

Enterprise social media and knowledge creation capability: a comparison between pre- and post-COVID-19 pandemic

ESM and
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Abstract

Purpose – Drawing upon the theory of communication visibility, this research intends to investigate the direct effect of enterprise social media (ESM) usage on team members' knowledge creation capability (KCC) and the mediating effects of psychological safety and team identification. In addition, it aims to untangle how the efficacy of ESM usage varies between pre- and post-COVID-19 periods.

Design/methodology/approach – Using two-wave survey data from 240 members nested within 60 teams, this study utilizes a multilevel approach to test the proposed hypotheses.

Findings – We discover that ESM usage enhances team members' KCC. More importantly, the results show that psychological safety and team identification mediate the ESM–KCC linkage. Interestingly, we further find that the impacts of ESM usage on team members' KCC, psychological safety, and team identification are stronger in the pre-COVID-19 period than those in the post-COVID-19 period.

Originality/value – This research sheds light on the ESM literature by unraveling the mechanisms of psychological safety and team identification underlying the linkage between ESM usage and team members' KCC. Moreover, it advances our understanding of the differential efficacy of ESM usage in pre- and post-COVID-19 periods.

Keywords Enterprise social media, Knowledge creation capability, Psychological safety, Team identification, COVID-19 pandemic

Paper type Research paper

1. Introduction

Over the last decade, enterprise social media (ESM) has witnessed dramatic growth and has been increasingly adopted for work-related communication and coordination (Forsgren and Byström, 2018; Leonardi *et al.*, 2013; Wang *et al.*, 2021b). Team members have widely utilized ESM to undertake various social interaction activities such as information sharing, video conferencing, real-time message communication, feedback acquisition, and intra- and inter-team collaboration



(Sæbo *et al.*, 2020; Wei *et al.*, 2022). More recently, researchers in information systems have highlighted that visible and open working environments afforded by ESM can facilitate knowledge sharing and exchange behaviors of team members (Leonardi *et al.*, 2013; Sun *et al.*, 2019), which may exert a profound impact on their knowledge creation capability (KCC).

KCC of team members is commonly regarded as a critical accelerator to firms' competitiveness, growth, and success, and has been emphasized in ESM research as well (Leonardi, 2015). Team members' KCC reflects their ability to exchange information and new ideas with each other, combine information and ideas to foster innovations, and perceive the value created for the team (Smith *et al.*, 2005). Some researchers underline that ESM functions as more than communication channels; it also acts as hubs for knowledge sharing and exchange among team members (Cui *et al.*, 2020; Sun *et al.*, 2019). This could enhance team members' abilities to resolve problems, generate novel ideas, and develop innovations (Mäntymäki and Riemer, 2016), thus improving their KCC. However, others pose opposite views and caution against the detrimental influence of ESM usage on team members' KCC. For example, Ma *et al.* (2020) and Chen *et al.* (2020) pointed out that ESM usage increases team members' knowledge hiding behaviors, which hampers knowledge sharing and exchange among them. Besides, some studies reveal that ESM usage amplifies team members' tendency to engage in cyberloafing, which deteriorates their job productivity and learning abilities (Nusrat *et al.*, 2021; O'Neill *et al.*, 2014; Zhong *et al.*, 2022). This may impede team members' knowledge sharing behaviors and creativity, thereby eroding their KCC. In addition, previous research suggests that coworkers' comments and feedback on ESM could exacerbate process complexity and decision uncertainty (Hildebrand *et al.*, 2013), which impairs team members' creativity and innovation and thus their KCC.

In view of this continuing controversy and the growing importance of ESM, it is essential to examine how ESM usage influences team members' KCC to advance theory and practice development in the field of ESM. Previous studies have primarily investigated the impact of ESM usage on employees' agility performance (Cai *et al.*, 2018), task performance (Deng *et al.*, 2021; Kuegler *et al.*, 2015), job performance (Cui *et al.*, 2020), and work efficiency (Yang *et al.*, 2021), and job satisfaction and turnover intention (Zhang *et al.*, 2019). Nevertheless, scant research has disentangled the mechanisms underlying the relationship between ESM usage and team members' KCC, particularly the mediating roles of team members' psychological and cognitive factors, which hampers a nuanced understanding of this relationship.

To bridge this knowledge gap, this study employs the theory of communication visibility (Leonardi, 2014, 2015) to unravel the mediating effects of psychological safety and team identification on the ESM–KCC linkage. Psychological safety and team identification are two key psychological and cognitive factors in intra-teams' studies (Cai *et al.*, 2018; Somech *et al.*, 2009). The theory of communication visibility suggests that as ESM makes intra-team communications visible, team members who are not even involved in the communications can gain a thorough understanding of the contents and information associated with the team (Leonardi, 2014). Previous research highlights that the meta-knowledge residing in the use of ESM contains not only information about “who knows what”, but also “who knows whom” (Engelbrecht *et al.*, 2019; Leonardi, 2015). By applying ESM, team members can observe the communications between others and infer what and whom those team members know. This can create a favorable team climate influencing team members' psychological safety and team identification, which in turn can affect their knowledge sharing and acquisition behaviors and thus KCC. Specifically, communication visibility afforded by ESM plays a pivotal role in fulfilling team members' psychological and cognitive needs, such as needs for safety, relatedness, belongingness, and expressing self-identities (Cai *et al.*, 2018; Karahanna *et al.*, 2018), thereby improving their psychological safety and team identification. When team members feel psychologically safe (Cai *et al.*, 2018; Edmondson, 1999) and possess a stronger sense of belongingness and emotional bonds to the team (Somech *et al.*, 2009), they are more

inclined to share their own opinions, information, and knowledge via ESM platforms (Chang and Chuang, 2011; Lin *et al.*, 2019). The knowledge sharing and acquisition among team members can help enhance their KCC (Kane, 2017). Hence, building on the theory of communication visibility, we theorize that team members' psychological safety and team identification act as two critical factors which may play a mediating role in the association between ESM and KCC.

