and collaboration technologies, especially ESS (Ragu-Nathan et al. 2008). In this setting, the focus is on two stressors: technology-overload (*too much*) and technology-invasion (*always connected*; Tarafdar et al. 2011).

Despite unique characteristics of collaborative overload, all described overload phenomena are entangled. For example, all five can be exemplified as an inverted u-shaped curve (cf. Karr-Wisniewski and Lu 2010, p. 1062). Utilisation of more information, more email, more communication, more available technology and increasing collaboration can initially be leveraged and lead to an improved individual productivity. But only up to a point. After this, if more information needs to be integrated, more emails are exchanged, more communication happens, more technology needs to be used or more collaboration is taking place, the productivity decreases and overload scenarios occur. This tipping point can vary for each employee. Thus, the individual level is important to understand such overload scenarios in general and collaborative overload in particular. Besides, spill-over effects can shift the tipping point. For instance, stress in private life exacerbates the perception and effects of overload.

The potential impact of collaborative overload has grown over the last years, inter alia due to the proliferation of social and collaboration technologies (Bughin et al. 2017). However, even though the term information overload has been discussed for decades, we still lack a clear conceptualisation (Lincoln 2011; O'Reilly 1980). Amongst others, a reason for this can be seen in different underlying research paradigms such as technology or social determinism (Kalman 2017). Some scholars focus solely on technology itself and do not consider social factors. For example, management information systems research focused mainly on software artefacts to deal with information overload but did not pay sufficient attention to root causes (Eppler and Mengis 2004). In the same vein, the important question if technology is a cause or solution for these phenomena is not answered yet (Bawden et al. 1999; Eppler and Mengis 2004; Sobotta 2016). Technology is often seen as means to reduce overload, but social processes are at minimum equally important (Barley et al. 2011). Other models view technology as a cause for overload (Karr-Wisniewski and Lu 2010; Stephens et al. 2017). In essence, technology can be both, helpful and harmful, and can even behave paradoxically (Jarvenpaa and Lang 2005). Which aspect prevails depends on the individual knowledge worker and, drawing on the affordances of collaboration platforms, how they are appropriated and used in daily work: "The very same features available in different technologies are being appropriated and interpreted as either facilitating communication overload, or reducing communication overload" (Stephens et al., 2017, p. 15). This is also true for collaborative overload. Therefore, the investigation of collaborative overload needs to integrate organisational and social dimensions next to technical dimensions (Maruping and Magni 2015).

3 Trends and Concerns

To answer the second research question, i.e. "*what are underlying causes of collaborative overload?*", we analyse and synthesise trends and related concerns. This problematisation covers three perspectives: First, the organisational and managerial level is introduced as framing conditions. Second, the technical level addresses the impact of collaborative technology. Third, the individual level covers both, managers as well as employees.

3.1 Organisational and Managerial Level: Framing Conditions

At the organisational level, there is a trend towards *matrix structures* (see Table 1) as opposed to functional and divisional structures (Cross et al. 2013, 2016; Cross and Gray 2013). Driven by the increased technical and organisational complexity of products and services, *work in teams*, often globalized and cross-functional, is seen as a requirement to be innovative and efficient (Cross et al. 2015). In the past, organisations were striving for individual employee optimisation. Today, the focus is on team optimisation since most of the problems are addressed in teams (Duhigg 2016). These two trends combined, lead to the development of *multi-project environments* (Zika-Viktorsson et al. 2006) and *multiple team memberships* (O’Leary et al. 2011). Parallel running projects lead to a higher share of coordination work in contrast to single project or departmental work. In contemporary workplaces, the employees are *ubiquitously and constantly connected*, which leads to *fragmented* and frequently *interrupted* work patterns. Moreover, they can even be regarded as necessary, especially for knowledge workers (Wajcman and Rose 2011). The effects of these developments with regard to collaborative overload are worsened by the underlying belief that *collaboration is seen as a panacea and an end in itself* (Breu et al. 2005; Dewar et al. 2009). Without clear goals and a shared understanding within the organisation why collaboration should be facilitated and increased, it is likely that no value-adding collaboration can be achieved (Gardner 2017; Randle 2017).

A related concern is that the *demanding nature of collaborative work* is not acknowledged (Barley et al. 2011). Since employees are more often asked for input, to provide access to resources or to attend meetings and telephone conferences, the share of necessary coordination work instead of doing project work is constantly growing (Eppler and Mengis 2004). In addition, the number and length of meetings also increases. Sometimes meetings and telephone conferences are experienced as boring and as a waste of time (Dewar et al. 2009). German managers, for example, indicated that too many and inefficient meetings account for 30 percent of overall boredom of their employees (Robert Half 2017). Another study from 2016 shows, that the three main obstacles to successful meetings are (1) lack of preparation, (2) too many and (3) the wrong selection of participants (Berg Lund & Company 2016). This is characterised by a *lack of accountability of meetings and conference call time*. Meetings are oftentimes the first choice to distribute information which can result in meeting overload. Another concern is that these developments come along with higher levels of (demanded) *multitasking*. However, if the human brain is capable to do this is still highly debated. Studies show that multitasking has more perils than advantages such as hampered productivity and increased anxiety (Atchley 2010; Ophir et al. 2009; Turkle 2015). Striving for more efficient teams may indeed lead to the opposite outcome: that *teams are structurally unproductive and inefficient*. Research shows that group norms such as an equal share of speaking turns and social sensitivity, which yield psychological safety (Edmondson 1999), are basic requirements for productive teams (Duhigg 2016). This is oftentimes not considered when new teams are formed. Overall, the increasing collaborative modes of working lead to less time for individual, interruption-free work. To compensate for this, employees work late or bring work home. This is mainly due to the *lack of structural protection of employee’s productive work and time* (Fried 2016).

