



Towards a digital work environment: the influence of collaboration and networking on employee performance within an enterprise social media platform

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Abstract

Today's organizations increasingly implement enterprise social media platforms to provide a digital work environment. Hereby, organizations expect various benefits, such as improved employee performance. In our research, we aim at uncovering how the introduction of enterprise social media platforms can support creating a digital work environment and how this digital work environment can influence an employee's performance. To answer these research questions, we perform a survey-based investigation among 247 employees of an international financial corporation headquartered in Germany. For our investigation, we conceptualize that a digital work environment must consist of a task and a social dimension. Our findings show that enterprise social media platforms address both work environment dimensions by enabling collaboration, as well as networking among employees. We also find that employees who collaborate and network via enterprise social media platforms, increase their work performance by becoming more efficient and also more innovative. We find that networking's impact on an employee's innovativeness is significantly stronger than that of collaboration. Finally, we show that our research contributes to the literature by, for example, shedding light to the relationship between ESM use and employee performance. Furthermore, by showcasing the relevant ESM platform functionalities that influence the collaboration and networking impacts, we provide insights to the actual IT artifact. Building on this, our study also yields various practical implications, such as proving which of the ESM functionalities are essential when increasing the employees' collaboration and networking, and ultimately increasing their performance.

Keywords Enterprise social media · Digital work · Collaboration · Networking · Employee performance

JEL Classification M1

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1 Introduction

Today's organizations are pressured to redesign how their employees work (Dery et al. 2017). Since more and more employees are working on complex and knowledge-intensive problems, the need for collaboration and consulting experts becomes increasingly important (Fisher et al. 2018). In this context, team members and experts are often geographically dispersed, owing to globalization (Dulebohn and Hoch 2017), and therefore organizations need to find efficient ways for working together over distances (Lattemann et al. 2017). Furthermore, globalization also leads to increased market pressure, which, in turn, pressures organizations to increase their innovativeness (Kiehne et al. 2016). Consequently, organizations need to create work settings that promote such innovativeness. Moreover, not only external factors pressure organizations, but also internal forces like employees demanding more flexible work settings to increase their work-life balance (Fritz and van Knippenberg 2018) and reduce work-family conflict (French et al. 2018). To address these demands and challenges, organizations increasingly initiate projects that introduce digital work (Dery et al. 2017).

For the purpose of our research, the term digital work¹ refers to work that employees carry out online via information and communication technology (ICT) (Davison and Ou 2014). Applying ICT for digital work enables the employees to collaborate online via information and document sharing, communicating and discussing to work on a problem and find a solution (Lopes et al. 2015). However, digital work involves more than enabling online collaboration. Research on traditional workplaces have already acknowledged for quite a long time the importance of social interactions and networking at work like informal talks at the water cooler or coffee kitchen (Lin and Kwantes 2015). Thus, in order to enable digital work, ICT should address all traditional workplace's characteristics in order to empower employees to work online. Consequently, we propose that ICT should ideally not only support the work related activities such as collaboration but also social activities. In this context, we introduce the concept of a holistic digital work environment (Johns and Gratton 2013) which consists of a task and social dimension (Lau et al. 2000) that need to be equally addressed by the application of ICT.

To provide such a digital work environment, organizations increasingly implement enterprise social media (ESM) platforms (Johns and Gratton 2013). ESM platforms are multifaceted ICTs that bundle and integrate a diverse range of collaboration and social media tools, such as wikis, weblogs, and social networking sites (Kügler et al. 2015). Studying the current literature, we find various studies stating that ESM platforms have the potential to support and enable digital work (e.g., Dery et al. 2017). Regarding the digital work environment's task dimension, we find various studies stating that employees' ESM platform use can promote and improve collaboration (e.g., Pahlke 2012; Ransbotham and Kane 2011; Silic et al. 2015). Regarding the social dimension, we found literature stating

¹ The terms "digital work," "virtual work," and "digital labour" are often used synonymously in that context (Mrass et al. 2017).

that employees' ESM use improves networking (Boughzala 2014) by enabling professional interaction and relationship building (Steinhüser et al. 2011). We, therefore, derive that an ESM platform's impact on employee collaboration refers to the task dimension of building a digital work environment and the separate impact on networking represents the social dimension for the purpose of our study. Thus, we propose that an ESM platform has the potential to address both dimensions of a digital work environment.

We find that most of the above mentioned studies focus either solely on the ESM's collaboration impact or the networking impact. Applying our digital work environment conceptualization inspires us to embed the ESM platform's collaboration and networking impact simultaneously in our study as representations of the two dimensions. In doing this, we aim at contributing to the research not only by confirming those former results and thus, contributing to the generalizability of the findings, but also by extending the current literature when comparing and contrasting the respective effects. Further, from a research perspective, Nauwerck and Cowen Forssell (2018) confirm a strong claim in the academic community that research on digital work environments is limited. Therefore, understanding how various ICTs can facilitate a digital work environment is fundamentally important. Drawing on this, we aim at explaining how an employee's ESM use influences the ESM's collaboration, respectively the networking impact. We, therefore formulate our first research question:

RQ1: How does an employee's ESM use influence the collaboration and networking impact?

Moreover, when introducing ESM platforms to provide a digital work environment, organizations expect various benefits. In this context, we found various studies stating that implementing an ESM platform has the potential to improve employee performance (e.g., Ali-Hassan et al. 2015; Bala et al. 2015; Lu et al. 2015; Pfaff and Hasan 2007; Steinhüser et al. 2011). Reviewing the current literature, we find several studies trying to uncover the seemingly complex relationship between employees' ESM use and their corresponding performance (e.g., Moqbel and Nah 2017; Suh and Bock 2015). Furthermore, Engeli and Mueller (1999) state in their early research that a digital work environment can improve a particular group's overall performance in a learning environment. Since we conceptualize an ESM platform's impact on collaboration and networking as representations of the digital work environment's two dimensions, we aim at empirically validating whether they serve as mediators for the relationship between ESM use and employee performance. In doing this, we plan at showcasing that it is essential to support collaboration and networking so that an ESM platform can ultimately impact an employee's performance. Therefore, we posit our second research question:

RQ2: Do collaboration impact and networking impact mediate the relationship between ESM use and employee performance?

Furthermore, we clarify this relationship by investigating which of the impacts play a more important role: the collaboration impact or the networking impact.