Furthermore, the effectiveness of communication visibility afforded by ESM may be shaped by external environmental change (Chen *et al.*, 2020). Particularly, the outbreak of the COVID-19 pandemic has sparked a series of interventions such as travel restrictions, social distancing, and remote working. This can significantly remold the external environment in which team members engage in routine communication and knowledge sharing activities (Feng and Zhou, 2022) and hence influence the efficacy of ESM. As underscored by Karanasios (2021), "COVID-19 is the first pandemic where social media and digital technology play such an expansive role in communication, information dissemination and citizen engagement." This implies that the impact of ESM usage on supporting team members' virtual and remote work will become more pronounced after the outbreak of COVID-19. As such, ESM usage may exert stronger impacts on team members' psychological and cognitive needs (Karahanna *et al.*, 2018), and their knowledge sharing and creation behaviors (Chang and Chuang, 2011). Thus, it is expected that the efficacy of ESM usage on team members' KCC, psychological safety, and team identification might be altered between pre- and post-COVID-19 periods. Nonetheless, scarce research has empirically unveiled how the effectiveness of ESM usage is modified by the shift of the external environment due to the COVID-19 pandemic. Accordingly, this study intends to arrive at recommendations for effective use of ESM by disentangling its differential efficacy in pre- and post-COVID-19 periods.

To accomplish the aforementioned objectives, we utilized survey data collected in two waves (i.e. before and after the outbreak of COVID-19) from 240 members nested within 60 teams in Malaysian manufacturing firms. We find that ESM usage has a direct and positive effect on team members' KCC. More importantly, ESM usage enhances team members' psychological safety and team identification, which in turn improve their KCC. This suggests that these two factors partially mediate the ESM–KCC association. Interestingly, the effects of ESM usage on team members' KCC, psychological safety, and team identification are more pronounced in the pre-COVID-19 period than those in the post-COVID-19 period.

Our research makes several important contributions. First, it adds to the ESM literature by opening the black box of how ESM usage influences team members' KCC. Specifically, this research provides a nuanced understanding of the effect of ESM on team members' KCC by attesting to the mediating roles of psychological safety and team identification, which has not been examined by previous literature. Second, this research expands the ESM literature by untangling how the efficacy of ESM usage is altered between pre- and post-COVID-19 periods. This echoes the call for more research exploring how the external environmental change could modify the effectiveness of ESM usage (Chen *et al.*, 2020). In particular, our results shed light on the detrimental impacts of ESM usage on team members' KCC, psychological safety, and team identification in the situation of the post-COVID-19 period. Third, this research enriches the theory of communication visibility by providing a solid theoretical foundation to unravel the underlying mechanisms of the ESM–KCC linkage and the varying efficacy of ESM in the pre- and post-COVID-19 periods.

2. Literature review and hypothesis development

2.1 Related research on ESM usage

As one of the computer-mediated tools, ESM has gained rapid popularity within firms (Fu *et al.*, 2020; Leidner *et al.*, 2018; Sun *et al.*, 2023). In contrast to conventional

communication tools, ESM provides novel social features in the workplace, facilitating an open, interactive, and fluid mode of communication (Sun *et al.*, 2020c, 2021a). The use of ESM allows employees to exchange messages with coworkers and post, edit, and sort text and files linked to themselves or other colleagues (Leonardi, 2014; Sun *et al.*, 2021b, 2022b).

Given the proliferation of ESM usage, a growing body of literature has explored its impact on employee- and firm-level outcomes. For instance, previous research has delved into the effect of ESM usage on employees' information and social overload (Chen and Wei, 2019), task performance (Deng *et al.*, 2021), job performance (Cui *et al.*, 2020; Jafar *et al.*, 2019), creative performance (Sun *et al.*, 2020a), agility performance (Cai *et al.*, 2018), work efficiency (Yang *et al.*, 2021), and job satisfaction and turnover intention (Zhang *et al.*, 2019). Besides, several studies have unraveled how ESM usage influences organizational outcomes, such as operational efficiency and innovativeness (Lam *et al.*, 2016), firm reputation (Guo *et al.*, 2020), new product development performance (Zhan *et al.*, 2020), and customer relations (Tajudeen *et al.*, 2018).

In sum, while the extant studies have provided insights into the implications of ESM usage for employees and organizations, scant empirical evidence is documented regarding how ESM usage influences team members' psychological and cognitive factors, which subsequently exert impact on their KCC. This inhibits a fine-grained understanding of how to transform the value of ESM into enhanced KCC, which plays a vital role in enabling firms to attain a competitive edge. In addition, although several studies have recognized that the value of ESM usage depends on the external environment (Chen *et al.*, 2020), there is a paucity of research that unravels how the effectiveness of ESM can be modified by external environmental change induced by the COVID-19 pandemic. Researchers have underlined that the global outbreak of the COVID-19 pandemic has significantly altered how employees perform their work (Kaya, 2020; Narayanamurthy and Tortorella, 2021), heightening the importance of ESM usage for intensifying information exchange and dissemination during the global crisis. Yet, scarce research has delved into how the efficacy of ESM usage on employees' KCC varies across pre- and post-COVID-19 periods, thus offering little guidance to firms regarding the contingency condition under which the value of ESM usage could be higher. Considering these significant research gaps, this paper endeavors to expand the ESM literature by disentangling the direct effect of ESM usage on team members' KCC and the mediation effects of psychological and cognitive factors as well as how such effects may vary between pre- and post-COVID-19 periods.