Trends	Concerns
Increasing collaborative modes of working, specifically more: <ul style="list-style-type: none"> • Matrix structures (Cross et al. 2013, 2016; Cross and Gray 2013) • (Distributed) Teamwork (Cross et al. 2015) • (Multi-) Project work (Zika-Viktorsson et al. 2006) and multiple team membership (O’Leary et al. 2011) • Interruptions, which are seen as ‘normal’ or even as a necessary part of knowledge workers’ workday (Wajcman and Rose 2011) • Collaboration, which is seen as an end in itself (Breu et al. 2005; Dewar et al. 2009; Gardner 2017; Randle 2017) 	<ul style="list-style-type: none"> • Collaborative work is highly demanding (Barley et al. 2011; Dewar et al. 2009; Eppler and Mengis 2004) • Perils of multitasking (Atchley 2010; Ophir et al. 2009; Turkle 2015) • Too many structurally unproductive and inefficient teams (Duhigg 2016) • Lack of accountability for meeting and conference call time (Fried 2016) • Overall, lack of structural protection of employee’s productive time (Fried 2016)

Table 1. Trends and Concerns on the Organisational Level

3.2 Technology Level: Impact of Collaborative Technology

The second trend is about the impact of collaborative technology. Over the past ten years, *the share of social technologies in the workplace has been growing rapidly* (see Table 2). Driven by, perhaps exaggerated (Giermindl et al. 2017), promises of productivity gains, more organisations are introducing collaboration platforms (Bughin et al. 2017). As a result, these platforms directly impact daily work practices: An *'always on' mentality* leads to a cycle of responsiveness where everybody feels the need to be available 24/7. This is due to the perceived need for employees that in order to be successful, one has to be highly responsive (Perlow 2012). Besides, collaboration platforms are designed to prime and nudge users to spend more time using them (Stewart 2017) and companies engage in user monitoring based on ESS analytics (Lock Lee 2017).

Related concerns to this technology push are that *organisations do not know how collaborative technology should be used*. This is true for the individual but also for the team level (Maruping and Magni 2015). This is further reflected in the *limited individual knowledge* how social technology can be used efficiently. When existing organisational defects are further supported with technology, these *issues are exacerbated* which can lead to even worse outcomes (Griffith 2014; Maruping and Magni 2015). Such an example is the *inability to 'turn off'*. In a culture where full-time responsiveness is valued or even enforced, technologies like mobile devices, email and now collaboration platforms can lead to situations where employees are constantly exposed to interruptions. Another aspect is that technology may *create more complexity itself* that it delivers overall productivity improvements, e.g. due to prescribed usage patterns (Stephens et al. 2017). Since employees are part of more projects and teams which oftentimes use different technologies, the *individual media repertoire is increasing*, leading to highly differentiated situations where the common denominator is vanishing (Greene 2017). The dependency on technology can lead to perceived stress. On top on these concerns, some *specific fears regarding social technologies* exist. Due to the affordances of social platforms and the visible connections and contents, the possibilities to monitor the behaviour of employees increase. Related concerns are impression management and frustration, e.g. when employees are jealous of colleagues (Farzan et al. 2008). These concerns combined lead to the feeling that *contemporary knowledge work is characterised by overload scenarios and fragmentation* (Cross et al. 2015; Wajcman and Rose 2011).

Trends	Concerns
Impacts of collaborative technology <ul style="list-style-type: none"> • Growing share of social technologies in the workplace (Bughin et al. 2017) • 'Always on' mentality, cycle of responsiveness (Perlow 2012) • Platforms are designed to prime and nudge users to spend more time using them (Stewart 2017) • Companies engage in user monitoring based on ESS analytics (Lock Lee 2017) 	<ul style="list-style-type: none"> • Unclear organisational expectations how to use collaborative technology and limited individual knowledge (Griffith 2014; Maruping and Magni 2015) • Technology exacerbates organisational issues (Mankins 2017) • Inability to 'turn off' (Perlow 2012) • Technology creates more complexity than productivity gains (Stephens et al. 2017) • Increasing complex media repertoires: highly differentiated, vanishing common denominator (Greene 2017; Mankins 2017) • Social technology specific <ul style="list-style-type: none"> ○ Increased visibility (Treem and Leonardi 2013) and thus the ability to monitor behaviour ○ Impression management and frustration (Farzan et al. 2008) • Overall, overload scenarios and fragmentation of work (Cross et al. 2015; Wajcman and Rose 2011)

Table 2. Trends and Concerns on the Technology Level

3.3 Individual Level: Managers and Employees

The increasing role of collaborative work on the organisational level causes an *increasing ratio of collaborative activities for the individual* (see Table 3). This is true at the manager but also at the employee level. The distinction is important since managers have a strong influence on the nature of col-

laboration in their organisations and teams, respectively. Shaping collaboration should be seen as part of the managerial functions. Managers spent most of the time in communication (Mintzberg 1990). Today, they spend up to 21 hours a week in meetings (Mankins and Garton 2017). At the employee level, i.e. knowledge workers without managerial responsibility, the same rationale applies (Cross and Gray 2013). According to a recent study, 60 percent of employees have to communicate with at minimum ten colleagues to get their work done, 30 percent with 20 colleagues or more (CEB 2013).