By contrasting the effects, we aim at shedding light on the importance of e.g., social interaction for an employee's performance (Huang and Li 2009). Hereby, our research also addresses calls for research to clarify how various ESM outcomes are related (e.g., Aral et al. 2013; Dittes and Smolnik 2017; Viol and Hess 2016; Wehner et al. 2017). Therefore, we posit our third research question:

RQ3: Do the effects of collaboration impact and networking impact on employee performance differ from each other?

To answer our research questions, we first develop a conceptual research model based on the current literature and derive a research model and hypotheses on how an employee's ESM use influences the collaboration and networking impacts and how this ultimately influences the employee's performance. To examine these hypotheses, we perform an empirical quantitative study by collecting survey-based data at an international financial corporation. Further, we analyze the empirical data and present our results. Finally, we discuss the results in the light of current research and we show how our research contributes to the literature. Building on this, we also derive various practical implications.

2 Theorizing the digital work environment, enterprise social media, and its impact

2.1 Conceptualizing the digital work environment

Before conceptualizing the digital work environment, we first define and establish a general work environment in accordance with Shravasti and Bhola (2015) who state that "work environment refers to working conditions at the workplace, which may either encourage or discourage employees to work." These working conditions act as the enabler that empower employees to complete their work (Veitch 2011). We define digital work as work that employees do online by using ICT (Davison and Ou 2014). Thus, in order to work online, ICT must provide the required working conditions. Consequently, we conceptualize the digital work environment as the online representation of the working conditions that the employees require to do their work.

Noe (1986) refers to the required working conditions and states that a work environment generally consists of a task dimension and a social dimension. Mottaz (1985), as well as Karahanna et al. (2005), similarly differentiate between the task dimension, which refers to "doing the job," and the social dimension, which refers to the interactions with coworkers. In this context, Hedman and Valo (2015) differentiate between formal and informal communication in teams. Lau et al. (2000) build on this and transfer this concept to the digital work environment context by defining the social dimension as using ICT for "building social relationship and solidarity among [...] team members" and the task dimension as using ICT for "the part of communication that is specifically directed toward getting the project work done." We, therefore, state as follows: To provide a holistic digital work environment, applying an ICT need to address both work environment dimensions and thus, entail task-performance and social-interaction capabilities.

2.2 How ESM platforms support building a digital work environment

Forsgren and Byström (2018) discuss ICT within the context of providing a digital workplace and state that organizations increasingly introduce enterprise social media (ESM) tools. Over time, various types of ESM tools, such as wikis, weblogs, and enterprise social networking sites have been developed, bundled, and integrated into extensive ESM platforms (Kügler et al. 2015). We define ESM platforms² by drawing on the most frequently used definition of Leonardi et al. (2013) who state that they are “web-based platforms that allow workers to (1) communicate messages with specific coworkers or broadcast messages to everyone in the organization; (2) explicitly indicate or implicitly reveal particular coworkers as communication partners; (3) post, edit, and sort text and files linked to themselves or others; and (4) view the messages, connections, text, and files communicated, posted, edited and sorted by anyone else in the organization at any time of their choosing.”

When conceptualizing how ESM platforms can support the creation of a digital work environment, we also draw on the technology affordance concept (Gaver 1991). According to Faraj and Azad (2012), technology affordances refer to “action possibilities and opportunities that emerge from actors engaging with a focal technology.” By referring to collaboration and networking as action possibilities provided by ESM platforms, we can derive the ESM platform’s collaboration and networking impact as affordances. Hereby, technology affordances emerge from the interaction between users and technology (Bradner 2001). To reveal this connection, we investigate the relationship between an employee’s ESM use and the respective collaboration and networking impact. Malhotra and Majchrzak (2012) provide further details of this relationship by stating that affordances emerge from technology features. Thus, when conceptualizing an employee’s ESM use, we aim at empirically assessing the major ESM functionalities’ use intensity.

Even though many organizations introduce ESM platforms to enable digital work, whether they have the potential to provide a holistic digital work environment remains questionable. In the following, we discuss this topic and derive corresponding hypotheses.

2.2.1 Collaboration impact—how ESM platforms support the digital work environment’s task dimension

As defined earlier, the digital work environment’s task dimension in the ICT application context refers to all activities that employees perform in order to complete their (projects) work (Lau et al. 2000). ESM platforms belong to the collaboration systems group (Johns and Gratton 2013) and, therefore, we posit that using these platforms to complete work mostly refers to collaborative activities. Furthermore, the increasing importance of collaboration at the workplace (Lending 2010) also

² Terms that are frequently used synonymously are “enterprise social software” (Kuegler et al. 2015), “enterprise social media” (Kane 2015), “enterprise social network(ing)” (Fulk and Yuan 2013; Mänymäki and Riemer 2016), and “enterprise 2.0” (McAfee 2006).

undermines the significance of collaborative activities to perform work-related tasks. We conceptualize collaboration by drawing on Gronski and Pigg (2000) who state that collaboration is an interactive process involving several people aiming at a common goal, such as performing a particular task. We studied the literature and found empirical studies indicating that ESM platforms promote and improve collaboration (e.g., Pahlke 2012; Ransbotham and Kane 2011; Silic et al. 2015). Therefore, we derive the support of collaborative activities as the ESM platform's representation of the digital work environment's task dimension. Based on this, we introduce the *collaboration impact* concept, which refers to the extent to which an ESM platform enables and improves an employee's collaborative activities.

2.2.2 Networking impact—how ESM platforms support the digital work environment's social dimension

Lau et al. (2000) define the digital work environment's social dimension as applying ICT to build and maintain social relationships. Building on this definition, we consider networking activities as a suitable representation of addressing the social dimension, since networking activities are defined as "behaviours that are aimed at building, maintaining, and using informal relationships" (Wolff and Moser 2009). We found literature stating that employees' ESM use improves networking capabilities (Boughzala 2014) by enabling professional interaction and relationship building (Steinhüser et al. 2011). ESM platforms can, therefore, strengthen (Bala et al. 2015) and extend an employee's network (Kim and Kane 2015). Consequently, we state the support of networking activities as an ESM platform's representation of the digital work environment's social dimension. Finally, we introduce the *networking impact* concept, which refers to the extent to which an ESM platform enables and improves an employee's networking activities.

