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# Email Overload: Investigating Technology-fit Antecedents and Job-related Outcome

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## Abstract

*Email is the communication application most widely used in organizations. Yet, email is associated with a number of negative aspects, most prominently 'email overload' – a phenomenon that is theoretically interesting but vexing in practice because it has proved intractable to manage. We problematize the current understanding of email overload as being due to lack of understanding of its technology fit-related antecedents and job-related outcomes, and then investigate how email overload is influenced by a lack of fit between the communication applications that the organization provides to individuals and those that (1) they want, and that (2) are suitable for their tasks. We hypothesize that such lack of fit leads to email by default, defined as the perception of email being used improperly, when other communication applications would be better suited. Email by default is then hypothesized to lead to email overload. We further investigate job-related outcomes of email overload. The hypothesized relationships are supported by our findings, based on data from a two-stage, multi-method empirical study in a large manufacturing organization. The paper theoretically broadens the scholarly discourse on email overload to include novel antecedents and outcomes in the ongoing quest to establish a more complete understanding of this phenomenon.*

**Keywords:** email overload; person-technology fit; task technology fit; email by default; job satisfaction, role overload

## Introduction

Computer-mediated communication is a central attribute of the workplace. Studies suggest that white-collar workers (e.g. managers and professionals) spend about 40-60% of their day in such communication with co-workers (e.g. Dabbish & Kraut, 2006), most widely through email (e.g. Barley, Meyerson, & Grodal, 2011). As an indicator of the perennial importance of workplace email communication, research and anecdotal evidence suggest that the time spent by individuals in processing email at work increased over a recent ten year period, from 29 minutes in 2006 (Jackson, Dawson, & Wilson, 2001) to two hours in 2017 (Dietzen, 2017; Ofcom, 2016). A key characterization of email, however, is that it is associated with a number of negative aspects, most prominently 'email overload' (Whittaker & Sidner, 1996), defined as an individual's perception of being overwhelmed by emails that s/he considers too numerous to handle (Dabbish & Kraut, 2006). Email overload is a theoretically important and interesting phenomenon because of its adverse effects on key workplace-related factors such as burnout and productivity (Barber & Santuzzi, 2015; Brown, Duck, & Jimmieson, 2014; Mano & Mesch, 2010; Reinke & Chamorro-Premuzic, 2014). Yet, this phenomenon continues to be vexing on a practical level because it has proved intractable to manage. Simply taking action to restrict email use has not proved effective. Policies that many organizations have adopted or attempted to adopt, such as shutting down email servers after a typical 5pm close of day, or penalizing after-hour email use, have not been well received by all employees (Leahy, 2012).

The email literature considers antecedents of email overload that are related to email itself, such as email content and use of email management features, and to organizational norms such as expectations of quick response (Barley et al., 2011; Dabbish & Kraut, 2006; Mano & Mesch, 2010). However, in addition to email, organizations deploy a variety of other communication applications (e.g. instant messaging and video conferencing). Individuals have varying preferences for using these applications. In the absence of their preferred applications, they experience a lack of fit between the communication applications that they *want to use* and those that the *organization provides them with*. Moreover, communication applications with particular features are better suited to particular communication tasks. When applications appropriate to the task are not available, individuals experience a lack of fit between the communication applications *that the task requires* and those that the *organization provides them with*. In both cases, given that email applications are widely available and can be used for a variety of purposes (Ducheneaut & Bellotti, 2001), it is likely that organizational members will simply use email by default as the primary way to communicate (Ducheneaut & Bellotti, 2001), even when it is not the preferred or best option. The literature shows that email communication is cascading, in that communication that is initiated with email is likely to continue with email (Thomas & King, 2006). As a result, users may experience email overload. Although the fit-based antecedents described above have been found to matter for the use of other communication applications

(Gebauer, Shaw, & Gribbins, 2010; Stich, Tarafdar, Cooper, & Stacey, 2017), they have not been investigated in the context of email use.

The first objective of this paper is thus to understand **how the fit experienced by individuals regarding their use of communication applications influences email overload**. We draw on the theoretical concept of 'fit' with respect to the use of Information Systems (IS). Specifically, we conceptualize 'Person Technology Fit', which we define as the degree to which there is a match between an individual's preferences for using particular communication applications and the organization's provision of them. We also draw from literature to examine 'Task Technology Fit', which is the extent to which individuals perceive that an application matches the requirements of the task to which it is applied and thus assist them in performing his or her tasks (e.g. Goodhue & Thompson, 1995). We link these two types of fit to 'email by default', defined as the perception of email being used improperly, when other communication applications would be better suited (Jung & Lyytinen, 2014). We then examine the link between email by default and email overload.

Our second research objective relates to the outcomes of email overload for individuals. The literature has considered work-related outcomes such as work productivity, and well-being-related outcomes such as burnout and exhaustion. However, recent studies (e.g. Barber & Santuzzi, 2015) show that demands from technology may influence outcomes more intrinsic to an individual's work, such as their job satisfaction. Such outcomes, while important because they reveal a more far-reaching nature of the effects of email use, remain under-studied with respect to email overload. Our second objective is therefore to understand **the effects of email overload on two such outcomes, job satisfaction and role overload**.

To address the above objectives, we executed a multi-method study in the UK office of a large international food manufacturing organization. We conducted the study in two stages, in a sequential and developmental research design (Creswell & Clark, 2011; Mingers, 2001). The first study (a qualitative one involving open-ended interviews with eleven middle/senior managers and board directors) informed the second (a quantitative one involving a survey of 134 middle and senior managers).

Our paper contributes to the discourse on email overload by investigating theoretically novel antecedents and outcomes. The investigated antecedents reveal the importance of providing individuals with communication applications matching their preferences and tasks to limit the use of email by default and thus reduce email overload. The new outcomes reveal that email overload's outcomes are more far-reaching than what has been considered until now, i.e. it negatively affects key aspects of an individual's job, such as job satisfaction. Implications for practice include the need to look at new email overload-reducing strategies that involve not only providing a range of communication applications, but applications that match employee preferences, along with training organizational members to use email applications mindfully rather than as a catch-all option.

We next present the literature background on email overload and its links with workplace communication. We then present the literature background on task technology fit and theorize the concept of 'person technology fit'. Following that, we present the research hypotheses. Thereupon, we present the two studies and their findings in sequence. Finally, we discuss implications for scholars and practitioners, as well as limitations and avenues for future research.

## **Literature Review**

In this section, we present the literature background on email overload and its relationship to workplace communication.

### **Email Overload**

Studies show that individuals often have negative cognitive perceptions about email. Primary among these is 'email overload', defined as an individual's perception of being overwhelmed by email that s/he considers too much to handle (Baker & Phillips, 2007; Dabbish & Kraut, 2006; Whittaker & Sidner, 1996). Email overload is an individual's subjective perception of being overwhelmed by the email they process. We note here that email overload is not about a specific number of emails, because the threshold at which a certain number of emails constitutes overloading varies from one individual to another (Kalman & Ravid, 2015; Stich, Tarafdar, Stacey, & Cooper, 2019).

Email is perceived to be overloading for a number of reasons. Firstly, individuals have to spend time reading and managing email messages (Jackson, Burgess, & Edwards, 2006). Secondly, email creates additional work requests (Bellotti, Ducheneaut, Howard, Smith, & Grinter, 2005) that "cause people to shift gears and to add new tasks to their current stack". (Dabbish & Kraut, 2006). About a third of all emails are estimated to contain requests for action (Dabbish, Kraut, Fussell, & Kiesler, 2005), because email is easier to send than written letters and memos (Thomas & King, 2006). Thirdly, email interrupts individuals in their work (Addas & Pinsonneault, 2018). Employees require, on average, 64 seconds to resume work after having been interrupted by an email; about 100 interruptions in an eight-hour day require roughly an hour and a half of recovery time per day (Jackson et al., 2001). Moreover, individuals often do not return directly to the same task, engaging instead in other activities (Mark, Gonzalez, & Harris, 2005) and taking considerably longer to complete the original task. Overall therefore, email has been characterized as a "fire hose" (Barley et al., 2011). Organizations have been concerned about how to handle the sheer volume of email they receive, the extra work it creates and the time it consumes.