Associated concerns are, that *managers at the intersection points* of matrix-based structures can be overloaded due to the increased (collaborative) demands (Feintzeig 2016; Mankins and Garton 2017). Also, managers often *do not know how to shape collaboration* in teams but also in routine work in departments (Maruping and Magni 2015). They regularly “shoot blindly” (Cross and Gray 2013, p. 2) when they introduce social technologies to increase value-adding communication and collaboration. One reason for this can be the reduced costs for advice seeking. For example, by introducing communication and collaboration platforms, employees tend to *ask highly visible experts* instead of searching for the needed information on their own (Cross et al. 2016; Cross and Gray 2013). Thus, these structurally exposed, visible employees pay a larger collaborative toll than others. A recent indicator for this concern is the benchmarking report of the social network analysis company SWOOP Analytics. They compared 57 companies with in total more than 250.000 employees over a period of six months (Lock Lee 2017). The metric called ‘key player risk’ shows that 50 percent of the network connections are made by only seven percent of the network participants. This can lead to uneven and lopsided collaboration (Cross et al. 2016). Furthermore, modern search algorithms can increase the amount of work for experts even more since they get placed at the top ranks (Cross and Gray 2013). Also, *behavioural traits* are at play, e.g. ‘extra-miler’ are prone to experience collaborative overload. These employees are willing to help others and add much of the valuable collaboration within organisations (Grant and Rebele 2017). Due to these concerns, the *perceived control* over the own work schedule is diminishing (Cross and Gray 2013) since it is likely that too often a colleague interrupts the current tasks and asks for help or advice: “I am constantly looking over my shoulder, fearing that someone is about to throw something at me.” (Perlow 1999, p. 65). Overall, employees and managers *do not have enough uninterrupted time for individual work* (Cross et al. 2016; Mankins and Garton 2017).

Trends	Concerns
Increasing ratio of collaborative activities for <ul style="list-style-type: none"> • managers (Mankins and Garton 2017; Mintzberg 1990) • and employees (CEB 2013; Cross and Gray 2013) Workdays are primarily characterised by communication and collaboration.	<ul style="list-style-type: none"> • Managers at intersections of matrix structures get overloaded (Feintzeig 2016; Mankins and Garton 2017) • Limited knowledge how to shape collaboration on the managerial level (Cross and Gray 2013; Maruping and Magni 2015) • Experts and structurally exposed individuals (e.g. boundary spanners) easily get overburdened with requests (Cross et al. 2016; Cross and Gray 2013). • Behavioural traits (‘givers’) may push employees close burn-outs (Grant 2013; Grant and Rebele 2017) • Diminishing ‘perceived control’ over one’s own schedule (Cross and Gray 2013) • Overall, managers and employees do not have enough uninterrupted time (Cross et al. 2016; Mankins and Garton 2017)

Table 3. *Trends and Concerns on the Individual Level*

The described trends and concerns are not exhaustive, rather they provide an account of developments which can be regarded as possible explanations and underlying reasons for collaborative overload. Moreover, trends do not work in isolation but can reinforce each other, also across the three levels. Metaphorically speaking, the organisational and managerial framing conditions can be viewed as an ‘engine’ and technology as the ‘fuel’ to enhance the speed of an enterprise, leading to individual consequences for the workforce. For instance, a company is not aware how employees are spending their time and is further lacking structural protection of employee’s time as well. With the introduction of a collaboration platform, this problem is exacerbated since it is easier to draw on colleagues’ time and energy. In the end, employees do not have enough uninterrupted time and productivity losses occur.

4 Discussion

Based on the contextualisation and the underlying trends and concerns of collaborative overload, the key issue appears to be finding a *balance between collaborative and uninterrupted work*. Specifically, the main objective for organisations with respect to long-term, productive collaboration for their members (managers and employees) is to reach a suitable balance of the time devoted to collaborative tasks on the one hand and individual and uninterrupted tasks on the other hand (Perlow 1999). While this dichotomy is not new, a balance of these activities in the teamwork-intense workplace of the 21st century is more relevant than ever. Collaboration, guided by organisational norms and rules and supported by appropriate technology, is important and necessary to be able to solve mission-critical problems which can hardly be done by single employees. However, without enough uninterrupted individual time, employees cannot concentrate on the task at hand and do the necessary individual work in the required quality. The path to find a suitable balance, encourage more collaboration or more individual and uninterrupted time, depends on many contingencies and is specific for every employee as well as the whole organisation.

By revisiting the introductory vignette, we can make several observations related to this key issue. The rollout of a collaboration platform requires expectation management by developing rules and norms. In the case of Paul and Anna, the central question is: *who* is expected to respond and *how fast* to field agents via IM? Anna, voluntarily or because of organisational requirements, has opted to use the tool with a larger amount of field agents. If this increased share of collaborative activities is expected and acknowledged by management, the work organisation needs to be changed accordingly. If not, Anna is a candidate for experiencing collaborative overload, amongst others, due to limited control over her communication and collaboration media repertoire as well as the changed work practices.

4.1 Research Agenda

To extend prior and enable future research, a *conceptualisation of collaboration in general and collaborative overload in particular* is needed: Which activities count as individual and which as collaborative work, e.g. working individually on a collaborative proposal? Are IMs and emails seen as part of collaboration? Is email overload part of collaborative overload? There is a risk of conflating organisational, technological and psychological issues. To address these issues, we propose the following research agenda (see Table 4).

Research Steps	Guiding Research Questions
Conceptualising collaborative overload	<ul style="list-style-type: none"> • RQ1: What counts as collaborative activity? • RQ2: What are suitable metrics for collaborative overload, e.g. a certain ratio of collaborative activities or perceived overload? • RQ3: What are reliable methods to measure the individual workload? • RQ4: Are there distinctive types of overload such as email or meeting overload? • RQ5: Is collaborative overload an accumulated problem, i.e. a syndrome, consisting of co-occurring overload phenomena? • RQ6: Is collaborative overload a form of (techno)stress and as such measurable with established stress metrics?
Investigating causes and conditions of collaborative overload	<ul style="list-style-type: none"> • RQ7: Which organisational characteristics and cultures contribute to collaborative overload? (<i>organisational</i>) • RQ8: How does team culture influence collaborative overload? (<i>organisational</i>) • RQ9: Is collaborative overload a leadership issue? (<i>organisational</i>) • RQ10: Which platforms and devices do knowledge workers use for collaboration, i.e. what constitutes the collaboration media repertoire? (<i>technological</i>) • RQ11: Are collaborative platforms designed to nudge employees to spend more time using them? (<i>technological</i>) • RQ12: How do personality traits influence collaborative overload? (<i>individual</i>)