2.2.3 ESM platform functionalities and their historical development

Research shows that adopting ESM platforms appears to have a positive impact on organizations by, for example, increasing productivity (Steinhüser et al. 2011) or improving innovativeness (Gray et al. 2011). Owing to such promising advantages, companies increasingly invest in ESM and its implementation (Chui et al. 2012; Ellison et al. 2014; Holtzblatt et al. 2013; Leonardi 2014). In practice, however, many companies tend to understand ESM as a new technical development and as a silver bullet to introduce digital work (Forsgren and Byström 2018). However, ESM platforms cannot be viewed as a brand new and disruptive technological development, but rather as a further stage emerging from groupware systems (Razmerita et al. 2014). Hereby, groupware systems were introduced to support "groups of people engaged in a common task" in the early stage of digital work during the 1990s (Ellis et al. 1991). Transferring this notion to our digital work environment conceptualization, we derive that the early groupware systems in the *old school* era of digital work mainly focused on the digital work environment's task dimension. Consequently, we posit that employees using groupware systems were mainly supported in their collaboration activities and, thus, using groupware systems had a positive

impact on the collaboration impact. Groupware systems therefore provided functionalities, such as virtual workspaces for group work (Olson et al. 1993), chat rooms for discussions (Banerjee and Chau 2004), as well as functions for managing and sharing documents (Nagypál et al. 2001).

However, owing to the rise of social media and its application in an organizational context during the 2000s (*new school* era), ESM platforms extended the view of groupware systems and the notion that digital work only refers to task-related collaborative activities by also enabling social networking (Leonardi et al. 2013). Since ESM platforms entail social media functionalities, such as following profiles, liking, sharing and commenting on content, and posting blog posts (Mark et al. 2014), we posit that employees who use ESM platforms also gain support in their networking activities, and eventually an employee's ESM use will have a positive influence on the networking impact.

An argument that the degree of an employee's ESM platform usage positively influences the collaboration impact and networking impact comes as no surprise, considering the above mentioned literature stating that ESM platforms entail collaboration, as well as networking. However, in our conceptualization, we use collaboration impact and networking impact simultaneous in our conceptual model. Since we have stated above that ESM platforms entail functionalities to influence the collaboration impact and networking impact, we hypothesize that ESM platforms equally influence the task dimension and the social dimension of building a digital work environment. Thus, we posit:

Hypothesis 1 (H1) *The effects of an employee's ESM use on the collaboration impact and the networking impact do not differ significantly.*

Finally, and by referring to the above mentioned functionalities of *old school* groupware systems and *new school* social media, we derive:

Hypothesis 2 (H2) *(a) An employee's use of old school groupware-based functionalities mainly determine the influence on the collaboration impact and (b) an employee's use of new school social media functionalities mainly determine the influence on the networking impact.*

2.3 Exploring the relationship between ESM use and employee performance

As stated, introducing enterprise social media allegedly has a positive impact on an employee's job performance (Ali-Hassan et al. 2015; Bala et al. 2015; Lu et al. 2015; Pfaff and Hasan 2007; Steinhüser et al. 2011). Defining employee performance, we draw on Hunt (1996) and Campbell et al. (1990) who theorize employee performance as actions performed by employees that are relevant to the organizational goals. Therefore, we draw on the concept of ambidexterity to conceptualize an employee's performance. The concept of ambidexterity is rooted in organizational science and implies that organizations need to address the following two aspects: Organizations need to exploit by applying current knowledge and improving

efficiency, and they also need to explore by acquiring new knowledge and increasing innovativeness (Andriopoulos and Lewis 2009; Sarkees and Hulland 2009). By transferring this concept to an employee's individual performance and to the ESM platform context, we draw on Kuegler et al. (2015) to introduce the concepts of *task performance impact* and *innovative performance impact*. They define task performance impact as how an ESM platform influences an employee's performance in completing daily tasks. Conversely, they define innovative performance impact as how an ESM platform influences an employee's performance in generating new ideas. Furthermore, Ali-Hassan et al. (2015) similarly distinguish between these two performance concepts.

Examining the literature, we find a research stream clarifying how and under which circumstances an employee's ESM use impacts on his/her performance. As stated, many organizations implement ESM platforms in order to enhance employee performance. However, many companies struggle to realize this benefit (Alarifi and Sedera 2014)—even though the employees use these platforms. This indicates that the relationship between an employee's ESM use and the performance impact is not straight forward, but rather complex.

2.3.1 How collaboration impact and networking impact act as mediators

Research states that online collaboration impacts on organizational performance (Rosenzweig 2009). Specifically when dealing with complex problems, collaboration is essential, because employees can combine their strengths and expertise (Fisher et al. 2018). In this context, we also refer to the collective intelligence concept, which Heylighen (1999) defines as “the ability of a group to solve more problems than its individual members.” Based on this definition, we derive that collaboration has an impact on employees performing their tasks. Furthermore, Lévy (2010) states that collective intelligence can also “create, innovate and invent,” which refers to the employees' innovativeness. Salehan et al. (2017) emphasize that employees who collaborate on an ESM platform have a positive impact on an employee's work performance. More specifically, Kuegler et al. (2015) empirically prove that employees who use an ESM platform to collaborate, improves the innovative impact, as well as the task performance impact.

Looking at the networking impact, ESM and social networking research shows various potential benefits. Hereby, we found evidence that informal communication has a positive impact on an employee's performance (Orbach et al. 2015). Moreover, Moqbel et al. (2013) state that networking on ESM platforms (more specifically on social networking sites) improves an employee's job performance. Building on our employee performance conceptualization, we find literature stating that especially informal communication and social exchange—such as social networking—have the potential to enhance an employee's innovative performance (Zhao and Rosson 2009). However, networking not only impacts on the innovative performance, but also on the employees' task performance. For example, previous studies found that ESMs enhance the transparency of interactions within the organization by making communication and knowledge more transparent (Beck et al. 2014; Leonardi 2014; Silic et al. 2015). Transactive memory theory suggests that, while building a strong and reliable social network within

an organization, employees can use this social network by accessing the knowledge of others (Wegner 1987). Moreover, Zhang et al. (2007) find that building such a transactive memory system impacts on the performance of groups. Consequently, we state that employees' ESM use for networking purposes impacts on an employee's innovative performance and task performance.