Antecedents of email overload can be classified into different types. They include characteristics of the email message itself, such as its ambiguity, emotion, and the length of content (Brown et al., 2014), and whether the email is relevant and critical (Sumecki, Chipulu, & Ojiako, 2011). They can also be about how people use email, such as the time people spend handling email (Barley et al., 2011), the frequency of checking and interruptions, and the number of emails sent and received (Baker & Phillips, 2007; Mano & Mesch, 2010). The higher the level of these factors, the greater the email overload perceived by individuals. Antecedents can also include email management practices that increase email overload, such as maintaining numerous folders and a large inbox (Barley et al., 2011; Dabbish & Kraut, 2006). Further, there are organizational antecedents of email overload - these include the perceived importance and criticality of email for work in the organization (Dabbish & Kraut, 2006) and expectations of quick response and high work availability, often even outside work hours (Derks & Bakker, 2010; Wajcman & Rose, 2011). These factors place pressure on individuals to use email more frequently, and thus contribute to the perception of email overload (Barley et al., 2011; Derks & Bakker, 2010).

The consequences of email overload are not beneficial for managerial work. Work-related outcomes include lower productivity, increased work and longer working hours, and poor decision-making (Barley et al., 2011; Dabbish & Kraut, 2006; Jackson & van den Hooff, 2012; Karr-Wisniewski & Lu, 2010, p.; Mark, Volda, & Cardello, 2012; Renaud, Ramsay, & Hair, 2006). Well-being-related outcomes include stress, burnout, anxiety and exhaustion (Barley et al., 2011; Renaud et al., 2006).

However, practical instances are beginning to show that email overload may have further-reaching consequences intrinsic to an individual's job. For example, prolonged and relentless demands from email such as responding to work communication outside traditional office hours, dealing with constant email interruptions, and related requests for work, can lead to the perception of a continual overload in one's overall organizational role<sup>1</sup>. Further, persistent email overload can result in individuals being so immersed with the work 'of the moment' that they lose sight of longer-term effectiveness, and thus experience lack of satisfaction at work. These sorts of outcomes are important because they negatively affect an individual's overall and long-term outlook towards their job, which can prevent them from being successful organizational members. The literature does not consider these sorts of outcome.

## **Workplace Communication and Email Use**

Contemporary workplaces have a number of salient characteristics vis-à-vis the use of communication applications that can help us understand the potential antecedents of email overload. Individuals, in addition to email, generally have access to a number of different communication applications, such as instant messaging, social networking, shared storage systems and video conferencing. Thus, email is not the only communication application available. However, email tends to be the default communication application in organizations for a number of reasons, as we explain below.

Email applications have many features and uses (Bertin, Colléaux, & Leclercq-Vandelannoitte, 2020; Ducheneaut & Bellotti, 2001). They can be used to manage tasks and schedules, send, receive and archive documents, and to communicate, even in nearly synchronous ways (Bertin et al., 2020), for a variety of workplace interactions (O'Kane, Palmer, & Hargie, 2007) and from multiple locations (Mazmanian, Orlikowski, & Yates, 2005). They are more convenient to use than separate applications for each feature

(Jung & Lyytinen, 2014). Such multi-functionality explains why email has become the “habitat” of many white-collar employees (Ducheneaut & Bellotti, 2001), who leave their email inboxes open permanently (Renaud et al., 2006) and spend a significant portion of their day dealing with email (Jackson et al., 2006). Furthermore, email applications are easy to use (Kruger, Epley, Parker, & Ng, 2005) and to setup on multiple devices (Mazmanian et al., 2005). People who regularly communicate, send documents, and delegate tasks to colleagues find these applications particularly appealing (Renaud et al., 2006). This might even be the case when an alternative communication application is better suited. Thus, when starting a new communication thread with a co-worker, email is often the first choice when the co-worker’s preferences are not known. Once a communication is initiated using email, it is difficult for individuals to switch to other communication applications because email threads grow as new recipients and tasks are added and documents are archived (Thomas & King, 2006). The above arguments point to the use of email by default, despite the existence of alternative communication applications. As defined earlier, email by default is the perception of email being used improperly, when other communication applications would be better suited (Jung & Lyytinen, 2014).

However, other communication applications are often more suitable than email for particular tasks. For example, email applications may not be appropriate for communicating emotions (Byron, 2008; Markus, 1994), and shared storage applications are more suitable for communicating information through files (documents and drawings). This indicates that an important concept here is the matter of *fit between the communication task and the capabilities of the communication application*. Furthermore, although a range of communication applications, such as email, social networking, video conferencing and instant messaging are available to employees, they may not prefer to use each application to the same extent (Stich et al., 2017). For example, they may use some applications at home, may be more used to them, or find some easier to use or more useful than others. Thus, they may have varying personal preferences that influence their usage behavior. This indicates that another important concept is the matter of a *fit between the preference of an individual and a particular communication application*.

The above arguments suggest that organizations do not always provide individuals with communication applications that fit in with what their tasks require and what they prefer. In such circumstances, the *lack of fit* between the communication applications available to employees and their tasks or preferences may lead to perceiving email as a default communication application, and hence potentially to email overload. We develop these relationships next.

## **Theoretical Development: Task Technology Fit and Person Technology Fit**

In this section, we present two forms of fit that individuals can experience regarding their use of communication applications. First, from the literature we draw on the concept of *task technology fit*, which refers to the perceived congruence between the communication applications provided by the organization and the requirements of the tasks (Goodhue & Thompson, 1995). Then we develop and conceptualize *person technology fit*, which refers to the perceived congruence between the communication applications provided by the organization and individuals’ preferred communication applications. Both are desirable conditions. In the former, the communication applications available to individuals correspond to what their tasks require, while in the latter, they correspond to their own use preferences.

### **Task Technology Fit**

The first concept of fit between the task and the capabilities of an application as described above is examined in the IS literature as ‘task technology fit’ (Goodhue & Thompson, 1995). Task technology fit (TTF) represents the correspondence between task requirements and the functionality provided by the application. TTF is defined as “**the degree to which a technology assists an individual in performing his or her portfolio of tasks**” (Goodhue & Thompson, 1995, p. 216). Individuals perceive a technology in the context of how well it enables them to perform their tasks. TTF improves individual and group work performance (Goodhue, 1998). It has been investigated with respect to the use of quantitative information analysis in managerial tasks (Goodhue, 1998), group decision support systems (GDSS) (Zigurs & Buckland, 1998), knowledge management systems (Kankanhalli, Tan, & Wei, 2005) and applications used by virtual teams (Maruping & Agarwal, 2004).

Particularly in the context of workplace communication applications, research (Gebauer et al., 2010) examines TTF through the matching of managerial tasks, features of mobile communication applications, and context of use. Managerial tasks with low and high levels of non-routineness are theorized to be best supported, respectively, by mobile information systems (IS) that emphasize data processing, and those that emphasize communication and information access. Managerial tasks with high interdependence are best supported by IS that enable notification and communication, while those with high time criticality are best supported by IS that facilitate notification. Mobile use contexts with high distraction levels are best supported by functionalities of notification and verification, while those with high user mobility are best supported by location awareness (Gebauer et al., 2010). For organizational communication using multiple applications simultaneously, TTF is the extent to which the capabilities of the communication application used for one conversation complement the capabilities of that used for the second conversation (Cameron & Webster, 2005).

The concept of TTF describes the first kind of fit referred to above as a potential antecedent of the nature of email use, namely, the *fit that the individual perceives between the communication task and the capabilities of the communication application*. It does not consider, however, the second kind of fit, which is the *fit between the preference of the individual and the particular communication application described*. We next turn to the work psychology literature to theorize this fit.