Table 4. Research Agenda for Collaborative Overload

In a first step, it is necessary to establish common ground towards the nature of collaboration, i.e. a categorisation of collaborative activities is needed (RQ1). This is pivotal and forms the fundament of the discourse. The extant literature offers different operationalisations of collaboration (Cross et al. 2016; Wajcman and Rose 2011). Besides, practitioners interpret it differently (Bughin et al. 2017; Fried 2016). This makes the discourse difficult and mostly inconsequential. Currently, we conceptualise individual work as periods of uninterrupted work in solitude. Collaboration, in contrast, involves interacting with at least one colleague to work together on a common task (Zigurs and Munkvold 2006). What are suitable metrics for collaborative overload (RQ2)? Does a certain ratio of collaborative activities in a specific timeframe, e.g. more than 75 percent per week, counts as overload (objective)? Is perceived overload the relevant metric (subjective)? Or is a combination of both constituting overload? What are reliable and valid methods to track how employees spend their time at work to determine the as-is status in the first place (RQ3)? Asking employees to reconstruct the workweek in hindsight can lead to inaccurate data due to the multiplicity and fragmentation of activities (Timely 2018). This stocktaking of collaborative activities must include time spent on collaboration platforms, measurable in form of *transactional data* (e.g. log files) and *user-generated data* (e.g. content), as well as *organisational data* in the broader sense (e.g. time spent in meetings; cf. Schwade and Schubert 2017). Further important conceptual questions are if the described types of overload such as email and meeting overload are distinctive (RQ4) and if collaborative overload is a constellation of different overload phenomena and thus a syndrome (RQ5)? Is collaborative overload a form of (techno)stress and as such measurable with established stress metrics (RQ6)?

The second step comprises the *investigation of causes and conditions*. For this, we draw again on the tripartite levels introduced in section three to structure the analysis. On the organisational level: Which organisational characteristics and cultures contribute to collaborative overload, for instance, the uncontrolled growth of meeting or the expectation to use ESS without recognition of the effort as part of worktime or performance (RQ7)? What is the influence of the team culture? For example, does a lack of psychological safety explain collaborative overload (RQ8)? Does collaborative overload occur when managers and leaders are not shaping collaboration? In other words, is collaborative overload a leadership issue (RQ9)? On the technological level: Which platforms and devices do knowledge workers use (RQ10)? Is the design of platforms upfront geared towards overload conditions, e.g. by sending alerts and reminders and thus interrupting and fragmenting work (RQ11)? Lastly, on the individual or psychological level: What is the impact of psychological predispositions and personality traits in general, e.g. to be a 'giver' or a 'taker' (RQ12)?

After causes and conditions have been clarified, the next general step is to develop a diagnostic method for collaborative overload. In the course of this development specific organisational as well as collaboration platform metrics can be developed to assess when and how employees are susceptible to collaborative overload. Correspondingly to the prior analysis, this method must consider the organisational framing conditions, the impact of technology as well as individual contingencies.

4.2 Research Framework

To not only depict current research gaps but also to take a step forward, we introduce an initial research framework for collaborative overload as our tentative conceptualisation. The framework exhibits how the different facets, i.e. causes and conditions, interact with each other. It extends the contextualisation from section two and further delineates collaborative overload. Again, each facet is mapped to the organisational, technological or individual level (see Figure 1).

Antecedents of collaborative overload on the organisational level are the following: (a1) *work organisation* describes the organisational structures how work is organised. For example, project-intense environments or matrix-based structures can accelerate, intensify and fragment the work. This also comprises what activities are accounted for as work time and if workhours are generally tracked. For instance, when a collaboration platform is used but the time spend on the platform is not accounted for as work. When organisations are not aware how managers and employees spend their time, not only on collaborative platforms but also in meetings or working on emails, they are not aware of potential

overload scenarios; (a2) *organisational culture* depicts the visible rules and invisible norms which impact how work is done. For example, a cycle of responsiveness can lead to the norm of being constantly available; (a3) *team composition* describes the practices how teams are formed. For example, how leaders and members are selected regarding age, gender or expertise. Technological antecedents are: (a4) *technology design* encompasses how the technology itself is developed, e.g. to nudge employees to spend as much time as possible on the platform; (a5) the *communication and collaboration media repertoire* describes which platforms and devices can or have to be used for daily work.