Summarizing, we already stated that an employee's ESM use positively effects the collaboration impact as well as the networking impact. Additionally, we find strong evidence the collaboration impact as well as the networking impact have a positive effect on ESM platform's innovative performance impact and task performance impact. Thus, we conceptualize them as mediators of the relationship between ESM use and employee performance. We, therefore, hypothesize as follows:

Hypothesis 3 (H3) *Collaboration impact and networking impact serve as mediators between an employee's ESM use and (a) the ESM platform's task performance impact and (b) innovative performance impact.*

2.3.2 How collaboration impact and networking impact have differential effects

Moreover, we refer to the previous argument that the collaboration impact represents the task dimension and the networking impact refers to the social dimension of building a digital work environment. Hereby, we defined collaboration as an interactive process during which several people work together on a particular task. Further, Tamine and Soulier (2016) strengthen this argument by stating the building of a group to jointly work on a task as essential for collaboration. Transferring this, to the effect of the collaboration impact on the two performance concepts, we posit:

Hypothesis 4 (H4) *Collaboration impact has a bigger influence on task performance impact than innovative performance impact.*

Further, we emphasize the social interaction's importance in innovations. In this context, Høyrup (2010) states that most innovations emerge as an unplanned surprise, and do not result from a task-oriented approach. Rebernik and Širec (2007), therefore, emphasize the importance of social interactions for diffusing tacit knowledge, which is an important element of the innovation process. Transferring this, to the effect of the networking impact on the two performance concepts, we posit:

Hypothesis 5 (H5) *Networking impact has a bigger influence on innovative performance impact than task performance impact.*

Figure 1 summarizes our proposed research model.

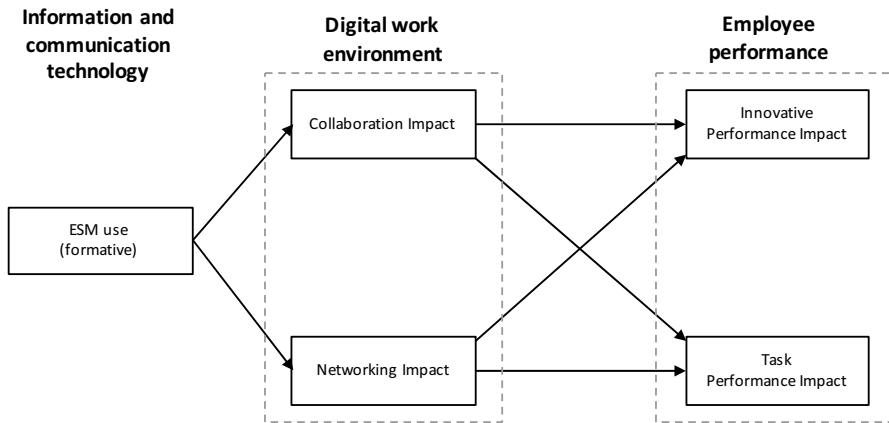


Fig. 1 Research Model

3 Methods

3.1 Research site

To assess and test our research model (see Fig. 1), we collected empirical data by applying a survey-based research approach. For this purpose, we approached an international financial corporation (hereafter referred to as “FinCorp”). FinCorp is one of the biggest insurance and asset management companies in the world. More than 100,000 employees work in geographically dispersed teams and in different (partly independent) divisions, such as property and casualty insurance, life/health insurance, asset management, and banking. Since all these different divisions vary slightly in their working and organizational culture, we therefore controlled for this source of variation by collecting our data in a selected department.

In 2013, FinCorp rolled out its ESM platform based on the software, Jive, which a major ESM provider distributes. This ensured that we studied a state-of-the-art ESM platform. Investigating the embedded functionalities, FinCorp’s ESM platform provides old school groupware-based functions, such as a document management tool that enables creating and sharing of documents, forums and chats that enable discussions, as well as group spaces for organizing in teams. Moreover, the platform also provides new school social media functionalities. Hereby, every employee is responsible for their own profile page on which they can post content, for example, in blogs. Employees can also comment on, like, and share various content, and build a social network by following other profile pages.

3.2 Survey instrument

We developed our survey following Straub’s (1989) guidelines. As recommended, we used proven measures from the literature in order to develop our survey instrument (e.g., Kankanhalli et al. 2005; Stone 1978). In doing this, we adapted the

wording to meet this study's context (Suddaby 2010). Except for ESM use, which we assessed as a formative measure, we operationalized the other variables as reflective measures. We developed an employee's ESM use as a formative measure by conducting a workshop with the particular project group for FinCorp's ESM platform and we extracted the most frequently used, as well as the most important, ESM functionalities. We, therefore, relied on the operationalization of Venkatesh et al. (2008) by formulating our measures and by assessing the major functionalities on a scale from 1 (never) to 5 (very often).

We developed the reflective measures by creating an item pool for each construct based on existing and proven measures from literature. Based on those item pools, we performed several procedures to ensure the quality of the survey instrument: We used the joint workshop with the project group to assure comprehensibility in FinCorp's context. Additionally, we conducted two rounds of card-sorting and item-ranking exercises as proposed by Moore and Benbasat (1991) with a group of four and five researchers. In this process, we constantly adjusted and refined the measurement instrument by rephrasing, adding and dropping items (see Appendix Table 6 for the final questionnaire).

Finally, developing our survey, we were also guided by Chang et al. (2010) in order to address the potential issue of common method variance *ex ante*—which is very important when developing questionnaire-based surveys.

3.3 Data collection and sample characteristics

We collected the data in March/April 2017 and rolled out our survey by posting an article on the intranet along with a link to our online survey and a disclaimer that the data will be handled strictly confidential and anonymous. After 2 weeks, we posted a reminder on the intranet and after 3 weeks the survey was closed. Our final sample comprises 260 participants who fully completed the online survey. However, we had to omit 13 questionnaires, owing to the respondents' lack of attention, which we detected by using an attention item in our questionnaire. This resulted in a final number of 247 usable data sets (see Appendix Table 7 for details on the final sample's characteristics). Before analysing the data, we dealt with a potential non-response bias by comparing early and late respondents (Lindner et al. 2001). Additionally, we tested for the common method variance *ex post*, by using the latent common factor approach, which Liang et al. (2007) illustrate.

3.4 Data analysis

We used the partial least squares (PLS) method to analyse the data and to assess our research model. We chose this approach, since PLS is recommended for assessing models that include formative measures (Hair et al. 2016). In terms of tools, we used

Table 1 Outer weights and outer loadings of formative measurement indicators

Indicators	Outer weight	Outer loading	VIF
Blog posts	-0.084	0.627***	2.162
Create documents	0.067	0.745***	2.428
Create groups	0.299*	0.819***	2.604
Comment on content	0.029	0.750***	2.851
Discussions	0.173*	0.726***	2.191
Following profiles	0.256*	0.794***	2.015
Like content	0.315**	0.870***	2.895
Share content	0.169	0.790***	2.447

Significance level: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

SmartPLS 3. Furthermore, in our data analysis, we mainly followed the recommendations and guidelines of Hair et al. (2016) and Hair et al. (2017).