2.2 Theory of communication visibility

In this study, the theory of communication visibility (Leonardi, 2014) is adopted as the theoretical lens to guide our research model. It holds that ESM usage allows communications between employees that are invisible on regular channels (e.g. phone calls, email, and face-to-face conversation) to become visible to coworkers who do not directly participate in the communication (Leonardi, 2015). This enables employees to see both the information contents shared by their coworkers on ESM and the structures of communication parties for these coworkers (Leonardi, 2014). Such visibility afforded by ESM can lead to an increased level of employees' instrumental knowledge regarding how to accomplish certain tasks (Cui *et al.*, 2020) and boost their meta-knowledge from two major perspectives. One is meta-knowledge of "who knows what" through message transparency (Leonardi, 2014). This indicates that an employee who is not the sender or recipient can also observe and apprehend the contents of messages transmitted on ESM, allowing an observer to identify and learn about coworkers' instrumental knowledge. Another is meta-knowledge of "who knows whom" through network translucence (Leonardi, 2014). This suggests that an employee can discern coworkers' communication networks by observing their social interactions on ESM, which enables an observer to infer

coworkers' interpersonal relationships, but the inferences may not be clear enough to ascertain the nature, scope, and strength of the observed relationships (Leonardi, 2014; Ng and Yee, 2020). Both message transparency and network translucence afforded by communication visibility are effective in avoiding work duplication and fostering knowledge recombination and creation within the team (Leonardi, 2015).

The theory of communication visibility has been widely employed by previous studies in the ESM scenario. For example, Cui *et al.* (2020) applied it to examine how ESM usage influences team members' knowledge sharing, which in turn affects their job performance. Deng *et al.* (2021) invoked the theory of communication visibility to investigate the mediating effects of perceived task independence and autonomy on the relationship between ESM usage and employees' task performance, while Rasheed *et al.* (2023) adopted this theory to explore the effect of ESM usage on employee agility and creativity. In this study, we also employ the theory of communication visibility as the theoretical underpinning, which is useful in extending our understanding of how ESM usage affects team members' psychological and cognitive conditions (i.e. psychological safety and team identification), which in turn influence their KCC. Furthermore, this theory helps us theorize how the effectiveness of ESM usage is reshaped in pre- and post-COVID-19 periods. In the following sections, we build on the theory of communication visibility to delineate our hypotheses.

2.3 Effect of ESM usage on team members' KCC

We propose that ESM usage is conducive to the improvement of team members' KCC. By utilizing ESM, team members command a better position to broadcast messages to a broad range of employees in the organization (Sun *et al.*, 2023). According to the theory of communication visibility, ESM creates a more visible and transparent working environment for team members (Leonardi *et al.*, 2013), enabling the contents and network connections of communications between team members to become visible to other employees who do not participate in the communications (Leonardi, 2014). For instance, team members can utilize a series of applications (e.g. wikis, microblogs, and social tagging tools) and functional modules (e.g. group chat, video conferencing, and file transfer) that are integrated into ESM to share contents, exchange information, and manage interpersonal connections (Wang *et al.*, 2021b). These activities significantly increase the visibility of team members' behaviors, knowledge, and communication networks to other coworkers (Leonardi and Treem, 2012; Wulf and Butel, 2017). Therefore, team members can view and learn from the messages or ideas shared by their colleagues, even though these contents may not be directly related to their working tasks (Shang and Sun, 2021). This provides opportunities for team members to gain a broader scope of information and knowledge, which is beneficial for shaping their learning behavior and boosting knowledge sharing and acquisition among them (Leonardi, 2015; Sun *et al.*, 2022a), thereby augmenting their KCC.

Moreover, the use of ESM enables team members to interact with their coworkers more fluently and promptly, thereby promoting more effective collaborations and knowledge sharing and acquisition among them (Cui *et al.*, 2020; Zhao *et al.*, 2020). Besides, the communication visibility afforded by ESM allows team members to learn from their colleagues' communication network connections, which advances their understanding of interpersonal relationships (Zhao *et al.*, 2020). This echoes the notion of previous research that the use of ESM is instrumental in building interpersonal trust (Cui *et al.*, 2020; Sun *et al.*, 2020b), enhancing immediate information exchange (Safari *et al.*, 2022), and reinforcing social interactions among team members (Sun *et al.*, 2023). This can help promote continuous collaboration and knowledge sharing and lead to more innovative endeavors among team members, which is expected to enhance team members' KCC. Hence, we hypothesize that:

H1. Team members' ESM usage has a positive effect on their KCC.

2.4 Mediating roles of psychological safety and team identification

Furthermore, drawing upon the theory of communication visibility, we argue that psychological safety and team identification function as critical mediators through which ESM usage influences team members' KCC. Prior research has acknowledged that the use of ESM in the workplace can result in employees' psychological and cognitive transitions (Cai *et al.*, 2018; Luqman *et al.*, 2021; Nusrat *et al.*, 2021). These shifts play central roles in altering team members' proactive behaviors including information sharing, knowledge seeking, and interpersonal collaborations (Cao and Ali, 2018; Luqman *et al.*, 2021), which could further impact their KCC. Specifically, introducing ESM into teamwork creates a transparent and open atmosphere with mutual respect and trust for team members to exchange information and ideas fluently and promptly (Luqman *et al.*, 2021). This has the potential to fulfill team members' psychological needs (Karahanna *et al.*, 2018) by increasing their psychological safety during teamwork (Cai *et al.*, 2018; Nusrat *et al.*, 2021). Meanwhile, the use of ESM in teamwork is also helpful to reduce team members' cognitive dissonance (Mäntymäki and Riemer, 2016) and enhance their cognitive capabilities by accomplishing better team identification (Leonardi and Treem, 2012). The improved psychological and cognitive conditions resulting from the use of ESM play essential roles in facilitating continuous information and knowledge sharing and acquisition among team members (Chang and Chuang, 2011; Chiu *et al.*, 2006; Lin *et al.*, 2019), which consequently fosters their KCC (Kane, 2017). As such, this study examines how ESM usage boosts team members' KCC by improving their psychological safety and team identification.