### Person Technology Fit

The framework of person environment fit from work psychology considers the congruence between the attributes of an individual and those of the environment (Schneider, Smith, & Goldstein, 2000), the underlying principle being that when they match or when the congruence is high, better individual and organizational outcomes will result (Ostroff, 1993). This fit pertains to the match between what individuals want and what their organizations can provide (Kristof, 1996). The basis of this idea is that individuals value flexibility and diversity in what the organization can provide them (Muchinsky & Monahan, 1987). PE fit occurs when an individual's needs and desires are satisfied by the organization (Kristof-Brown, Zimmerman, & Johnson, 2005). People experience more positive job attitudes and outcomes when their needs are fulfilled.

We draw on the concept of person environment fit to theorize *person technology fit* (PTF). We define PTF as the degree to which there is a match between an individual's preferences for using particular communication applications and the organization's provision of them. Individuals perceive a technology in the context of their preference for it. Individuals' preferences shape their use of communication applications. For example, research shows that some individuals may have a preference for engaging in polychronic organizational communication, that is, simultaneous communication with many people on several devices (Turner & Reinsch, 2004). Email is just one communication application among many others. Employees may have different preferences for using different workplace communication applications based on familiarity, use at home, and individual propensity (Cavazotte, Heloisa Lemos, & Villadsen, 2014; Scott & Timmerman, 2005). PTF signifies the fit between an individual's preference for communication applications and their organizational availability. Thus, high PTF implies that an organization makes available the communication applications that employees prefer to use. Low PTF indicates that the organization does not provide individuals' preferred communication applications (Stich et al., 2017), symbolizing low congruence between the communication applications that individuals prefer to use and what the organization provides.

### Research Hypotheses

Based on our theorization above, we develop our research model and frame our research hypotheses. The conceptual thread (Figure 1) of our argument follows the logic that **technology fit-related factors** (TTF and PTF) shape **how email use is perceived** (email by default), which influences **email-related outcomes** (email overload and email enabled productivity), which in turn lead to **job-related outcomes** (role overload and job satisfaction). Following this logic, we first link the two fit concepts, TTF and PTF, with how email is perceived, that is, email by default. We then hypothesize relationships between email by default and two email-related outcomes, namely, email overload (a negative effect) and email-enabled productivity (a

positive effect). Then, we relate these two email-related outcomes to two corresponding job-related outcomes, namely, role overload (a negative outcome) and job satisfaction (a positive outcome).

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### **From Task Technology Fit and Person Technology Fit, to Email by Default**

As illustrated by the literature review, organizations do not always provide employees with the communication applications that their tasks require or that they prefer. In our theorization, we framed these two conditions as TTF and PTF respectively. The lower the extent to which these two conditions are present, the more likely it is that employees will choose to use email applications because they are easy to use (Kruger et al., 2005), and cover a wide range of functions (Ducheneaut & Bellotti, 2001), even though they may not be the best choice for the given task (Jung & Lyytinen, 2014). Moreover, organizational members are accustomed to using email, so that when they do not have the applications that they prefer to use or that their tasks require, they are prone to use email (Ducheneaut & Bellotti, 2001; Pillet & Carillo, 2016). Further, it is easy to set up long, persistent communication trails with email applications that individuals use as a means of archiving data, so that they are hard to abandon once adopted (Thomas & King, 2006). The above arguments imply that lack of PTF and TTF may lead to the use of email, even for communication tasks that are not suited to email, simply because email applications are widely available. In such a case, individuals would perceive that email is being improperly used, and other communication applications would be more suited. That is, they would experience email by default. When PTF and TTF are high, a range of applications, that are either preferred or that fit the task, are available to individuals. Having access to a variety of applications would mean that when email is used, it is done so in a more purposeful way, considering the alternatives available (Jung & Lyytinen, 2014). Thus, email by default is likely to decrease when individuals have access to alternative communication applications that they prefer (i.e. there is higher extent of PTF) or that are more appropriate for their communication tasks (i.e. there is higher extent of TTF).

Thus, we suggest in the following hypotheses that individuals will experience higher email by default when their organizations do not provide them with communication applications that they find useful for their work (i.e. low TTF) or that they prefer to use (i.e. low PTF).

Hypothesis 1a (H1a): Task technology fit is negatively associated with email by default.

Hypothesis 1b (H1b): Person technology fit is negatively associated with email by default.

### **From Email by Default to Email Overload and Email Enabled Productivity**

Email by default will contribute to email overload because email overload is rooted in improper use of email (Dabbish et al., 2005). When individuals experience email by default they may not consider email as helpful or critical (Sumecki et al., 2011). For instance, when email applications are used in a quasi-synchronous way, when a synchronous communication application would be more useful, individuals may feel frustrated by the time and cognitive efforts required to rapidly interpret such messages, and engage in back and forth, leading to email overload (Brown et al., 2014; Byron, 2008; Riordan & Trichtinger, 2017). Further, the literature shows that once communication is initiated using email, it is likely to continue by email (Thomas & King, 2006), leading to cascading use of email, whether or not it is appropriate for the particular task. This is likely to increase the sheer volume and frequency of email, making it difficult for organizational members to manage the continuous email flow and interruptions, suitably archive, file and retrieve critical emails, and assess the importance of incoming emails (Burgess, Jackson, & Edwards, 2005; Soucek & Moser, 2010). This is likely to lead them to experience email overload. We thus suggest the following hypothesis.

Hypothesis 2a (H2a): Email by default is positively associated with email overload.

Email applications enhance employee productivity (Mazmanian et al., 2005) because they enable individuals to accomplish critical communication (Sumecki et al., 2011), important work (Dabbish & Kraut, 2006; Reinke & Chamorro-Premuzic, 2014) and archiving (Ducheneaut & Bellotti, 2001). However, individuals who experience email by default may not consider email applications useful or important, which would diminish their benefits (Sumecki et al., 2011). They may feel distracted from effectively performing

their work because of the attention and mental resources required to use email (Burgess et al., 2005; Mano & Mesch, 2010; Thomas & King, 2006). Perceptions of email by default can therefore damage the productivity gains enabled by email, leading us to frame hypothesis H2b as:

Hypothesis 2b (H2b): Email by default is negatively associated with email-enabled productivity.

Email overload increases information overload (Dabbish & Kraut, 2006; Karr-Wisniewski & Lu, 2010). Since individuals have a finite capacity to process and assimilate information, email overload can lead to lowered productivity with the email application (Brown et al., 2014; O'Reilly, 1980; Renkl & Atkinson, 2003). Email overload can lead individuals to spend more time handling email, making their workdays longer and faster paced (Barley et al., 2011). Both longer and faster-paced days are associated with high levels of exhaustion and burnout (Barber & Santuzzi, 2015; Brown et al., 2014; Reinke & Chamorro-Premuzic, 2014), implying low productivity. Additionally, research shows that the more email people receive, the more they fear falling behind. They feel compelled to keep on top of their email, even to the exclusion or neglect of other work-related tasks, which further lowers productivity (Barley et al., 2011). Email overload also increases the chances of cyber incivility, which decreases task performance (Giumetti et al., 2013; Park, Fritz, & Jex, 2018). Thus, we state H3 as:

Hypothesis 3 (H3): Email overload is negatively associated with email-enabled productivity.