3.5 Measurement model assessment

In assessing an employee's ESM use as a formative measure, we followed the recommendations of Cenfetelli and Bassellier (2009), and Hair et al. (2016). We first tested for collinearity and our results show that all the indicators' variance inflation factor (VIF) was below the recommended threshold of five (Hair et al. 2016). Next, to explain an employee's ESM use, we assessed the indicators' outer weights und corresponding significance to determine each functionality's relative contribution. Via this process, we found that the functionalities "create groups," "discussions," "following profiles," and "like content" have a significant effect. Then, we assessed the indicators' outer loadings and since all the indicators exceeded the 0.5 threshold in terms of absolute importance, we retained them when we assessed the structural model as recommended by Hair et al. (2016). Table 1 shows an overview of the formative measure assessment.

To assess the reflective measures' measurement model, we performed several activities consistent with the instructions of Hair et al. (2016) to ensure a valid measurement model, thereby assessing the variables' construct reliability and validity. Table 2 states the variables' mean, standard deviation (SD), composite reliability (CR), average variance extracted (AVE), and Cronbach's alpha (CA), and shows that all indicators exceed the required thresholds (Hair et al. 2016).

We also examined the loadings and cross-loadings (see Appendix Table 8). The results show that all loadings exceed the 0.7 threshold. Moreover, all the cross-loading differences exceed the recommended 0.1 threshold (Gefen and Straub 2005). Table 2 also shows that the measurement model meets the Fornell–Larcker criterion (Fornell and Larcker 1981). Complementing the Fornell–Larcker criterion, we also checked the HTMT values, which are all lower than 0.9 (Hair et al. 2016).

Table 2 Measurement model properties for reflective measures

	Construct reliability and validity					
	Indicators	Mean	SD	CR	AVE	CA
Collaboration impact (CI)	3	2.175	1.022	0.856	0.775	0.855
Networking impact (NI)	3	2.057	1.085	0.895	0.827	0.894
Innovative performance impact (IPI)	3	2.132	1.058	0.949	0.862	0.920
Task performance impact (TPI)	3	2.543	1.099	0.944	0.848	0.910
Fornell–Larcker criterion						
	CI	NI	IPI	TPI		
Collaboration impact (CI)	0.880					
Networking impact (NI)	0.621	0.909				
Innovative performance impact (IPI)	0.591	0.684	0.928			
Task performance impact (TPI)	0.561	0.597	0.652	0.921		

All items underlying the above constructs were measured using five-point Likert-type scales (1 = strongly disagree, 5 = strongly agree)

The results marked in bold indicate where the highest value is expected

SD standard deviation, *CR* composite reliability, *AVE* average variance extracted, *CA* Cronbach's alpha

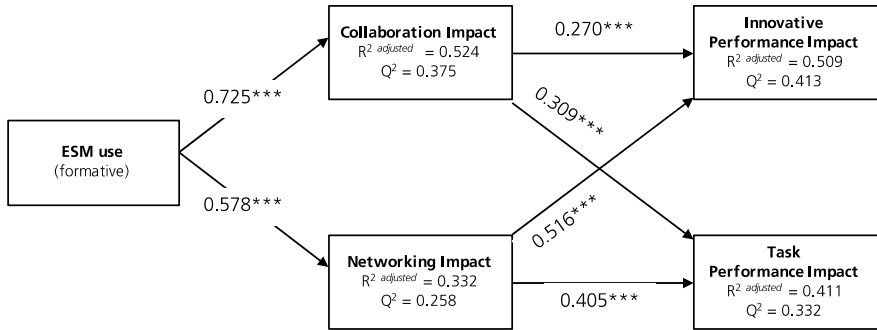
4 Results

4.1 Structural model assessment

We further assessed the structural model via a bootstrap analysis (1000 subsamples). Figure 2 shows the structural model's final results. Our analysis shows that the degree of an employee's ESM use has a significant positive effect on the collaboration impact and the networking impact. Moreover, the collaboration impact has a strong positive effect on the task performance impact and the innovative performance impact. Our data likewise shows that networking impact has a strong positive effect on the task performance impact and the innovative performance impact.

We considered the adjusted R-squared (R^2_{adjusted}) and found that our model explains the respective dependent variables' variances very well. Furthermore, there are no collinearity issues, since all VIFs are below five (Hair et al. 2016). Moreover, the Stone–Geisser's Q^2 criterion (Geisser 1975; Stone 1974) shows that all Q^2 values are considerably above zero and thus, indicate a high predictive relevance (Hair et al. 2016).

We also checked our model for control variables (age, current position, and gender), but could not find any significant effect, except for age having a significant, negative effect on networking impact (-0.152 ; $p=0.006$). Moreover, we added the control variables, but could not observe any major increase in terms of the R^2_{adjusted} .



Significance level: ***: $p < 0.001$; **: $p < 0.01$; *: $p < 0.05$

Fig. 2 Results of the structural model assessment

4.2 Analyzing differential effects

Furthermore, we also tested whether the networking impact’s effect on, respectively, task performance impact and innovative performance impact is significantly stronger than the collaboration impact’s effect. Hereby, we applied Chin’s (2004) pooled standard error method for path comparison as well as the Satterthwaite method (Satterthwaite 1946).

Table 3 shows the results.

We find that ESM use has a significantly stronger effect on the collaboration impact than the networking impact, thereby rejecting Hypothesis 1 (H1), since the pooled standard error method for path comparison, as well as the Satterthwaite method each shows a t value exceeding the 1.96 threshold. Furthermore, we empirically prove that the networking impact has a significantly stronger effect on innovative performance impact, thereby supporting Hypothesis 5 (H5). However, when it comes to the relationships with the task performance impact, neither of the two tests provides evidence for statistically significant differential effects, thereby rejecting Hypothesis 4 (H4).