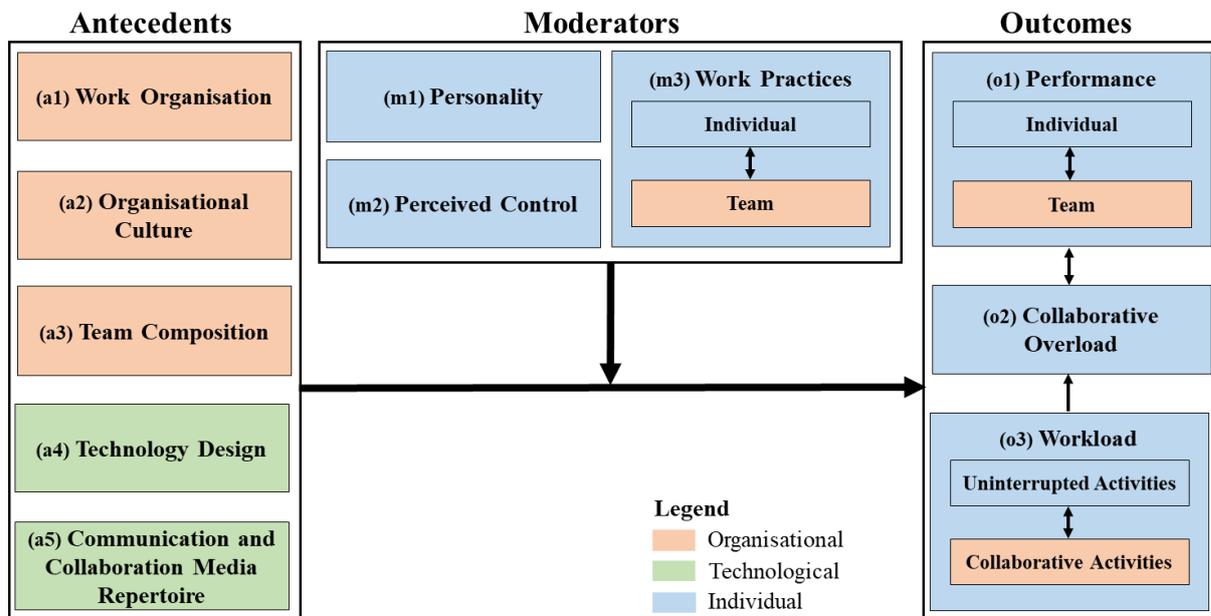


Figure 1. Initial Research Framework for Collaborative Overload

The primary outcomes are the measures of (o1) *performance* and (o3) *workload*, both on the individual and team level. The workload is an important outcome for the identified key issue of balancing collaborative and uninterrupted work. It answers questions regarding the overall workload, e.g. hours per week, as well as the ratio between uninterrupted and collaborative activities. The secondary outcome is perceived (o2) *collaborative overload*.

This relationship is moderated by three facets: (m1) *personality* describes, among others, if employees act as givers, matchers or takers; (m2) *perceived control* over the own workweek also moderates the outcomes. For example, low perceived control can lead to increased overload since coping mechanisms can only be applied to a limited extent; also (m3) *work practices* influence the relationship between the antecedents and the outcomes. Individual work practices, e.g. rules and techniques where and when to work and other patterns of time allocation, impact team work practices. Thus, individual and team work practices are oftentimes mutually dependent.

We are suggesting three propositions to illustrate the application of the initial research framework to render the above research questions more precisely:

- Proposition 1 (a1/m2/o3 addressing RQ7 and RQ12): *Knowledge workers in multi-project environments with low perceived control regarding their workday are more likely to report a higher share of collaborative activities than uninterrupted activities.*
- Proposition 2 (a5/m3/o1 addressing RQ8 and RQ10): *Knowledge workers who use diversified and complex communication and collaboration media repertoires with conflicting individual and team work practices achieve a lower performance.*
- Proposition 3 (o1/o2/o3 addressing RQ2): *Knowledge workers who report to have not enough individual and uninterrupted time are more likely to perceive collaborative overload and thus achieve a lower performance.*

It is important to emphasise that the initial research framework as well as the research agenda depict our tentative understanding of collaborative overload and are thus not meant to be exhaustive. In future research, additional facets might be included or the focus might shift to specific ones which are expected to have a stronger influence on collaborative overload. For instance, specific personality traits next to the trichotomy of giver, matcher or taker, such as conscientiousness or extraversion (Goldberg 1990) might have an impact on collaborative overload.

5 Conclusion

In knowledge-intense workplaces, more work is done in networks and teams. This has led to a growing share of collaborative activities, which can account for up to 80 or even 95 percent of an employee's typical work. In line with these trends, concerns have been raised regarding unintended, negative consequences of these collaboration-intense work environments and modes of organising. One of these consequences is collaborative overload. It describes scenarios in which employees are piled with excessive messages and emails asking for help or attending meetings with less time for uninterrupted work. Although remedies have been proposed, we suggest to first develop a more nuanced understanding of what collaborative overload constitutes and what its underlying root causes are.

We have aimed to establish a frame of reference for the discourse with the research agenda and the initial research framework for collaborative overload. The research agenda depicts the steps which need to be taken to advance the understanding of this important syndrome of modern workplaces. The initial research framework helps to disentangle the phenomenon by highlighting its constituting facets. We have identified organisational, managerial and technical antecedents of collaborative overload, which we conceptualise as an individual issue construct. Organisations are well advised to recognise the risks and downsides of too much collaboration and to provide an environment which is sensitive to this issue and creates awareness of often unnoticed collaborative efforts, for example by means of measuring collaborative activities.

Finally, we agree that there will be no definite solution for phenomena like information or collaborative overload (Eppler and Mengis 2004). The right balance is not a state but an ongoing process since "both the creation and reduction of overload, as parallel processes, can occur at the same time" (Weick 1970, p. 85). However, we are confident that our contributions are valuable steps in a process of improvement and refinement (Eppler and Mengis 2004) to shed more light on and explain the phenomenon of collaborative overload.

References

- *Aral, S., Brynjolfsson, E., and Van Alstyne, M. 2012. "Information, Technology, and Information Worker Productivity," *Information System Research* (23:3), pp. 849–867.
- *Atchley, P. 2010. "You Can't Multitask, So Stop Trying," *Harvard Business Review* (available at <https://hbr.org/2010/12/you-cant-multi-task-so-stop-tr>; retrieved April 20, 2018).
- *Barley, S. R., Meyerson, D. E., and Grodal, S. 2011. "E-mail as a Source and Symbol of Stress," *Organization Science* (22:4), pp. 887–906.
- *Bawden, D., Holtham, C., and Courtney, N. 1999. "Perspectives on information overload," *Aslib Proceedings* (51:8), pp. 249–255.
- *Berg Lund & Company. 2016. "BLC Studie Unternehmenssteuerung 2016," (available at <http://berg-lund.de/publikationen/unternehmenssteuerung-2016>; retrieved April 20, 2018).
- Boell, S. K., and Cecez-Kecmanovic, D. 2014. "A Hermeneutic Approach for Conducting Literature Reviews and Literature Searches," *Communications of the Association for Information Systems* (34:12), pp. 257–286.
- *Breu, K., Hemingway, C., and Ashurst, C. 2005. "The impact of mobile and wireless technology on knowledge workers: An exploratory study," in *Proceedings of the 13th European Conference on Information Systems*, Regensburg, Germany.
- *Bughin, J., Chui, M., Harrysson, M., and Lijek, S. 2017. "Advanced social technologies and the