### **Job-related Outcomes**

Role overload is defined as individuals' perception that they have more work than they can handle in their organizational role (Tarafdar, Qiang Tu, Ragu-Nathan, & Ragu-Nathan, 2007). Email overload increases the amount of work that people have to deal with (Barley et al., 2011). In addition, email content can be demanding (Friedman & Currall, 2003). Email received from superiors (Byron, 2008) or at particular times such as outside regular work hours (Derks, van Duin, Tims, & Bakker, 2015) can be perceived as needing immediate response. Email can also be interruptive and disruptive, generating more work in order to respond (Mazmanian et al., 2005; Renaud et al., 2006). Given the surveillance potential of electronic communication, individuals experiencing email overload may also be subject to the perception of being monitored (Smith & Tabak, 2009) and may push themselves to do more to respond to the received emails. In general, email overload leads to escalating engagement, expectations of availability, and amplified communication flows (Mazmanian, Orlikowski, & Yates, 2013). It also encroaches on time reserved for private activities (Wajcman & Rose, 2011). Overall therefore, email overload leads to a perception in individuals that their organizational role requires them to do more than is possible, in other words, role overload. Thus, we state H4 as:

Hypothesis 4 (H4): Email overload is positively associated with role overload.

The complex and interactive nature of modern workplaces makes coordination, communication and archiving of work-related information necessary (Burgess et al., 2005; Soucek & Moser, 2010). To address this need, the use of email applications is a key aspect of individuals' organizational work. However, it is likely that individuals who are not productive through using email applications are not able to engage in the communication and coordination necessary to execute their jobs in a satisfactory way. Individuals who do not effectively use email are known to experience low work effectiveness (Mano & Mesch, 2010), which can lead to dissatisfaction with the job. Thus, we state H5 as:

Hypothesis 5 (H5): Email-enabled productivity is positively associated with job satisfaction.

### **Research Methods**

We adopted a multi-method research design, using both qualitative and quantitative methods. Our empirical site was the UK office of a large international food manufacturing organization. We conducted our study in two stages. This was necessary in order to understand the nature of email use vis-à-vis the portfolio of communication applications that the organization made available to employees, and the construct embodying the new concept of PTF. For the second stage, we developed a survey based on the literature and the qualitative study to test the hypotheses in our research model. Thus, while the qualitative study helped us to understand and develop the new construct, in the quantitative study we tested the hypotheses, by drawing on the findings of the literature and the qualitative study. This places our research design in the

tradition of multimethod research. In particular, we follow a sequential mix of methods where the first study informs the design of the subsequent one (Venkatesh, Brown, & Bala, 2013).

## Study 1: Qualitative Study - Interviews

### *Participants and Interview Protocol*

We conducted eleven interviews with managers ranging from middle managers to board directors from seven different departments of the organization (see Table 1). They were all white-collar employees who used email and other communication applications extensively in their day-to-day work. We contacted them in a snowball fashion, our first point of contact being a senior manager in the HR department. Interviews took place through video-conferencing or on the phone. For all interviews, we asked questions about their organizational email use, use of other communication applications, and how their email use affected key aspects of their job, following an open-ended interview protocol (see Table A.1 in the Appendix). Each interview lasted 45 minutes to an hour. The informing theoretical lens for the questions drew from the literature review and background described earlier in the paper.

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### *Analysis and Findings*

The interviews were audiotaped by consensus with the interviewee. They were transcribed and yielded 94 pages of text, which we analyzed through coding. We followed an approach similar to Hackney et al. (2007) to first develop broad initial coding categories. Accordingly, we first assigned relevant text elements to the concept under investigation, namely the concept of person technology fit. Thereafter, we carried out open and axial coding (Corbin & Strauss, 2008) on this text to identify sub-themes (Corbin & Strauss, 2008). We identified the more granular aspects of the concept by drawing on the conceptual foundation of person-environment fit (Schneider et al., 2000). We iteratively analyzed the data for evidence of how interviewees described their use of email and other communication applications and their preferences for communication applications. As we show next, our literature review on email use and the theoretical foundation of person environment fit helped us to understand the various aspects of the concepts of person technology fit and how it relates to email use. We reached theoretical saturation before we stopped the coding (Starks & Brown Trinidad, 2007). To present the data below, we use a descriptive approach (Miles, Huberman, & Saldaña, 2014), wherein we develop a narrative. We present quotes from the data interwoven with our interpretation and analysis. Such an approach helped us to explain the nature of the concept of person technology fit and its relationship to email use. We next describe our findings.

Our first finding was **that email was used not in isolation, but as part of a milieu of communication applications**. A range of communication applications was available to employees. However, email was the “go-to” communication application, as in many other organizations (Dietzen, 2017). Rose, a senior HR manager, confirmed that email was here to stay: “*there is a push from colleagues to use emails*”, often against her preference for face-to-face communication. She further acknowledged that most emails she received “*could have been done over Communicator (instant messenger application) or Skype*”, which she would also have preferred.

Stemming from the first finding, our second finding was that, **given the portfolio of applications available to them, employees evaluated the organization’s provision of the communication applications they wanted to use, that is, person technology fit**. For a perception of fit to occur, individuals need to understand what they want vis-à-vis what the environment (in this case, the organization) provided (Edwards, Cable, Williamson, Lambert, & Shipp, 2006). Interviewees had clear preferences as to which applications they wanted to use, and wanted to have the flexibility to use them. Alan, a director, preferred texting applications because he found them convenient to use while out and about. Mike, a market development manager, wanted to use WhatsApp in his team, because “*in sales quite often people are all over the place, and not everybody is looking at their laptop but everybody has their phone*”. Ruth, a senior marketing manager, particularly appreciated Chatter, an enterprise social network, and wished she could use it more in her team. Finance director, Renee, said that she was flexible with her team as to which

application to use and encouraged her subordinates to use the ones they preferred. Likewise, Larry, a sales manager, encouraged his team to adopt “a mix of face to face, email and Skype” to prevent his subordinates from “having too many emails or too many phone calls”. These examples illustrate that our interviewees had a clear perception of which applications they wanted to use and appreciated the flexibility of having a range (Ramirez, Dimmick, Feaster, & Lin, 2008) to choose from. Interviewees also evaluated whether or not the organization provided them with the applications they wanted to use. Carol, a sales manager, was enthusiastic about the applications at her disposal and felt no ‘missing link’ (Stich et al., 2017): “I think the tools that we develop in the business are actually first-class tools really”. Others did not share this view. Leslie, a communication manager said: “the fundamental issue is that our tools, as in our intranet and the things from a technology perspective that are available for us to use, are very limited”. Although Carol perceived that the organization provided her with the applications she preferred to use (i.e. she experienced high person technology fit), Leslie felt that (the same organization) did not (i.e. she experienced low person technology fit). Ruth, a senior marketing manager, was pleased with the communication applications at her disposal, but felt that the organization could go further: “I think we have a lot of the tools available and I think we’ll need more of them”, indicating moderate person technology fit.

Our third finding was that interviewees shared the perception that **email was being used by default** in their organization, instead of “picking the phone and talking” (Larry, sales manager) or “getting in a room or picking up a phone and having a bit of a chat” (Alan, board director). Emails were even exchanged on a regular basis between colleagues physically near each other – a practice that John, a sales director, alluded to: “if it’s important and we only sit meters apart you need to come and have a conversation with me”. These testimonies point toward the idea that email was forced into many kinds of exchanges and tasks, even in nearly synchronous ways (Bertin et al., 2020; O’Kane et al., 2007). For our interviewees, such use of email often led to spiraling increases. Larry, a sales manager, complained that people were “sending six emails back and forth when I could spend five minutes talking through”, and Alan, a board director, said that he disliked getting “lots of emails [among many people] being exchanged on a particular subject” instead of clarifying the subject with the help of more appropriate applications.

Our interviewees thus provided vivid illustrations of the person technology fit concept, by describing (1) that their use of email was not stand-alone, but was part of their use of the portfolio of communication applications the organization provided them with; (2) that they preferred to use specific applications; (3) how they felt about their organization providing them with such applications (or not).

## **Study 2: Quantitative Study - Survey**

### **Survey Design**

We developed the items for the survey by drawing both on the literature and on the findings of the qualitative study. Items for TTF were based on Goodhue and Thompson (1995) and assessed in a reverse-coded way the extent to which the respondents were provided with technologies that they considered useful for communicating with colleagues and their work. For PTF, we drew from the findings of the qualitative study to frame the survey items. The respondents were asked to rate the extent to which they were provided with a range of technologies they wanted, to communicate with colleagues; they were able to choose what technologies to use; and they were forced by company policies to use technologies they did not want to use (reverse coded item) (see Table 3).