Table 3 Results of path comparison tests

Path coefficient	Pooled standard error method	Satterthwaite method
ESM use → networking impact vs. ESM use → collaboration impact	t = 2446	t = 2442
Networking impact → task performance impact vs. Collaboration impact → task performance impact	t = 1.142	t = 1.141
Networking impact → innovative performance impact vs. Collaboration impact → innovative performance impact	t = 2.832	t = 2.826

Table 4 Comparing the formative measurement indicators' outer weights and outer loadings

Indicators	Collaboration impact		Networking impact	
	Outer weight	Outer loading	Outer weight	Outer loading
Blog posts	-0.160	0.611***	-0.066	0.555***
Create documents	0.296**	0.850***	-0.149	0.587***
Create groups	0.353***	0.865***	0.162	0.690***
Comment on content	0.110	0.730***	-0.012	0.713***
Discussions	0.134	0.698***	0.145	0.671***
Following profiles	0.258**	0.737***	0.318*	0.836***
Like content	0.019	0.742***	0.543***	0.934***
Share content	0.198	0.822***	0.207	0.724***

Significance level: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

4.3 Unravelling the ESM platforms' functionalities to explain networking impact and collaboration impact independently

We also analyzed the ESM use variable's impact on networking impact and collaboration impact independently to showcase differences with regard to the ESM functionalities' relative importance of when explaining an ESM platform's impact on, respectively, an employee's collaboration behavior and networking behavior. Table 4 shows the results:

Considering the outer weights and, thus, the various functionalities' relative importance in explaining the ESM use variable in the collaboration impact context, we find that creating documents, creating groups, and following profile pages are significant. In the networking impact context, following profiles and liking content are significant. Consequently, we conclude that our results support Hypothesis 2b fully and Hypothesis 2a only partially, since profile-following is significant in explaining the relationship between ESM use and collaboration impact, and refers to a new school social media functionality.

4.4 Testing for mediation effects

As the last step of our analysis, we tested our model for mediation effects. More specifically, we tested whether collaboration impact and networking impact mediate the relationship between ESM use and task performance impact, as well the relationship between ESM use and innovative performance impact, respectively. We followed the guidelines of Hair et al. (2016). We therefore extended our baseline structural model (see Fig. 2) by estimating the model with additional paths between ESM use and, respectively, task performance impact, as well as innovative performance impact (see Appendix Table 9).

Our results show that the relationship between ESM use and innovative performance impact is weak (0.053) and not significant, while the indirect effects remain

significant. We therefore derive that collaboration impact and networking impact serve as full mediators between ESM use and innovative performance impact and thus, our results fully support Hypothesis 3b (H3b). We considered the relationship between ESM use and task performance impact, and found a significant effect (0.193; $p=0.018$), while the indirect effects also remained significant. We therefore conclude that collaboration impact and networking impact partially mediate the relationship between ESM use and task performance impact and thus, our results also partially support Hypothesis 3a (H3a).

Additionally, we checked whether collaboration impact, respectively networking impact individually serve individually as mediators between ESM use and task performance impact, as well the relationship between ESM use and innovative performance impact. In our analysis, we find that both collaboration impact and networking impact act as partial mediators for the mentioned relationships.

Summarizing, Table 5 shows an overview and summary of our results:

5 Discussion

5.1 Core findings and interpretations

Returning to our digital work environment conceptualization, our study supports that an ESM platform has the potential to help providing a digital work environment. Since an employee's ESM use impacts on the collaboration impact and networking impact, ESM platforms address both work dimensions (task and social). Academics and practitioners can, therefore, understand ESM platforms as a cornerstone in organizational endeavors to introduce digital work and provide a modern digital workplace (Dery et al. 2017). Additionally, referring to the facilitation of digital work in a bigger context, our study is also embedded in the research streams on organizational digitization and digital transformation. In a recently published article, Hicks (2019) emphasizes on the importance of digital work in the context of digital transformation. Further, digital work is also an essential factor for organizations when planning their endeavors to provide their employees with the workplace of the future (Köffer 2015).

Moreover, the significant effects are consistent with various prior studies. For example, Pahlke (2012) empirically proves that organizations can use ESM platforms to promote collaboration. Steinhüser et al. (2011) who state, based on their explorative case study approach, that ESM use impacts on social networking among employees, is another example. Therefore, we contribute to the literature by reinforcing the generalizability of these studies' results by confirming their effects in another empirical setting and using another empirical approach. Furthermore, referring again to the old school versus new school discussion, we show that ESM platforms successfully extend the old school groupware systems' impact by introducing functionalities that enable social networking and, thus, address the digital work environment's social dimension.

Table 5 Overview of hypotheses and summary of results

Hypothesis	Description	Result of analysis
H1	The effects of an employee's ESM use on the collaboration impact and the networking impact do not differ significantly	Not supported
H2a	An employee's use of old school groupware-based functionalities mainly determines the influence on the collaboration impact	Partially supported
H2b	An employee's use of new school social media functionalities mainly determines the influence on the networking impact.	Supported
H3a	Collaboration impact and networking impact serve as mediators between an employee's ESM use and the ESM platform's task performance impact	Partially supported
H3b	Collaboration impact and networking impact serve as mediators between an employee's ESM use and the ESM platform's innovative performance impact	Supported
H4	Collaboration impact has a bigger influence on task performance impact than innovative performance impact	Not supported
H5	Networking impact has a bigger influence on innovative performance impact than task performance impact	Supported

Revising our hypotheses, our differential effects analysis shows that ESM use has a significantly stronger effect on collaboration impact than on the networking impact, thereby rejecting Hypothesis 1 (H1). We can explain this differential effect in the context of the empirical setting. FinCorp initially introduced the tool as a collaboration platform and for the first users to come on board. FinCorp started motivating several project teams to use the ESM platform for doing their project work. Thus, currently most employees use the ESM platform for the purpose of collaborating.

The fact that ESM platforms are, in fact, a further development of groupware systems can also be observed when considering our ESM use variable. To measure an employee's ESM use, we rely on a formative measure based on the ESM platform's main functionalities. Considering the outer weights and, therefore, each functionality's relative importance with regard to explaining an employee's ESM use (see Table 2), we observe, on the one hand, that new social media functionalities, such as liking content (Hermida et al. 2012), determine the overall use score, while, on the other hand, we also notice old school groupware functionalities, such as creating virtual workspaces for group work (Olson et al. 1993), which are significant for formatively determining an employee's ESM use. Drawing on this and unravelling the relationship between the formative measure ESM use and the collaboration impact, as well as the relationship between the formative measure ESM use and networking impact (see Table 4), we also find proof for our argument that networking impact represent the new school social media functionalities, thereby fully supporting Hypothesis 2b (H2b), whereas collaboration impact refers to the rather old school groupware system functionalities, thus, supporting Hypothesis 2a (H2a)—although only partially, because the profile-following functionality significantly influences the collaboration impact. Since profile pages are one of an ESM

platform's main components (O'Leary 2016), this explains to a certain extent why following profile pages is a significant determinant for explaining the influence of an employee's ESM use on the collaboration impact and the networking impact.