Psychological safety reflects members' perception of an interpersonal context wherein they "are comfortable being themselves" (Edmondson, 1999). We speculate that ESM usage is beneficial for enhancing team members' psychological safety. Specifically, the visibility of intra-team communications enabled by ESM elevates information transparency, which can help develop a cognitive social structure that precisely reflects the ambient communication patterns (i.e. communications occurring around a team member but not directly involving the team member). This further leads to intra-team ambient awareness of ambient communications occurring amongst team members (Forsgren and Byström, 2018; Leonardi, 2015), which may affect their psychological perceptions by reducing their perceived interpersonal concerns regarding the usage of ESM (Lin *et al.*, 2019). Prior literature has implied that ESM usage allows team members with ambient awareness to feel psychologically safe in a relatively transparent team climate (Cai *et al.*, 2018; Nusrat *et al.*, 2021). Thus, team members will feel more comfortable being themselves and speaking up with less fear of judgment and punishment during work when they are highly aware of the ambient communications afforded by ESM usage. This suggests that team members could perceive ESM as a safe environment for self-expression, indicating that ESM usage can augment the sense of psychological safety of team members. In addition, it is argued that since ESM usage can reinforce communications and interactions in the workplace, team members can better coordinate and integrate their relationships for the purpose of task integration (Cai *et al.*, 2018). The improved relational coordination can foster team members' psychological safety (Carmeli and Gittell, 2009). Therefore, we hypothesize that:

H2a. Team members' ESM usage has a positive effect on their psychological safety.

Furthermore, enhanced psychological safety, in turn, helps promote team members' KCC. Specifically, researchers have underscored that team members with higher psychological safety are more willing to share information and knowledge with their coworkers because they feel less threatened by exposure to the judgment during work and feel comfortable to engage in open communications (Lee *et al.*, 2011; Siemsen *et al.*, 2009). The frequent and prompt exchange of information and knowledge among team members is beneficial for them to enhance KCC. Moreover, psychological safety plays an essential role in facilitating

effective team learning and creativity (Carmeli and Gittell, 2009; Edmondson, 1999; Gong *et al.*, 2012). It is argued that a psychologically safe environment encourages team members to gain lessons from failures, such as speaking up about problems and errors that arise in work (Carmeli and Gittell, 2009). This is vital for team members to accumulate and exploit knowledge to come up with new ideas or discover novel solutions to resolve work-related issues (Lee *et al.*, 2011; Siemsen *et al.*, 2009), thereby augmenting their KCC. Hence, we hypothesize that:

H3a. Team members' psychological safety has a positive effect on their KCC.

Team identification emphasizes the "psychological merging" of an individual and the team (Turner *et al.*, 1987) and can be regarded as either cognition- or affect-based bonds between a team member and the team (Somech *et al.*, 2009). According to the theory of communication visibility, ESM usage can increase team members' awareness of social and work-related interactions among other coworkers (Leonardi *et al.*, 2013), which contributes to advanced cognitive and social learning as well (Leonardi, 2014). This plays a pivotal role in forming a broader sense of social interdependence between team members by helping them better identify their coworkers (Leonardi and Treem, 2012). As such, team members may form a stronger sense of belongingness and emotional attachment to the team, which leads to a higher level of team identification. Previous research has also suggested that enhanced social interactions and interdependence among team members via ESM usage are conducive to social bonding at the workplace, which might boost their team identification (Luqman *et al.*, 2020). Thus, we hypothesize that:

H2b. Team members' ESM usage has a positive effect on their team identification.

Improved team identification, in turn, enables team members to enhance their KCC. Previous research has widely recognized that team identification exerts a positive impact on knowledge sharing behaviors (Chang and Chuang, 2011; Chiu *et al.*, 2006; Kordzadeh and Warren, 2017). Specifically, when team members possess a stronger sense of belonging and emotional bonds to the team, they tend to be more willing to conduct information sharing and knowledge transfer through ESM platforms (Lin *et al.*, 2019) and maintain a higher level of coherence which is beneficial for knowledge management and creation (Forsgren and Byström, 2018). For instance, team members who have higher team identification are more willing to discuss work-related ideas and share instrumental knowledge and meta-knowledge with coworkers, thereby enabling them to cultivate critical thinking abilities and come up with new ideas on work processes, and product and service improvements. The combination and exchange of ideas among team members are favorable for them to create opportunities for innovation or find solutions to resolve problems, thus boosting their KCC. Hence, we hypothesize that:

H3b. Team members' team identification has a positive effect on their KCC.

2.5 A comparison of the impact of ESM usage between pre- and post-COVID-19 pandemic

The outbreak of the COVID-19 pandemic has significantly transformed how and where work is performed (Narayanamurthy and Tortorella, 2021), posing unparalleled challenges to employees and changing the ways they work (Chen *et al.*, 2022). Given that team members conduct remote work or work from home during the COVID-19 pandemic, ESM acts as a more critical tool for them to establish connectivity and continue normality (Yousaf *et al.*, 2022). This amplifies the importance of using ESM for work-related information sharing and exchange during the COVID-19 pandemic (Liu *et al.*, 2021). Therefore, the external environmental change induced by the COVID-19 pandemic may alter the efficacy of ESM usage on team members' KCC, psychological safety, and team identification. Accordingly,

we endeavor to explore the differing effects of ESM usage between pre- and post-COVID-19 periods, so as to deepen our understanding of the external contingency influencing the effectiveness of ESM usage.

Specifically, based on the theory of communication visibility, we posit that during the COVID-19 pandemic, the communication visibility enabled by ESM usage is more effective in promoting knowledge exchange and social interactions between team members, which can further enhance their KCC. Karanasios (2021) pinpointed that ESM becomes more pronounced for people to undertake a number of initiatives (e.g. creating awareness, learning, and disseminating information and new ideas) to handle the situations of remote or virtual work triggered by COVID-19. As such, during the COVID-19 pandemic, communications on the ESM platforms play a more significant role in fostering mutual understanding, learning behaviors, and intimate working relationships among team members (Feng and Zhou, 2022). This is more beneficial for team members to develop novel ideas and find solutions to resolve work-related issues, thereby enhancing their KCC to a greater extent. In this sense, the efficacy of ESM usage on team members' KCC is reinforced during the post-COVID-19 period. Accordingly, we hypothesize that:

H4a. The effect of ESM usage on team members' KCC is stronger in the post-COVID-19 period than that in the pre-COVID-19 period.