Email by default was measured by items capturing the perception that email is used, even though another communication application could be more appropriate to communicate or share documents (Byron, 2008; Jung & Lyytinen, 2014; Markus, 1994; Ramirez et al., 2008; Stich et al., 2017). Respondents assessed the extent to which they perceived that their communication application preferences were unknown to colleagues (i.e. perception of improper use of email when other applications would better suit the preferences of respondents); they received email when they thought another application would have been better suited; and they received documents through email when they thought another application would have been better suited (see Table 3). The items started with “my colleagues” (e.g., “my colleagues communicate with me”) for two reasons. First, we focus on email receiving rather than email sending, given that individuals have little control over receiving email, thereby making it more relevant to email overload (Renaud et al., 2006). Second, the literature shows that individuals assess more accurately the email behaviors of others, and overestimate their own email behaviors (Kruger et al., 2005). Thus, we believe

that respondents would be better placed to respond to questions framed from the receiver's side and that social desirability would be less of an issue.

Email overload was measured using a combination of items from Renaud et al. (2006), Brown et al. (2014) and Sumecki et al. (2011). For the email-enabled productivity and the role overload scales, we adapted the items from Tarafdar et al. (2007). Job satisfaction was measured with items adapted from Ragu-Nathan et al. (2008) (see Table 3). All of these are established scales in the literature.

Prior to administering the survey, we conducted face validation of the survey items with five employees from the company. They were middle and senior managers from the HR and sales departments. None of them had participated in Study 1. We asked each individual to complete the survey with the objective of assessing whether the items were clearly understandable in the context of the organization, and whether they could be answered within a reasonable time of less than fifteen minutes. Based on their feedback, a few items were reformulated slightly for grammar and wording.

### ***Control Variables***

We applied a number of control variables to account for alternative explanations. First, for email overload and email-enabled productivity, we controlled for 'email broadcasting'. This represents a widely prevalent organizational email use behavior in which individuals propagate email threads that are addressed to a variety of people (e.g. by using 'reply all') as opposed to having one clearly defined recipient (Ramsay & Renaud, 2012). Email broadcasting increases the overall volume of email that employees receive and hence influences email overload and email-enabled productivity (Brown et al., 2014; Thomas & King, 2006). Finally, for job satisfaction and role overload, we applied typical controls as suggested in the literature (Decker & Borgen, 1993), namely, age, gender, and organizational tenure. Age was measured in categories (below 26=1, 26 to 35=2, 36-45=3, 46-55=4, 56-65=5, above 65=6) to guarantee anonymity, gender as male=1 and female=2, and organizational tenure in years. All the survey items are presented in Table 3.

### ***Participants and Procedure***

We collected data from employees from the same organization. Our respondents were white-collar workers from different departments including marketing, communication, sales, finance, human resources and supply chain management, who extensively use email and other applications for organizational communication. Their roles included manager, project leader, senior manager and director. We received an email list of 151 employees from the organization's HR department and sent them a link to the survey, which they filled out electronically. Employees were informed that participation was voluntary and that their responses would be treated as confidential. 134 valid responses were returned, representing a response rate of 89%. None of these employees had participated in Study 1. Demographics of the survey participants based on the valid responses are displayed in Table 2.

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### ***Construct Reliability and Validity***

Construct means, standard deviations and scale reliabilities, together with factor loadings of each item on its respective construct, are shown in Table 3. All the factor loadings are greater than the recommended value of 0.7 (Chin, 1998); the loading of the first item of EBD is slightly below at 0.694. All composite reliabilities are greater than the recommended value of 0.7 (Hair, Black, Babin, & Anderson, 2019; Hair, Ringle, & Sarstedt, 2011). All Cronbach Alpha values are greater than the recommended values of 0.7 (Hair et al., 2019) with the exception of EBD's Cronbach Alpha of 0.66; we deem this as acceptable given that EBD has a composite reliability of 0.82.

We tested for the existence of common method bias as suggested by Podsakoff et al. (2003). We conducted a principal component factor analysis. The results revealed eight factors with eigenvalues greater than 1.0 accounting for 73.1% of the total variance. The first factor explained 30.4% of the variance, which is below the 50% limit suggested in the literature. We note that the survey was anonymous. Further, it was promoted

within the organization by two senior employees in the HR department, who were independent from the researchers/authors. Employees were ensured that their data would not be seen by colleagues or supervisors. The risk of reporting inaccurate data is thus low. Further, the presence of reverse coded items in the survey questionnaire, together with the mix of positive and negative relationships in the hypotheses helped to further guard against the incidence of common method bias. We thus do not expect a significant presence of common method bias in our data (Conway & Lance, 2010).

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We analyzed the data using partial least square techniques on Smart-PLS 3.0. Our structural model is relatively complex, with seven study variables and four control variables. Further, two of the variables represent new concepts. Additionally, the hypotheses embody conceptually new relationships between fit related variables and email and work-related outcomes through a theoretical integration of hitherto disparate literatures. The PLS method is known for its ability to handle complex models involving relatively new or untested relationships. Moreover, it can also handle relatively small sample sizes (Ringle, Wende, & Becker, 2015). Thus, we adopted this method for estimating parameters of interest and calculating standard errors and associated t-tests.

In Table 4, we show inter-construct correlations and the square root of the average variance extracted (AVE) for each construct. For each construct, the square root of the AVE (along the shaded diagonal) is greater than its inter-construct correlation with every other construct. We tested for multi-collinearity and found all VIFs to be well below the recommended threshold of 5 (Hair et al., 2011). Further, looking at cross-loadings for each construct in Table B.1 in the Appendix, we find that all items loaded highest on their own construct. Taken together, these results indicate that the constructs in our model show good discriminant and convergent validities.

### **Structural Model Testing**

Having tested for the validity of our constructs, we next tested our hypothesized relationships and their structural model. We show the results in Figure 2. The two fit constructs explain 12.2% of the (adjusted R square) variance in email by default. The effect of email by default helps account for 30.3% of the variance in email overload and 36.9% of the variance in email-enabled productivity. Email overload explained 35.1% of the variance of role overload. Email-enabled productivity accounted for 9.4% of job satisfaction variance. In the interests of completeness, we also examined the (non-hypothesized) relationships between email overload and job satisfaction, and between email-enabled productivity and role overload. These were found to be non-significant. The only significant control variable-related relationship was that between email broadcasting and email overload.

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The results of the hypothesis testing are summarized in Table 5. Overall therefore, the findings of our two studies indicate that the better the fit between task and technology as well as person and technology, the less email is perceived as the default medium in an organization, which is favorable for achieving

productivity from email applications and mitigates email overload. This in turn promotes improved job-related outcomes such as low role overload and high job satisfaction.

## Discussion and Conclusion

Based on a problematization of our current understanding of email overload, we set out in this paper to theoretically broaden the consideration of antecedents and outcomes. We describe below the theoretical and practical contributions of our study, together with its limitations and potential for future research.

### Contributions to Theory

The literature focuses on antecedents of email overload that relate to the email itself (e.g. email content), to how email applications are used (e.g. managing email by using specific application features such as automatic email filtering and sorting), and to how organizational members respond to email (e.g. organizational expectations of immediate response) (Dabbish & Kraut, 2006). These factors provide a basis for appreciating that email overload is influenced by email content, email management, and organizational norms regarding email. Notwithstanding these known antecedents, email overload is a persistent phenomenon (Horrigan, 2016). In this paper, we note that *email applications exist as part of a set of communication applications in organizations*. Therefore, we suggest expanding the antecedents to include theoretically new factors that consider other communication applications.