Moreover, our research supports Hypothesis 3a (H3a) partially and Hypothesis 3b (H3b) fully by showcasing that the networking, as well as the collaboration impact mediate the relationship between an employee's ESM use and the performance impacts. More precisely, the collaboration impact and networking impact fully mediate the relationship between ESM use and the innovative performance impact. ESM platforms can, therefore, only enhance an employee's innovative performance when the employee uses it actively for collaborating and networking purposes. Our research, therefore, shows that passive usage behavior (often also referred to as lurking) (Alarifi et al. 2015) will likely not improve an employee's innovative performance. Furthermore, since collaboration impact and networking impact only partially mediate the relationship between ESM use and task performance, we conclude that other usage behaviors can also theoretically improve an employee's task performance. However, this is not surprising, since performing a particular task might require specific knowledge, which an employee can passively access by using the ESM platform.

Further, the differential effects analysis does not show a significant difference between the networking impact and collaboration impact influencing the task performance impact, thereby rejecting Hypothesis 4 (H4). We can explain this result by referring to literature stating that ESM platforms and social networking can improve an employee's awareness and sensemaking, which refer to an employee's knowledge of his or her coworkers (Dimicco et al. 2009; Leonardi 2015). Consequently, employees acquire knowledge of the coworkers' competences through networking activities and, thus, they are able to rely on them as experts when performing tasks.

Our results ultimately show that the networking impact is significantly more important when it comes to explaining the innovative performance impact, thereby supporting Hypothesis 5 (H5). This finding is also consistent with the practitioner literature stating that "conversations at the water cooler or in the company cafeteria are often occasions for knowledge transfer" (Davenport and Prusak 1998). Since it is well-known that knowledge sharing on ESM platforms has an important impact on an employee's innovativeness (e.g., Leonardi 2014), we find that researchers can understand the ESM platform's networking component as a digital water cooler that promotes informal knowledge transfer. Discussing this finding in the context of knowledge management literature, research also states that informal social interaction and knowledge exchange among employees has a positive impact on an organization's innovative performance (e.g., Huang and Li 2009).

5.2 Theoretical contributions

In our study, we use ESM platforms' various functionalities as indicators to operationalize ESM use as a formative variable. Hereby, our research is one of the first studies to conceptualize ESM use by referring to the individual functionalities. In contrast to using reflective measures, this approach enables us to gain

insight into the various functionalities' role and importance to explain the ESM platform's collaboration and networking impact. Hereby, we provide an alternative and more comprehensive perspective of IT use as proposed by Barki et al. (2007) as well as Cenfetelli and Bassellier (2009). Consequently, our research addresses a major call for research, which demands opening the black box and further clarifying the IT artifact's actual impact within the information systems (IS) research realm (Orlikowski and Iacono 2001). Our research can, therefore, serve as an example for upcoming research and quantitative studies that investigate the impact of ESM use.

As stated in the conceptualization, we can discuss collaboration impact and networking impact in context of technology affordances (Gaver 1991). Our research suggests that enabling employees to collaborate and to network are in fact affordances of an ESM platform. Additionally, by linking the functionalities of the ESM platform to collaboration impact and networking impact, our research is in line with approaches by Malhotra and Majchrzak (2012) and Argyris and Monu (2015) who link various tools to affordances and thus, our research introduces this approach to ESM research. Further, Bernhard et al. (2013) state that quantitative research on affordances is scarce and thus, our research contributes to the affordance research stream by setting an example. Additionally, we went through the ESM literature, and found several studies introducing various affordances of ESM platforms (e.g., Gibbs et al. 2013; Treem and Leonardi 2013); thus, our study extends these approaches by introducing collaboration and networking.

We introduce our digital work environment conceptualization to ESM research. By dividing a digital work environment into a task and social dimension, and by linking project collaboration to the task component and networking to the social component, we develop a simplistic and robust framework, which can be applied not only to future ESM studies, but also to other contexts. We also discuss collaborating and networking in the contexts of groupware systems and ESM platforms. Hereby, Koch (2008) states that groupware systems research usually focuses on a group of people who collaborate in pre-planned ways of working together, whereas ESM research puts the single employee in the centre of attention by investigating emerging social interactions. Our research, therefore, combines and bridges two research subfields concerned with organizational collaboration (Koch et al. 2015).

In this study we show that ESM platforms, which influence an employee's performance, is not straight forward, although studies state that introducing ESM platforms can influence task performance in dispersed teams (Suh and Bock 2015) and support organizational innovation efforts (Malsbender et al. 2013). By showing networking impact and collaboration impact as mediators of ESM use and employee performance, our study further investigates those relationships. Thereby, our study aligns with the latest research efforts, which unravel the relationship between ESM use and innovative, as well as task, performance (e.g., Ali-Hassan et al. 2015; Kuegler et al. 2015). Consequently, our research also addresses calls for research to clarify how various ESM use outcomes are related (e.g. Aral et al. 2013; Dittes and Smolnik 2017; Viol and Hess 2016; Wehner et al. 2017). Finally, since one of our dependent variables refers to the ESM platform's innovative performance impact, our research also contributes to innovation research by responding to calls for

research that clarifies the relationship of technology, how it is used, and how it influences innovation (e.g., Nambisan et al. 2017; Wehner et al. 2017).

5.3 Managerial implications

Our study also provides several implications for practice. However, discussing those managerial implications, it is essential to note that our results are only based on data, which has been collected in only one organization (see also Sect. 5.4) and thus, the following recommendations should not be blindly followed. However, since the ESM platform that serves as empirical basis for our study, entails the major ESM functionalities as well as is the product of one of the major ESM providers, we claim that other organizations might compare to our results. Additionally, our theoretical model and the corresponding relationships are developed on the basis of prior studies and literature indicating the applicability of our results in other organizational contexts.

After initial optimism and positive ideas, more and more skeptic voices arose with regard to the management perspective on ESM platforms (e.g., Bughin 2016; Mann et al. 2012; Miller et al. 2011). We statistically show that employees who use ESM platforms actually influence an employee's task performance and innovative performance. Practitioners can, therefore, use our research to empirically contradict the sceptics and convince the organizational decision makers of the power and potential associated with ESM platforms.