Furthermore, the social features embedded in the ESM platforms are more effective in enhancing team members' psychological safety during the COVID-19 pandemic. Chakraborty *et al.* (2021) noted that using ESM to create communication visibility forms part of how team members cope with intense uncertainty and complexity during a pandemic. For example, it helps team members who experiencing negative emotions towards work during the pandemic to seek emotional and social support from others (Liu *et al.*, 2021). Team members can participate in the interaction by sharing valuable information and knowledge to help each other. Moreover, communications through ESM could provide information on potential actions to mitigate the fear of pandemic and psychological distress. Such reciprocal activities are more helpful for enhancing team members' sense of psychological safety during the COVID-19 pandemic when they confront work-related challenges induced by this crisis. As such, we conjecture that the impact of ESM usage on team members' psychological safety is stronger in the post-COVID-19 period than that in the pre-COVID-19 period. Thus, we hypothesize that:

H4b. The effect of ESM usage on team members' psychological safety is stronger in the post-COVID-19 period than that in the pre-COVID-19 period.

Likewise, we postulate that the effect of ESM usage on team members' team identification is strengthened in the post-COVID-19 period. The rapid spread of COVID-19 has pushed massive team members to change their working styles and shift towards remote work (Feng and Zhou, 2022). This pandemic poses unprecedented uncertainties and challenges to team members, requiring them to adapt to the new work settings quickly. This magnifies the importance of ESM in the context of COVID-19. ESM could serve as a more essential tool for team members to communicate with each other and enhance social interactions in the post-COVID-19 period (Liu *et al.*, 2021). Hence, ESM is likely to be more effective in boosting social interdependence between team members and fostering team members' belongingness and emotional attachment to the team during the post-COVID-19 period. Therefore, we posit that the efficacy of ESM usage on team members' team identification is greater in the post-COVID-19 period than that in the pre-COVID-19 period. Hence, we hypothesize that:

H4c. The effect of ESM usage on team members' team identification is stronger in the post-COVID-19 period than that in the pre-COVID-19 period.

3. Method

3.1 Data collection and sample

Through a two-wave survey, we gathered data from manufacturing companies in Malaysia. Using the widely adopted survey measures, we developed the survey in English. Then, we distributed a draft survey to an expert panel comprising two professors and several managers from the manufacturing sector to check the clarity, interpretability, and structural accuracy of the measurement items. According to the feedback, we revised the survey slightly.

We collected data at two different time points, before (i.e. late 2017) and after (i.e. early 2022) the outbreak of the COVID-19 pandemic. In late 2017, the human resource department was first contacted to recommend the team in the companies that used ESM platforms in their daily communication and operations. Next, the team manager recommended by the human resource department was contacted. After obtaining initial agreement from the team leader to participate in this survey, team leaders were asked to assist in distributing the online survey web link to the team members. We emphasized to the participants that their responses are anonymous and confidential and will not be traced back to their team leaders. In this round of data collection, 136 respondents from 34 teams were solicited to complete the survey. Four teams were removed from the sampling dataset because team leaders failed to fill in the survey. Eventually, data of 120 members nested within 30 teams were collected in the first round. In 2022, we sent a follow-up online survey with the same set of measures to the same 30 companies. We followed the same procedures to contact team managers through the human resource departments of the firms, and all the firms agreed to participate in the survey. We eventually obtained another set of data containing 120 members nested within 30 teams in the second round. One thing to note is that we did not insist on contacting the original respondents because of the inevitable personnel changes of the teams during the interval. In other words, the respondents from the second-round data collection were not exactly the same as those from the first-round data collection. Thus, we considered our sample as cross-sectional instead of longitudinal. In total, our final sample contains 240 members nested within 60 teams. Our sample size is consistent with the sampling suggestion by [Arend and Schäfer \(2019\)](#) to reach sufficient statistical power in two-level models. [Table 1](#) provides detailed information about the demographic characteristics of the respondents.

3.2 Evaluation of biases

The potential non-response bias was checked ([Armstrong and Overton, 1977](#)). The results of *t*-test suggest that there are no significant differences between the first 25% and last 25% responses for all variables, and thus nonresponse bias is not a severe concern in our research. To check for common method bias (CMB), we firstly conducted the Harman's single-factor test ([Podsakoff et al., 2003](#)). The results of an exploratory factor analysis indicate that the first factor only explains 34.60% of the total variance, which is well below the threshold of 50% ([Harman, 1976](#)). Besides, a confirmatory factor analysis (CFA) was applied to perform the Harman's single-factor test. The model fit indicators ($\chi^2 = 1181.641$, d.f. = 347, $p = 0.000$, RMSEA = 0.1, GFI = 0.688, CFI = 0.692, NFI = 0.618, IFI = 0.696) are unacceptable and significantly worse than those in our measurement model. To inspect the issue of method variance, we also used a marker variable (i.e. the lowest bivariate correlation among the manifest variables) ([Williams et al., 2010](#)). The adjusted correlations are statistically significant. Collectively, these tests show that CMB is not a severe issue in this research.

3.3 Measurement and validity

We operationalized all main variables using multi-item scales with a five-point Likert rating system, which ranges from 1 (i.e. strongly disagree) to 5 (i.e. strongly agree). All the items

IMDS 124,4		Frequency	Percentage (%)
	<i>Individual level (n = 240)</i>		
	<i>Team member's gender</i>		
	Male	120	50.00
	Female	120	50.00
1422	<i>Team member's age</i>		
	<18	1	0.42
	18–25	48	20.00
	26–30	116	48.33
	31–40	72	30.00
	41–50	3	1.25
	<i>Team member's ethnicity</i>		
	Malaysian	66	27.50
	Chinese	155	64.58
	Indian	19	7.92
	<i>Team level (n = 60)</i>		
	<i>Team leader's gender</i>		
	Male	34	56.67
	Female	26	43.33
	<i>Team leader's age</i>		
	21–25	7	11.67
	26–30	22	36.67
	31–35	13	21.67
	36–40	15	25.00
	41–45	3	5.00
	<i>Team leader's education level</i>		
	High school/Technical school/Technical secondary school	6	10.00
	Diploma	16	26.67
	Bachelor's degree	21	35.00
	Master's degree or above	17	28.33
	Source(s): Author's own creation		

Table 1.
Demographic
characteristics of the
respondents

were acquired from extant studies and adapted to the context of our study. The survey items are shown in [Table 2](#). To examine the differential effects of ESM usage in pre- and post-COVID-19 periods, we created a dummy variable, which took the value of 0 for data collected before (i.e. late 2017) and 1 for data collected after (i.e. early 2022) the outbreak of the COVID-19 pandemic.