Our first contribution is to broaden the theoretical scope of the discourse on email overload by revealing two new antecedents of email overload that relate to the *overall portfolio communication applications* that are available to employees in the organization. These antecedents are important to examine because email is not a workplace communication application in isolation, but is rather part of an entangled web of numerous communication applications available for use by employees in organizations. At the same time, simply using other communication applications is not likely to reduce email overload. We suggest that email overload can be alleviated when two kinds of fit exist with respect to the communication applications available to individuals. The first is the fit between an individual's communication tasks and the range of communication applications the organization provides. When this fit is high, employees in the organization will use those communication applications that are most suited for the task because they are available. The second is the fit between individuals' preference or liking and the range of communication applications available in the organization. When this fit is high, employees will use those communication applications that they prefer because they are available. Under both of these conditions, the experience of email by default will be low, because employees can use communication applications that they either find more suitable for the task, or that they prefer. Thus, email overload will be alleviated. Our conceptualization of these two novel antecedents extends the existing set of antecedents of email overload. The high values of variance explained for both email overload and email-enabled productivity give strong empirical credence to these theoretically new relationships.

Our second contribution is to identify two long-term, job-related factors emanating from email overload, namely job satisfaction and role overload. The literature has considered outcomes of email overload that are email-related, such as email-enabled productivity, and that are well-being-related, such as burnout (Barber & Santuzzi, 2015). We build on this research stream and expand the set of outcomes to more ongoing job-related outcomes. We were able to show two distinct pathways. While email overload is linked to role overload, email-enabled productivity is connected to job satisfaction. The cross relationships were not hypothesized and were not statistically significant. When an employee has the perception of being overwhelmed by email, this has implications on how that person generally perceives his or her role. Since email often takes up a significant amount of the time and cognitive capacity involved in a white-collar worker's volume of work, it is not surprising that this gives such individuals a general feeling of being overloaded in their role. On the other hand, email-enabled productivity is linked to job satisfaction but not to role overload. Efficiency in communication, coordination and information-archiving tasks made possible through use of email is often a core factor in white-collar workers' success in their job (Burgess et al., 2005; Jackson et al., 2006). Employees who manage this aspect well are expected to express greater satisfaction with their job. The connection between email overload and these two seminal aspects of an individual's job demonstrates a theoretically and practically far-reaching effect of email overload. We note that IS research, by increasingly linking IS-related factors to job-related outcomes such as job satisfaction, job commitment

and role stress (e.g. Tarafdar et al 2007, Stich et al 2019), acknowledges that the effects of use of IS are no longer confined to just IS-related outcomes, but have a wider reach. The research on email overload has been largely deficient in this aspect.

Our third contribution is to expand the study of technology-related fit in IS. The literature has examined the concept of the fit between *task and application* (i.e. task technology fit) in explaining the use and success of IS (Gebauer et al., 2010; Goodhue & Thompson, 1995), the notion being that a higher fit experienced by the individual between task and technology will lead to more effective use of IS. We examine the existing concept of task technology fit in the new context of use of communication applications in an organization, and find that a lack of fit leads employees to experience email by default and to experience lower productivity by using email. This finding complements previous findings that a lack of task technology fit reduces individuals' work-related performance with technology (e.g. Gebauer et al., 2010). We further introduce the new concept of person technology fit, which examines the match between the applications available to individuals from the organization, and the applications that they prefer, that is, the fit between the person and the application. This new type of fit is relevant because, typically, organizations provide a range of communication applications, and individuals are not equally favorably disposed toward all of them. They are likely to use those that they prefer. We show that when they do not find the ones that they prefer, the result is the perception that email is being used by default, because that is the most commonly available and widely used application. In suggesting this new type of fit, we introduce a new dimension to the notion of fit in IS. We also theoretically integrate the two IS literature streams on email use and technology-related fit, and to our knowledge, this is the first study to do so.

### **Limitations and Directions for Future Research**

Like any study, ours is not free from limitations, which also suggest directions for future research. First, our study is limited to the empirical consideration of one organization. While keeping to one organization helped control for factors such as organizational norms and helped us focus on the substantive elements of our research model such as use of email, future research should validate our findings across a wider sample of organizations. Second, while the qualitative study was conducted with middle and senior managers, the quantitative study featured participants with a broader range of roles, from managers and project leaders through to senior executive positions. It is possible that in the more junior roles, where core responsibilities likely include more process management, email may be more of a distraction than for senior managers, where communication is a core responsibility. Future research could investigate the relationships we examine for different organizational roles and hierarchical positions. Third, as with any cross-sectional survey study, assertions of causality must be carefully avoided. Fourth, we had a single point of response for each study. Although we undertook a variety of steps to mitigate common method bias as discussed (Conway & Lance, 2010; Podsakoff et al., 2003), it remains a possibility. Fifth, the R squared value of job satisfaction was somewhat low, at around 10 %. We note however that job satisfaction depends on many different factors, and similar values of R squared are commonly found in studies that examine job satisfaction as a dependent variable (Ruch, Gander, Platt, & Hofmann, 2018; Törnroos, Jokela, & Hakulinen, 2019). Sixth, in the interests of keeping the model reasonably parsimonious and to focus on our novel relationships, we did not include all possible antecedents of email overload. While there can be many factors that affect email overload, the focus of our study is technology fit-related factors. Future research could investigate both of the fit-related constructs in the context of larger nomological networks that include other antecedents of email overload. For example, self-efficacy in the use of email may influence email by default, and is an interesting factor that future research could investigate. Finally, IS scholars could apply the concept of PTF to understand similar phenomena associated with the use of communication applications such as information overload and communication overload. They could also consider how factors such as group/team communication norms affect PTF.

### **Implications for Practice**

Email overload continues to be a problem that has eluded effective counter measures. In their attempts to combat email overload, organizations have considered email management policies such as locking down email servers after office hours, deleting emails that arrive after certain times, and even banning email for a time (e.g. a day, a week) (Mark et al., 2012). Such policies, although perhaps temporarily useful, are inflexible, do not leverage the asynchronous flexibility that email applications offer, and thus do not

adequately address the problem of email overload (Blackman, 2018). Management of emails through proper use of the features of email applications have fared better but have not gone the full distance (Bellotti et al., 2005; Jackson et al., 2006). Email has remained the default communication technology in organizations. Our findings suggest that organizations struggling with email overload can attempt to attenuate the default use of email by applying two new levers. Specifically, we suggest that organizations should not just provide employees with a range of communication applications (e.g. video conferencing, instant messaging), but should ensure that employees have adequate access to a sufficient range of communications that *fit their preferences and task requirements*. These strategies are likely to be effective in encouraging the use of alternative communication applications, rather than email by default. In addition, team leaders and those in senior positions should provide team members with the flexibility to use the applications they prefer. We thus provide new managerial levers to reduce email overload for organizations to consider. To the best of our knowledge, these approaches do not exist in current organizational policies on email use. We also alert organizations to job-related outcomes of email overload and email-enabled productivity – namely, job satisfaction and role-related overload – two crucial factors that organizations seek to manage.

## Conclusion

To conclude, email remains the most widely used organizational communication application. Yet, email overload and associated negative outcomes continue to fester as costs of doing business. With this paper, we hope to have theoretically broadened the scholarly discourse on email overload to include new antecedents and outcomes, in the ongoing quest toward a more complete understanding of this phenomenon and with the aim of mitigating its negative consequences.