However, we also found research stating that employees might perceive using ESMs as a waste of time (Choudrie and Zamani 2016). Our findings also reflect this viewpoint, since we prove collaboration impact and networking impact as mediators and partial mediators, respectively. Thus, employees' ESM use leads to performance improvements if employees use the platform for collaboration and networking purposes. Consequently, we posit that organizations could provide initial training, as well as continuous mentoring programs, to show their employees how to collaborate and network, thereby counteracting wrong usage behavior. We conceptualized collaboration impact as a more formal and task-related activity. Collaborating in official projects has predetermined project structures, responsibilities, and goals. Dealing with formal activities and predefined structures, we find that training activities work very well, since the employees can learn how the offline structures are transferred and represented in the ESM platform's virtual work environment. Nevertheless, training is only one major aspect of introducing ESM platforms—especially when it comes to more informal and social-related activities, such as networking. We find that it is not trivial to predefine and teach informal social interaction, since every employee might have different preferences and personal traits. Furthermore, the ESM platforms' flexibility refers to the emerging dynamics and new practices whereby employees take the platform over (Richter and Riemer 2013). Especially since the networking impact has a stronger influence on both performance impacts, organizations could consider promoting employee networking activities. The research states that networking behavior always demands an open organizational culture (Korzynski 2015). In this context, an open organizational culture apparently

has a positive influence on an organization's innovative potential (Powell 2015). Furthermore, promoting such an organizational culture apparently also help implement ESM platforms' sustainably (Li 2010; Nguyen et al. 2017).

Finally, our research also contributes to practice by continuing the old school versus new school discussion. By conceptualizing ESM platforms as a further groupware systems development and by demonstrating this development, we posit—with regard to the relative importance of the various groupware-grounded functionalities that explain ESM use—that it is essential for organizations to shut down the old groupware and collaboration tools when introducing ESM platforms. Since human beings usually resist change (MacGregor 1960), employees tend to continue using the old school tools when they must collaborate, for example. However, shutting down the old tools will force the employees to use the new ESM platforms for collaboration purposes, which will ultimately also lure them into the new networking possibilities.

5.4 Limitations and future research

Our paper contains a number of concerns and limitations, which must be discussed. Although these concerns and limitations theoretically limit our findings, they provide a starting point for future research.

The first concern is that we collected and analyzed data from only one organization's department. This approach enabled us to control for variances with regard to the platform itself and the organizational cultures, which proved to be a major influence with regard to assessing ESM platforms. However, this approach also leaves the question whether our results generally apply to other organizations unanswered (Lee and Baskerville 2003). Although FinCorp's ESM platform is a state-of-the-art ESM platform from a major provider, the implementation process and the prevailing culture could differ from those of other organizations. We therefore suggest that future research efforts should test our model in different organizations to increase our results' generalizability. Furthermore, by testing our model in other organizations, future research could investigate the role of organizational culture, size, and industry when explaining how an employee's ESM use impacts on the separate performances.

The second concern, which relates to our study's design, involves the application of self-reported data. Hereby, self-reported data is always perception-based in the respondents' eyes. By addressing this, researchers can develop our study further and improve our results' robustness. Academics can achieve this using additional (more) objective data sources as indicators for our variables. These data sources can, for example, include interviewing supervisors on assessing an employee's task and innovative performance or using log file data when assessing an employee's ESM use.

A third concern relates to the survey's cross-sectional design. Since we collected the data and measured all the variables at a certain point in time, we must interpret the causal relationships very carefully (Baumgartner and Homburg 1996). Considering our theoretical model, it becomes obvious that especially the relationship

between the collaboration impact and innovative performance impact is not affected immediately. Moreover, sparking innovative and new ideas takes time. However, the ESM platform had been implemented for some time at FinCorp and thus, we believe that the corresponding effects could be measured adequately.

Future research could also investigate our theoretical model over time. In doing this, a longitudinal study design would not only address the concern about the cross-sectional study design by measuring real causal relationships, but it would also enable the researchers to observe changes in the model in terms of single variables that improve or decline. This approach would also enable the researchers to observe how the prevailing relationships change. Furthermore, research has shown that the link between networking and innovativeness is rather complex, since many different aspects play a role (Pittaway et al. 2004). Future research can therefore investigate this relationship even further.

Appendix

See Appendix Tables 6, 7, 8, 9

Table 6 Measures

Construct	Question	Literature sources
Innovative performance impact	By using the system, I more often create new ideas for improvements	Developed, based on Janssen (2001) and Kuegler et al. (2015)
	Using the system improves my ability to generate innovative solutions to problems	
	Using the system makes me more often to produce innovative ideas for work improvement	
Task performance impact	Using the system enables me to accomplish tasks quicker	Developed, based on Seddon and Kiew (1996) and Kuegler et al. (2015)
	Using the system enables me to accomplish tasks more quickly	
	The system supports me in doing my job	
Networking impact	I use the system to maintain social relationships with my colleagues	Developed, based on Kuegler and Smolnik (2014)
	I use the system to establish social relationships with my colleagues	
	I use the system to get to know people in my organization	
Collaboration impact	I use the system to collaborate with co-workers	Developed, based on Kuegler et al. (2015)
	I use the system to coordinate with my colleagues	
	I use the system to jointly work on tasks	

Table 7 Demographics

Category	Frequency
Organizational tenure (years)	
0–5 years	93
6–10 years	62
11–15 years	33
16–20 years	28
21–30 years	21
31–40 years	10
More than 41 years	0
Overall work experience (years)	
0–5 years	48
6–10 years	36
11–15 years	30
16–20 years	50
21–30 years	55
31–40 years	28
More than 41 years	0
Organizational tenure (seniority)	
Administrative specialist	25
Young professional	43
Functional expert	107
Lower management	33
Middle management	35
Top management	4
Social media experience (private use) (degree)	
Low	6
	31
Mid	68
	88
High	54

Table 8 Loadings and cross-loadings

		Collab	Network	TaskPerf	InnoPerf
Task performance impact (TaskPerf)	TPI 1	0.910	0.620	0.482	0.568
	TPI 2	0.927	0.601	0.539	0.548
	TPI 3	0.925	0.581	0.528	0.534
Innovative performance impact (InnoPerf)	IPI 1	0.612	0.917	0.524	0.607
	IPI 2	0.605	0.915	0.576	0.643
	IPI 3	0.600	0.952	0.543	0.653
Collaboration impact (Collab)	CI1	0.506	0.466	0.894	0.480
	CI2	0.469	0.577	0.854	0.612
	CI3	0.506	0.510	0.892	0.539
Networking impact (Network)	NI1	0.559	0.608	0.609	0.933
	NI2	0.515	0.626	0.573	0.938
	NI3	0.554	0.631	0.508	0.854

The results marked in bold indicate where the highest value is expected

Table 9 Testing mediation effects

Dependent variable	Collaboration impact	Networking impact	Innovative performance impact	Task performance impact
Main effects				
ESM use	0.716***	0.586***	0.053 ^{n.s.}	0.193*
Collaboration impact			0.240**	0.199**
Networking impact			0.504***	0.361***
$R^2_{adjusted}/Q^2$	0.511/0.368	0.341/0.266	0.508/0.413	0.425/0.343

Significance level. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

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