We also included several control variables in our models, which may affect team members' psychological safety, team identification, and KCC. At the team member level, we controlled for age, gender, and ethnicity (a dummy variable with 1 representing Malaysian and 0 otherwise) of team members. At the team level, we controlled for team size and team leader's tenure, gender, education level, and age. In addition, we controlled for IT/non-IT sector which teams belong to because under different conditions, the teams may have varying conventions of using ESM.

We performed a CFA using AMOS28 to verify the convergent and discriminant validity of the variables: ESM usage, psychological safety, team identification, and KCC. The results of factor loadings, Cronbach's alpha, and composite reliability (CR) values are presented in [Table 2](#). For all constructs, the factor loadings of items are significant and greater than the

Constructs	Items	Factor loadings	Cronbach's alpha	CR
Enterprise social media usage (Cai <i>et al.</i> , 2018)	I often use ESM to contact other people for my work	0.66	0.801	0.802
	I regularly use ESM to communicate with colleagues or customers in my daily work	0.59		
	The frequency of usage of ESM to do the following things in my daily work is ask questions	0.66		
	The frequency of usage of ESM to do the following things in my daily work is answer questions	0.65		
	The frequency of usage of ESM to do the following things in my daily work is share files	0.62		
	The frequency of usage of ESM to do the following things in my daily work is work-related socialization	0.62		
	Psychological safety (May <i>et al.</i> , 2004)	I am not afraid to express my opinions at work		
I am not afraid to be myself at work		0.70		
I accepted each other's differences		0.76		
Working in this team, my unique skills and talents are valued and utilized		0.71		
Team identification (Allen and Meyer, 1990)	I feel emotionally attached to the team	0.70	0.838	0.838
	I feel strong sense of belonging to the team	0.73		
	I feel like part of the family in my team	0.79		
	I feel if the team problem is my own problem	0.79		
Knowledge creation capability (Cao and Ali, 2018)	Team members interact frequently to discuss work-related ideas and new developments	0.67	0.857	0.855
	Team members do not have difficulty getting together to exchange new ideas and developments	0.69		
	Team members are always available to discuss new ideas or developments	0.69		
	Team members feel free to contact anyone to discuss new ideas or developments	0.66		
	Team members are proficient at combining and exchanging ideas to solve problems or create opportunities	0.67		
	Team members do a good job of sharing their individual ideas to come up with new ideas, products, or services	0.67		
	Team members often exchange and combine ideas to find solutions to problems	0.67		
	Team members see benefits from exchanging and combining ideas with one another	Dropped in CFA		
	The most valuable ideas seem to come when members pool their efforts	Dropped in CFA		
	Team members believe that, by exchanging and combining ideas, they can create value for the team	Dropped in CFA		
	Team members believe that, by pooling their efforts, they can create value for the team	Dropped in CFA		

Note(s): All estimated loadings are significant at $p < 0.001$; CR = composite reliability

Source(s): Author's own creation

Table 2. Measurement validity and reliability

cutoff value of 0.5 (Arcidiacono *et al.*, 2023; Flynn *et al.*, 2010). We dropped four items for KCC because of their low factor loadings (Fornell and Larcker, 1981). The Cronbach's alpha values are greater than 0.8, suggesting good reliability of all the constructs. Besides, the CR values of all constructs are higher than 0.8, thereby establishing convergent validity (Hair *et al.*, 2010).

Table 3 demonstrates the descriptive statistics on each variable and the correlations across variables. We also assessed variance inflation factors (VIFs) for addressing the potential multicollinearity issue. All VIF values are below the threshold of 10, suggesting that multicollinearity is not a threat in our study. Following Hair *et al.* (2010), we checked discriminant validity by comparing the correlations between all possible pairs of constructs with the square root of average variance extracted (AVE) of each construct. Table 3 shows that the square root of AVE for each construct is higher than all correlations it has with the remaining constructs. This offers strong evidence of discriminant validity. The results of the CFA ($\chi^2 = 377.648$, d.f. = 183, $p = 0.000$, RMSEA = 0.067, GFI = 0.865, CFI = 0.904, NFI = 0.831, IFI = 0.905) also suggest a good model fit.

3.4 Analytic approach

Given that our data are inherently multilevel (i.e. 240 members nested within 60 teams), we employed a multilevel approach to test our hypotheses. This is because scores of lower-level units (i.e. team members) within a higher-level unit (i.e. team) are expected to be dependent due to their shared experiences, which violates the independence assumption of many statistical models such as ordinary least squares regression and consequently leads to biased estimation of the effects in the model (Cenfetelli and Schwarz, 2011). We calculated the intraclass correlation coefficient (ICC) to confirm that our data warrant multilevel analysis. The ICC of our model is 0.409. This means that almost 41% of total variance in the dependent variable (i.e. KCC) is between teams, which exceeds the 0.25 threshold of a “large” between-effect (LeBreton and Senter, 2007). Accordingly, a multilevel modeling should be more appropriate in our context, as it decomposes the conflation of nested multilevel effects into separate within- and between-effects, thereby mitigating estimation bias (Zhang *et al.*, 2009).

4. Results

4.1 Main results

Table 4 presents our multilevel modeling results. Model 1, model 4, and model 7 represent the baseline models of psychological safety, team identification, and KCC, respectively. Model 2, model 5, and model 8 add ESM usage. The results show that team members’ ESM usage is positively related to their KCC ($\gamma = 0.359$, $p < 0.001$), psychological safety ($\gamma = 0.376$, $p < 0.001$), and team identification ($\gamma = 0.466$, $p < 0.001$), thus supporting H1, H2a, and H2b. Furthermore, the results reveal that the effects of both psychological safety and team identification on KCC are significantly positive ($\gamma = 0.477$, $p < 0.001$; $\gamma = 0.413$, $p < 0.001$, respectively), thereby lending support to H3a and H3b.