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## Notes

<sup>1</sup>See for example, <http://www.bbc.com/capital/story/20180830-what-would-happen-if-we-banned-work-emails-at-the-weekend> and <https://www.fastcompany.com/40559486/laws-banning-after-hours-email-wont-fix-our-24-7-work-culture>

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## Appendix A

**Table A.1. Schedule for Interviews**

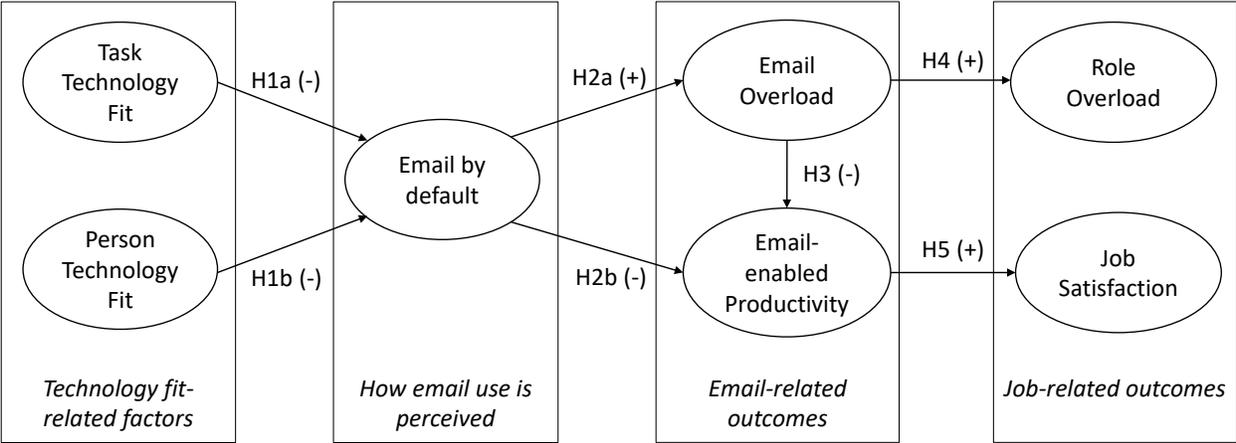
<b>No.</b>	<b>Guideline Topic</b>
1	Role and function within the organization
2	Use of different communication channels in the organization and their prevalence
3	How and when the different communication and workflow applications were used
4	Preferences for different communications and workflow applications
5	Use of email regarding overall volume, content, recipients, senders, perceptions of overload and support for work
6	Use of communication and workflow applications by colleagues
7	Inter-personal experiences and dynamics vis-à-vis colleagues in the use of communication and workflow applications

## Appendix B

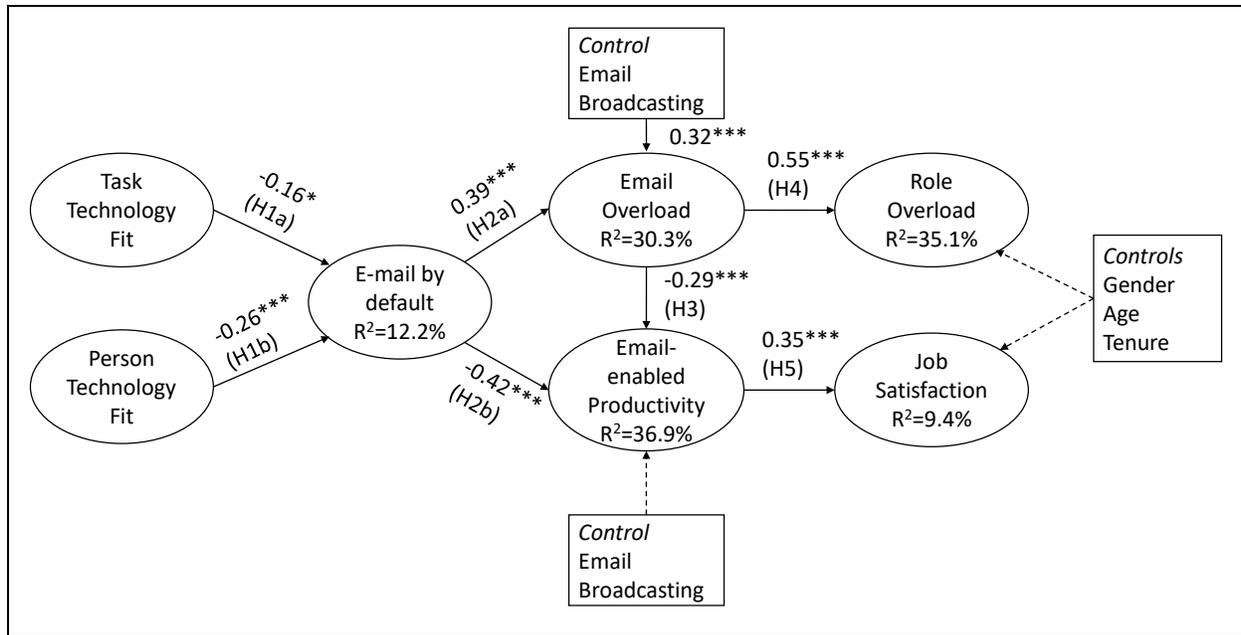
**Table B.1. Item Cross-Loadings**

	TTF	PTF	EBD	EMO	EEP	JOS	ROO	EBC	AGE	GEN	TEN
<b>TTF 1</b>	<b>0.951</b>	0.418	-0.291	-0.305	0.279	0.200	-0.238	-0.187	0.019	-0.061	0.007
<b>TTF 2</b>	<b>0.961</b>	0.498	-0.251	-0.352	0.298	0.178	-0.351	-0.267	0.045	-0.093	-0.011
<b>PTF 1</b>	0.439	<b>0.879</b>	-0.325	-0.263	0.379	0.257	-0.110	-0.132	-0.012	-0.140	0.027
<b>PTF 2</b>	0.311	<b>0.827</b>	-0.178	-0.154	0.242	0.234	-0.132	-0.149	0.047	0.011	-0.023
<b>PTF 3</b>	0.418	<b>0.790</b>	-0.305	-0.254	0.220	0.192	-0.158	-0.133	0.092	-0.002	0.038
<b>EBD 1</b>	-0.218	-0.178	<b>0.694</b>	0.331	-0.416	-0.310	0.219	0.136	-0.072	0.017	-0.093
<b>EBD 2</b>	-0.161	-0.318	<b>-0.866</b>	0.499	-0.503	-0.107	0.294	0.281	0.077	-0.146	-0.046
<b>EBD 3</b>	-0.316	-0.293	<b>-0.755</b>	0.226	-0.374	-0.056	0.195	0.212	0.093	0.015	-0.048
<b>EMO 1</b>	-0.297	-0.248	0.292	<b>0.861</b>	-0.414	-0.156	0.616	0.381	0.199	-0.011	0.177
<b>EMO 2</b>	-0.303	-0.186	0.468	<b>0.860</b>	-0.470	-0.117	0.413	0.322	0.074	-0.037	-0.001
<b>EMO 3</b>	-0.304	-0.232	0.482	<b>0.898</b>	-0.417	-0.192	0.518	0.389	0.012	0.026	-0.096
<b>EEP 1</b>	0.293	0.307	-0.507	-0.367	<b>0.863</b>	0.334	-0.278	-0.305	-0.084	0.126	0.122
<b>EEP 2</b>	0.229	0.328	-0.508	-0.535	<b>0.921</b>	0.257	-0.347	-0.187	-0.070	0.105	0.120
<b>EEP 3</b>	0.299	0.360	-0.505	-0.431	<b>0.921</b>	0.277	-0.301	-0.179	-0.112	0.036	0.127
<b>JOS 1</b>	0.220	0.341	-0.191	-0.224	0.312	<b>0.917</b>	-0.249	-0.226	0.005	-0.042	-0.037
<b>JOS 2</b>	0.132	0.226	-0.147	-0.067	0.231	<b>0.856</b>	-0.052	-0.226	0.198	-0.065	0.142
<b>JOS 3</b>	0.179	0.270	-0.195	-0.183	0.319	<b>0.942</b>	-0.188	-0.271	0.057	-0.009	0.017
<b>ROO 1</b>	-0.324	-0.139	0.228	0.492	-0.256	-0.207	<b>0.867</b>	0.247	0.110	0.005	0.107
<b>ROO 2</b>	-0.220	-0.119	0.217	0.432	-0.259	-0.047	<b>0.846</b>	0.181	0.234	-0.177	0.175
<b>ROO 3</b>	-0.144	-0.055	0.217	0.410	-0.199	-0.108	<b>0.777</b>	0.234	0.051	-0.130	0.090
<b>ROO 4</b>	-0.337	-0.204	0.362	0.639	-0.411	-0.239	<b>0.910</b>	0.352	0.154	-0.026	0.093
<b>EBC 1</b>	-0.210	-0.096	0.273	0.320	-0.199	-0.132	0.214	<b>0.764</b>	0.076	-0.129	-0.099
<b>EBC 2</b>	-0.241	-0.192	0.179	0.382	-0.186	-0.268	0.268	<b>0.836</b>	-0.076	-0.027	-0.118
<b>EBC 3</b>	-0.112	-0.166	0.218	0.290	-0.206	-0.233	0.250	<b>0.791</b>	0.004	-0.084	-0.125
<b>AGE</b>	0.034	0.040	0.046	0.109	-0.098	0.090	0.164	-0.002	<b>1.000</b>	-0.165	0.540
<b>GEN</b>	-0.081	-0.058	-0.064	-0.007	0.099	-0.041	-0.088	-0.097	-0.165	<b>1.000</b>	-0.084
<b>TEN</b>	-0.002	0.024	-0.077	0.030	0.136	0.039	0.134	-0.142	0.540	-0.084	<b>1.000</b>