- future of collaboration,” *McKinsey Global Institute*.
- *CEB. 2013. “Driving the Strategic Agenda in the New Work Environment,” (available at <https://www.cebglobal.com/content/dam/cebglobal/us/EN/talent-management/workforce-surveys/pdfs/workforce-survey-analytics-survey-solutions.pdf>; retrieved April 20, 2018).
- *Chui, M., Manyika, J., Bughin, J., Dobbs, R., Roxburgh, C., Sarrazin, H., Sands, G., and Westergren, M. 2012. “The social economy: Unlocking value and productivity through social technologies,” *McKinsey Global Institute*.
- *Cross, R., Ernst, C., Assimakopoulos, D., and Ranta, D. 2015. “Investing in boundary-spanning collaboration to drive efficiency and innovation,” *Organizational Dynamics* (44:3), pp. 204–216.
- *Cross, R., and Gray, P. 2013. “Where Has the Time Gone? Addressing Collaboration Overload in a Networked Economy,” *California Management Review* (56:1), pp. 1–17.
- *Cross, R., Kase, R., Kilduff, M., and King, Z. 2013. “Bridging the gap between research and practice in organizational network analysis: A conversation between Rob Cross and Martin Kilduff,” *Human Resource Management* (52:4), pp. 627–644.
- *Cross, R., Rebele, R., and Grant, A. 2016. “Collaborative Overload,” *Harvard Business Review* (94:1), pp. 74–79.
- D’Arcy, J. D., Gupta, A., Tarafdar, M., and Turel, O. 2014. “Reflecting on the ‘Dark Side’ of Information Technology Use,” *Communications of the Association for Information Systems* (35:5), pp. 109–118.
- *Dabbish, L. A., and Kraut, R. E. 2006. “Email Overload at Work: An Analysis of Factors Associated with Email Strain,” in *Proceedings of the 20th Anniversary Conference on Computer Supported Cooperative Work*, Banff, Canada, pp. 431–440.
- *Dewar, C., Keller, S., Lavoie, J., and Weiss, L. M. 2009. “How do I drive effective collaboration to deliver real business impact?,” *McKinsey & Company*.
- *Duhigg, C. 2016. *Smarter, Faster, Better - The Secrets of Being Productive in Life and Business*, New York, USA: Penguin Random House.
- *Edmondson, A. 1999. “Psychological Safety and Learning Behavior in Work Teams,” *Administrative Science Quarterly* (44:2), pp. 350–383.
- *Eppler, M. J., and Mengis, J. 2004. “The Concept of Information Overload: A Review of Literature from Organization Science, Accounting, Marketing, MIS, and Related Disciplines,” *The Information Society* (20:5), pp. 325–344.
- *Evaristo, R., Adams, C., and Curley, S. 1995. “Information load revisited: A theoretical model,” in *Proceedings of the 16th International Conference on Information Systems*, Amsterdam, Netherlands.
- *Farzan, R., DiMicco, J. M., Millen, D. R., Brownholtz, B., Geyer, W., and Dugan, C. 2008. “Results from Deploying a Participation Incentive Mechanism within the Enterprise,” in *Proceedings of the 26th SIGCHI Conference on Human Factors in Computing Systems*, Florence, Italy.
- *Feintzeig, R. 2016. “So Busy at Work, No Time to Do the Job,” *The Wall Street Journal* (available at <https://www.wsj.com/articles/so-busy-at-work-no-time-to-do-the-job-1467130588>; retrieved April 20, 2018).
- *Fried, J. 2016. “Restoring Sanity to the Office,” *Harvard Business Review* (available at <https://hbr.org/ideacast/2016/12/restoring-sanity-to-the-office.html>; retrieved April 20, 2018).
- Fulk, J., and Yuan, Y. C. 2013. “Location, Motivation, and Social Capitalization via Enterprise Social Networking,” *Journal of Computer-Mediated Communication Location* (19:1), pp. 20–37.
- Fuller, R. M., and Dennis, A. R. 2009. “Does fit matter? The impact of task-technology fit and appropriation on team performance in repeated tasks,” *Information Systems Research* (20:1), pp. 2–17.
- *Gardner, H. K. 2017. *Smart Collaboration: How Professionals and Their Firms Succeed by Breaking Down Silos*, Boston, USA: Harvard Business Review Press.
- Gartner. 2017. “Social Software in the Workplace,” (available at <https://www.gartner.com/reviews/market/workplace-social-software>; retrieved April 20, 2018).
- *Giermindl, L., Strich, F., and Fiedler, M. 2017. “Do Enterprise Social Networks Increase Productivity or Lead to Information Overload?,” in *Proceedings of the 23rd Americas*