In model 3, model 6, and model 11, we added the dummy variable (i.e. post-COVID-19 period) and its interactive terms with EMS usage to test the differential effects of ESM in pre- and post-COVID-19 periods. Surprisingly, the results are contrary to our theoretical expectations. Specifically, we find that the relationship between ESM usage and team members’ KCC is dampened in the post-COVID-19 period ($\gamma = -0.739$, $p < 0.001$). Besides, the linkage between ESM usage and team members’ psychological safety is weakened in the post-COVID-19 period, as the coefficient of the interactive term between ESM usage and post-COVID-19 period is significantly negative ($\gamma = -0.823$, $p < 0.001$). Similarly, the link between ESM usage and team members’ team identification is attenuated in the post-COVID-19 period ($\gamma = -0.841$, $p < 0.001$). Therefore, H4a, H4b, and H4c are not supported. To further illustrate the nature of the interactions, we drew the interaction effect graphs in Figures 1–3. The figures demonstrate that in the pre-COVID-19 period, the slope lines for KCC, psychological safety, and team identification are positive, whereas in the post-COVID-19 period, the slope lines are negative. This further verifies that the effects of ESM usage are weakened in the post-COVID-19 period.

Constructs	Mean	S.D.	AVE	1	2	3	4	5	6	7	8	9
1. Enterprise social media usage	3.804	0.629	0.404	<i>0.635</i>								
2. Psychological safety	3.782	0.725	0.540	0.340**	0.735							
3. Team identification	3.740	0.750	0.565	0.382**	0.504**	0.752						
4. Knowledge creation capability	3.788	0.654	0.457	0.394**	0.574**	0.507**	0.676					
5. Team member's age	3.120	0.745	N/A	0.028	0.043	0.081	-0.053	1.000				
6. Team member's gender	0.500	0.501	N/A	0.144*	-0.033	-0.039	0.046	-0.078	1.000			
7. Team member's ethnicity	0.275	0.447	N/A	-0.038	-0.024	0.093	-0.015	0.054	-0.037	1.000		
8. Team size	1.430	0.560	N/A	-0.013	-0.073	-0.099	-0.133	-0.031	-0.104	0.190	1.000	
9. Team leader's tenure	2.580	0.587	N/A	0.207	0.194	0.144	0.288	0.054	-0.043	0.088	0.246	1.000
10. Team leader's gender	0.433	0.497	N/A	-0.017	0.048	-0.005	-0.025	0.112	-0.034	0.008	0.165	0.105
11. Team leader's education level	3.820	0.959	N/A	0.050	0.015	0.128	0.083	-0.017	0.000	-0.077	-0.163	-0.017
12. Team leader's age	3.750	1.107	N/A	-0.011	0.021	0.040	0.041	-0.137	-0.038	0.055	0.175	0.174
13. IT sector	0.070	0.250	N/A	0.110	0.017	-0.002	-0.023	-0.042	0.000	-0.052	0.032	-0.038
				10		11			12			13
10. Team leader's gender				1.000								
11. Team leader's education level				0.132	1.000							
12. Team leader's age				-0.228	-0.185	1.000			1.000			
13. IT sector				-0.234	-0.088	0.181	1.000					

Note(s): * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ (two-tailed test); italic diagonals are square roots of the construct's AVE; variables (i.e. team size, team leader's tenure, team leader's gender, team leader's education level, team leader's age, and IT sector) are at the team level (n = 60); other variables are at the team member level (n = 240)

Source(s): Author's own creation

Table 3.
Descriptive statistics and correlation matrix

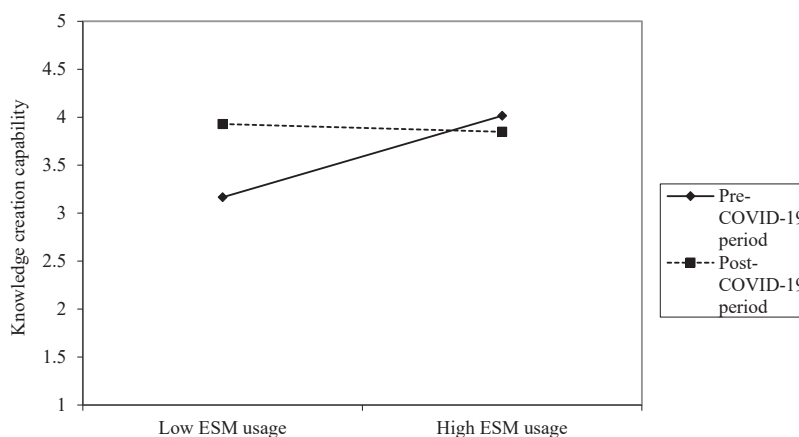
Table 4.
Multilevel modeling
results

Dependent variable	Model 1		Psychological safety		Model 3		Model 4		Team identification		Model 6	
	γ	S.E.	γ	S.E.	γ	S.E.	γ	S.E.	γ	S.E.	γ	S.E.
Constant	3.264***	0.213	2.118***	0.475	0.808*	0.474	3.025***	0.485	1.642**	0.512	0.384*	0.509
Team member's age	0.028	0.062	0.020	0.059	0.012	0.056	0.063	0.064	0.056	0.060	0.035	0.056
Team member's gender	-0.047	0.093	-0.117	0.089	-0.105	0.082	-0.054	0.095	-0.141	0.090	-0.142	0.083
Team member's ethnicity	-0.045	0.105	-0.021	0.100	-0.036	0.092	0.175	0.108	0.204*	0.100	0.165	0.094
Team size	0.018	0.035	0.027	0.027	0.010	0.023	0.028	0.052	0.020	0.040	0.016	0.030
Team leader's tenure	0.064	0.101	0.025	0.044	0.006	0.016	0.035	0.060	0.002	0.013	0.000	0.000
Team leader's gender	0.000	0.000	0.000	0.000	0.018	0.036	0.000	0.000	0.000	0.000	0.000	0.000
Team leader's education level	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.013	0.005	0.010	0.005	0.009
Team leader's age	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.004	0.000	0.000
IT sector	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ESM usage			0.376***	0.072	0.739***	0.087			0.466***	0.071	0.832***	0.088
Post-COVID-19 period					3.379***	0.502					3.312***	0.508
ESM usage \times Post-COVID-19 period					-0.823***	0.130					-0.841***	0.132