Note: EBD = Email by default, PTF = Person-technology-fit, TTF = Task-technology-fit, EMO = email overload, EEP = email-enabled productivity, ROO = role overload, JOS = job satisfaction, EBC = email broadcasting, AGE = age, GEN = gender, TEN = company tenure.



**Figure 1. Research Hypotheses**



Note: \* p<.05, \*\* p<.005, \*\*\* p<.001. Dotted arrows show a non-significant relationship.

**Figure 2. Structural Equation Model**

**Table 1. Sample Characteristics (Qualitative Study)**

<b>Department</b>	<b>Gender</b>	<b>Designation</b>	<b>Name (Anonymized)</b>
Communications	Female	Senior manager	Leslie
Finance	Female	Director	Renee
Sales	Female	Senior manager	Carol
HR	Female	Senior manager	Rose
Market Development	Male	Senior manager	Peter
Sales	Male	Director	John
Marketing	Female	Senior manager	Ruth
Sales	Male	Middle manager	Larry
Sales	Male	Senior manager	Mike
Sales	Male	Board director	Bryan
Supply Chain	Male	Board director	Alan

**Table 2. Sample Characteristics (Quantitative Study)**

<b>Gender</b>	Male/Female	34.3% / 65.7%			
<b>Age</b>	Below 26	17.9%	<b>Education</b>	Secondary	9.0%
	26 to 35	32.8%		Further	17.2%
	36 to 45	36.6%		Undergraduate	11.9%
	46 to 55	11.2%		Graduate	41.0%
	56 to 65	1.5%		Post-graduate	20.9%

**Table 3. Survey Items, Mean, Standard Deviation, Reliability (Cronbach's Alpha and Composite Reliability), and Factor Loading**

Item	Mean	Standard Deviation	Factor Loading
<b>Task Technology Fit (TTF) (<math>\alpha = 0.91</math>, CR = 0.95)</b>			
My company provides me with technologies that are not useful for communicating with colleagues. <i>–reverse coded</i>	4.16	1.03	0.884
My company provides me with technologies that are not useful for my work. <i>–reverse coded</i>			0.850
<b>Person Technology Fit (PTF) (<math>\alpha = 0.78</math>, CR = 0.87)</b>			
My company provides me with a range of technologies I want for communication with colleagues.	4.23	1.05	0.879
My company is flexible regarding the technologies I can or cannot use.			0.827
My company's policies force me to use technologies that I do not want to use for communicating with colleagues. <i>–reverse coded</i>			0.790
<b>Email by Default (EBD) (<math>\alpha = 0.66</math>, CR = 0.82)</b>			
My colleagues do not know which communication medium I prefer to use.	4.05	1.00	0.694
My colleagues communicate with me through e-mail when they could better use another communication medium (e.g., talk to me in person or by phone).			0.866
My colleagues send me documents through email when they could better use another document sharing software (e.g., SharePoint, portal, ERP, Skype for Business).			0.755
<b>Email Overload (EMO) (<math>\alpha = 0.84</math>, CR = 0.91)</b>			
I face email overload at work.	4.11	1.18	0.861
I find email distracting.			0.860
I find email to be a source of stress.			0.898
<b>Email-enabled Productivity (EEP) (<math>\alpha = 0.89</math>, CR = 0.93)</b>			
E-mail helps to improve the quality of my work.	3.81	1.16	0.863
E-mail helps to improve my productivity.			0.921
E-mail helps me to accomplish more work than would otherwise be possible.			0.921
<b>Role Overload (ROO) (<math>\alpha = 0.87</math>, CR = 0.91)</b>			
I often have to do more work than I can handle.	4.40	1.06	0.867
I often work beyond actual or official working hours.			0.846
I often attend to many problems or assignments at the same time.			0.777
I never seem to have enough time to do my actual work.			0.910
<b>Job Satisfaction (JOS) (<math>\alpha = 0.89</math>, CR = 0.93)</b>			
I like doing the things I do at work.	4.63	0.92	0.917
I feel a sense of pride in doing my job.			0.856
My job is enjoyable.			0.942
<b>Email Broadcasting (EBC) (<math>\alpha = 0.71</math>, CR = 0.84) [Control]</b>			
I get the same e-mail from a number of different people.	4.18	0.93	0.764
I get many "FYI"-e-mails.			0.836
I get copied on e-mails which are sent to many people.			0.791

Note: Scales ranged from 1=strongly disagree to 6=strongly agree.

**Table 4. Inter construct correlations and AVE square roots**

	EBD	PTF	TTF	EMO	EEP	ROO	JOS	EBC	GEN	TEN	AGE
EBD	0.60										
PTF	-0.34	0.83									
TTF	-0.29	0.48	0.96								
EMO	0.47	-0.28	-0.35	0.87							
EEP	-0.56	0.35	0.30	-0.50	0.90						
ROO	0.31	-0.16	-0.31	0.59	-0.34	0.85					
JOS	-0.20	0.28	0.20	-0.18	0.32	-0.19	0.91				
Control Variables											
EBC	0.28	-0.16	-0.24	0.42	-0.25	0.31	-0.27	0.80			
GEN	-0.06	-0.07	-0.09	-0.01	0.10	-0.09	-0.04	-0.10	1.00		
TEN	-0.08	0.02	-0.00	0.03	0.14	0.14	0.04	-0.14	-0.08	1.00	
AGE	0.05	0.04	0.03	0.11	-0.10	0.17	0.09	-0.00	-0.17	0.54	1.00

Note: EBD = email by default, PTF = person technology fit, TTF = task technology fit, EMO = email overload, EEP = email-enabled productivity, ROO = role overload, JOS = job satisfaction.

*Control Variables:*

EBC = email broadcasting, GEN = gender, TEN = company tenure. Values on the diagonal are square root of AVE.

**Table 5. Summary of Results**

<b>Hypotheses</b>		<b>Result</b>
H1a	Task technology fit is <i>negatively</i> associated with email by default.	Supported
H1b	Person technology fit is <i>negatively</i> associated with email by default.	Supported
H2a	Email by default is <i>positively</i> associated with email overload.	Supported
H2b	Email by default is <i>negatively</i> associated with email-enabled productivity.	Supported
H3	Email overload is <i>negatively</i> associated with email-enabled productivity.	Supported
H4	Email overload is <i>positively</i> associated with role overload.	Supported
H5	Email-enabled productivity is <i>positively</i> associated with job satisfaction.	Supported