- Conference on Information Systems*, Boston, USA.
- Goldberg, L. R. 1990. "An Alternative 'Description of Personality': The Big Five Factor Structure," *Journal of Psychology and Social Psychology* (59:6), pp. 1216–1229.
- *Gomez-Rodriguez, M., Gummadi, K. P., and Schölkopf, B. 2014. "Quantifying Information Overload in Social Media and its Impact on Social Contagions," in *Proceedings of the 8th International AAAI Conference on Weblogs and Social Media*, Ann Arbor, USA, pp. 170–179.
- *Grant, A. 2013. *Give and Take: A Revolutionary Approach to Success*, New York, USA: Penguin Group.
- *Grant, A., and Rebele, R. 2017. "Generosity Burnout," *Harvard Business Review* (available at <https://hbr.org/cover-story/2017/01/beat-generosity-burnout>; retrieved April 20, 2018).
- *Greene, J. 2017. "Beware Collaboration-Tool Overload," *The Wall Street Journal* (available at <https://www.wsj.com/articles/beware-collaboration-tool-overload-1489370400>; retrieved April 20, 2018).
- *Griffith, T. L. 2014. "Are Companies Ready to Finally Kill Email?," *MIT Sloan Management Review* (available at <http://sloanreview.mit.edu/article/are-companies-ready-to-finally-kill-email/>; retrieved April 20, 2018).
- *Jarvenpaa, S. L., and Lang, K. R. 2005. "Managing the Paradoxes of Mobile Technology," *Information Systems Management* (22:4), pp. 7–23.
- *Kalman, Y. 2017. "Why do we blame information for our overload?," in *Work Pressures: New Agendas in Communication*, D. I. Ballard and M. S. McGlone (eds.), New York, USA: Routledge, pp. 45–61.
- Kane, G. C. 2015. "Enterprise Social Media: Current Capabilities and Future Possibilities," *MIS Quarterly Executive* (14:1), pp. 1–16.
- *Karr-Wisniewski, P., and Lu, Y. 2010. "When more is too much: Operationalizing technology overload and exploring its impact on knowledge worker productivity," *Computers in Human Behavior* (26:5), pp. 1061–1072.
- Kok, A. de, and Helms, R. W. 2016. "Attitude Towards the New Way of Working - a Longitudinal Study," in *Proceedings of the 24th European Conference on Information Systems*, Istanbul, Turkey.
- *Koroleva, K., Krasnova, H., and Günther, O. 2010. "'STOP SPAMMING ME!' - Exploring Information Overload on Facebook," in *Proceedings of the 16th Americas Conference on Information Systems*, Lima, Peru.
- Lee, J. 2016. *The Impact of ICT on Work*, Springer.
- Leidner, D. E., and Kayworth, T. 2006. "A Review of Culture in Information Systems Research: Toward a Theory of Information Technology Culture Conflict," *MIS Quarterly* (30:2), pp. 357–399.
- *Leonardi, P. M. 2014. "Social Media, Knowledge Sharing, and Innovation: Toward a Theory of Communication Visibility," *Information Systems Research* (25:4), pp. 796–816.
- *Leonardi, P. M., Huysman, M., and Steinfield, C. 2013. "Enterprise Social Media: Definition, History, and Prospects for the Study of Social Technologies in Organizations," *Journal of Computer-Mediated Communication* (19:1), pp. 1–19.
- *Lincoln, A. 2011. "FYI: TMI: Toward a holistic social theory of information overload," *First Monday* (16:3).
- *Lock Lee, L. 2017. "Enterprise Social Networking Benchmarking Report 2017," *SWOOP Analytics* (available at <http://www.swoopanalytics.com/media/swoop-releases-2017-enterprise-social-network-benchmark-report/>; retrieved April 20, 2018).
- *Maier, C., Laumer, S., Eckhardt, A., and Weitzel, T. 2015. "Giving too much social support: social overload on social networking sites," *European Journal of Information Systems* (24:5), pp. 447–464.
- *Mankins, M. 2017. "Collaboration Overload Is a Symptom of a Deeper Organizational Problem," *Harvard Business Review* (available at <https://hbr.org/2017/03/collaboration-overload-is-a-symptom-of-a-deeper-organizational-problem>; retrieved April 20, 2018).
- *Mankins, M., and Garton, E. 2017. *Time, Talent, Energy*, Boston, USA: Harvard Business Review

- Press.
- *Maruping, L. M., and Magni, M. 2015. "Motivating Employees to Explore Collaboration Technology in Team Contexts," *MIS Quarterly* (39:1), pp. 1–16.
 - Mazmanian, M., Orlikowski, W. J., and Yates, J. 2013. "The Autonomy Paradox: The Implications of Mobile Email Devices for Knowledge Professionals," *Organization Science* (24:5), pp. 1337–1357.
 - *McAfee, A. 2009. *Enterprise 2.0: New collaborative tools for your organization's toughest challenges*, Boston, USA: Harvard Business School Press.
 - *Mintzberg, H. 1990. "The Manager's Job: Folklore and Fact," *Harvard Business Review* (86), pp. 163–176.
 - *O'Leary, M. B., Mortensen, M., and Woolley, A. W. 2011. "Multiple Team Membership: a Theoretical Model of Its Effects on Productivity and," *Academy of Management Review* (36:3), pp. 461–478.
 - *O'Reilly, C. A. 1980. "Individuals and Information Overload in Organizations: Is More Necessarily Better?," *Academy of Management Journal* (23:4), pp. 684–696.
 - *Ophir, E., Nass, C., and Wagner, A. D. 2009. "Cognitive control in media multitaskers," *Proceedings of the National Academy of Sciences of the United States of America* (106:37), pp. 15583–15587.
 - *Ouardi, Y., Goyal, T., Graf-Vlachy, L., Mammen, J., König, A., and Saunders, C. 2016. "The Cost of Sharing: The Effect of Sharing Inclination on Information Overload," in *Proceedings of 24th European Conference on Information Systems*, Istanbul, Turkey.
 - Paré, G., Trudel, M. C., Jaana, M., and Kitsiou, S. 2015. "Synthesizing information systems knowledge: A typology of literature reviews," *Information and Management* (52:2), pp. 183–199.
 - *Perlow, L. A. 1999. "The time famine: Toward a sociology of work time," *Administrative Science Quarterly* (44:1), pp. 57–81.
 - *Perlow, L. A. 2012. *Sleeping With Your Smartphone*, Boston, USA: Harvard Business Review Press.
 - *Perlow, L. A. 2014. "Manage Your Team's Collective Time," *Harvard Business Review* (92:6), pp. 23–25.
 - *Perlow, L. A., and Porter, J. L. 2009. "Making time off predictable--and required.," *Harvard Business Review* (87:10), pp. 102–109.
 - Pirkkalainen, H., and Salo, M. 2016. "Two Decades of the Dark Side in the Information Systems Basket: Suggesting Five Areas for Future Research," in *Proceedings of the 24th European Conference on Information Systems*, Istanbul, Turkey.
 - *Ragu-Nathan, T. S., Tarafdar, M., Ragu-Nathan, B. S., and Tu, Q. 2008. "Consequences of Technostress for End Users in Organizations: Conceptual Development and Empirical Validation," *Information Systems Research* (19:4), pp. 417–433.
 - *Randle, C. 2017. "24/7: Managing Constant Connectivity," in *Work Pressures: New Agendas in Communication*, D. I. Ballard and M. S. McGlone (eds.), New York, USA: Routledge, pp. 20–26.
 - *Robert Half. 2017. "Arbeitsmarktstudie 2017," (available at https://www.roberthalf.de/presse/ein-arbeitstag-langeweile-pro-woche?language_content_entity=de; retrieved April 20, 2018).
 - *Schumpeter. 2016. "The Collaboration Curse," *The Economist* (available at <https://www.economist.com/news/business/21688872-fashion-making-employees-collaborate-has-gone-too-far-collaboration-curse>; retrieved April 20, 2018).
 - Schwade, F., and Schubert, P. 2017. "Social Collaboration Analytics for Enterprise Collaboration Systems: Providing Business Intelligence on Collaboration Activities," pp. 401–410 (available at <http://hdl.handle.net/10125/41197>).
 - *Shannon, C., and Weaver, W. 1949. *The Mathematical Theory of Communication*, Urbana, USA: University of Illinois Press.
 - *Sobotta, N. 2016. "A Systematic Literature Review on the Relation of Information Technology and Information Overload," in *Proceedings of the 49th Hawaii International Conference on System Sciences*, Koloa, USA, pp. 858–867.
 - *Solon, O. 2017. "Ex-Facebook president Sean Parker: site made to exploit human 'vulnerability,'"

- The Guardian* (available at <https://www.theguardian.com/technology/2017/nov/09/facebook-sean-parker-vulnerability-brain-psychology>; retrieved April 20, 2018).
- *Speier, C., Valacich, J. S., and Vessey, I. 1999. "The Influence of Task Interruption on Individual Decision Making: An Information Overload Perspective," *Decision Sciences* (30:2), pp. 337–360.
- Srivastava, S. C., Chandra, S., and Shirish, A. 2015. "Technostress creators and job outcomes: Theorising the moderating influence of personality traits," *Information Systems Journal* (25:4), pp. 355–401.
- *Stephens, K. K. 2017. "Understanding Overload in a Contemporary World," in *Work Pressures: New Agendas in Communication*, D. I. Ballard and M. S. McGlone (eds.), New York, USA: Routledge.
- *Stephens, K. K., Mandhana, D. M., Kim, J. J., and Li, X. 2017. "Reconceptualizing Communication Overload and Building a Theoretical Foundation," *Communication Theory* (27:3), pp. 269–289.
- *Stewart, J. B. 2017. "Facebook Has 50 Minutes of Your Time Each Day. It Wants More.," *The New York Times* (available at <https://www.nytimes.com/2016/05/06/business/facebook-bends-the-rules-of-audience-engagement-to-its-advantage.html>; retrieved April 20, 2018).
- *Tarafdar, M., Tu, Q., Ragu-Nathan, T. S., and Ragu-Nathan, B. S. 2011. "Crossing to the Dark Side: Examining Creators, Outcomes, and Inhibitors of Technostress," *Communications of the ACM* (54:9), pp. 113–120.
- *The Radicati Group Inc. 2014. "Email Statistics Report, 2014-2018," (available at <https://www.radicati.com/?p=10644>; retrieved April 20, 2018).
- Timely. 2018. "Automatic time tracking benefits everyone," (available at <https://timelyapp.com/blog/automatic-time-tracking-benefits-everyone>; retrieved April 20, 2018).
- *Treem, J. W., and Leonardi, P. M. 2013. "Social Media Use in Organizations: Exploring the Affordances of Visibility, Editability, Persistence, and Association," *Annals of the International Communication Association* (36:1), pp. 143–189.
- *Turkle, S. 2015. *Reclaiming Conversation: The Power of Talk in a Digital Age*, New York, USA: Penguin Press.
- *Wajcman, J., and Rose, E. 2011. "Constant Connectivity: Rethinking Interruptions at Work," *Organization Studies* (32:7), pp. 941–961.
- *Watson-Manheim, M. B., and Bélanger, F. 2007. "Communication media repertoires: Dealing with the multiplicity of media choices," *MIS Quarterly* (31:2), pp. 267–293.
- Webster, J., and Watson, R. T. 2002. "Analyzing the Past to Prepare for the Future: Writing a Literature Review," *MIS Quarterly* (26:2), pp. xiii–xxiii.
- *Weick, K. E. 1970. "The twigging of overload," in *People and Information*, H. B. Pepinsky (ed.), New York, USA: Pergamon Press, pp. 67–129.
- Zigurs, I., and Munkvold, B. E. 2006. "Collaboration Technologies, Tasks, and Contexts," in *Human-Computer Interaction and Management Information Systems: Applications*, D. Galletta and P. Zhang (eds.), London, UK, pp. 143–169.
- *Zika-Viktorsson, A., Sundström, P., and Engwall, M. 2006. "Project overload: An exploratory study of work and management in multi-project settings," *International Journal of Project Management* (24:5), pp. 385–394.