Dependent variable	Model 7		Model 8		Model 9		Model 10		Model 11		Model 12	
	γ	S.E.	γ	S.E.	γ	S.E.	γ	S.E.	γ	S.E.	γ	S.E.
Constant	3.348***	0.411	2.242***	0.425	1.756***	0.371	1.985***	0.381	1.023**	0.317	0.706	0.369
Team member's age	-0.066	0.054	-0.074	0.050	-0.077	0.045	-0.089	0.047	-0.067	0.046	-0.073	0.042
Team member's gender	0.043	0.080	-0.024	0.076	0.069	0.067	0.069	0.070	-0.004	0.068	0.048	0.062
Team member's ethnicity	-0.001	0.091	0.022	0.085	0.017	0.076	-0.074	0.080	0.015	0.076	-0.006	0.070
Team size	0.058	0.090	0.050	0.077	0.025	0.041	0.022	0.037	0.039	0.063	0.019	0.031
Team leader's tenure	0.140	0.206	0.083	0.123	0.058	0.088	0.081	0.119	0.051	0.077	0.032	0.049
Team leader's gender	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Team leader's education level	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.001	0.000	0.000	0.000
Team leader's age	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.008	0.000	0.002
IT sector	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ESM usage			0.359***	0.061					0.675***	0.072	0.355***	0.081
Post-COVID-19 period									3.109***	0.414	1.703***	0.427
ESM usage \times Post-COVID-19 period									-0.739***	0.107	-0.391***	0.110
Psychological safety											0.262***	0.052
Team identification					0.477***	0.047					0.163**	0.051

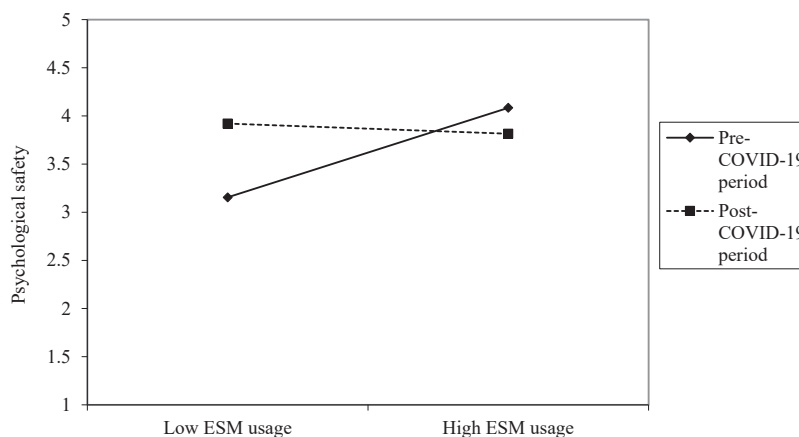
Note(s): * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ (two-tailed test); S.E. = standard error; Monte Carlo simulation with 10,000 resamples

Source(s): Author's own creation



Source(s): Author’s own creation

Figure 1.
Interaction effect of
ESM usage and post-
COVID-19 period on
team members’ KCC



Source(s): Author’s own creation

Figure 2.
Interaction effect of
ESM usage and post-
COVID-19 period on
team members’
psychological safety

4.2 Post-hoc analysis

As a *post-hoc* analysis, we further tested the mediating effects of psychological safety and team identification on the ESM–KCC linkage using the MLmed, which is an effective SPSS macro that enables us to estimate multilevel models with mediation paths (Hayes and Rockwood, 2020). We adopted a Monte Carlo simulation with 10,000 resamples to generate 95% confidence intervals (CIs). Table 5 demonstrates that the indirect effect of ESM usage on KCC through psychological safety is significant ($\beta = 0.048$; 95% CI = [0.006, 0.099]) and the indirect effect through team identification is also significant ($\beta = 0.043$; 95% CI = [0.008, 0.088]). This verifies the partial mediation effects of both psychological safety and team identification on the link between ESM and team members’ KCC. Table 6 provides a summary of our hypotheses testing results.

Figure 3.
Interaction effect of
ESM usage and post-
COVID-19 period on
team members' team
identification

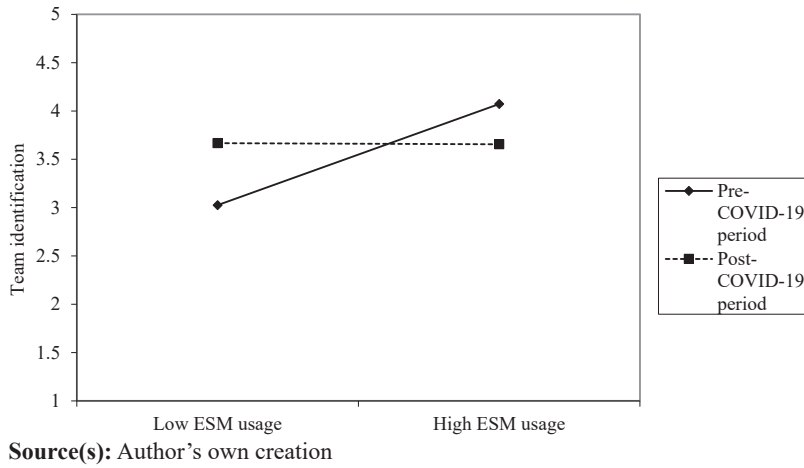


Table 5.
Results of post-hoc
mediation effect
analyses

Path examined	COVID-19 period	Direct effect		Indirect effect	
		γ	β	95% confidence interval	
ESM usage \rightarrow PS \rightarrow KCC	Pre	0.258**	0.226***	0.118	0.353
	Post	-0.093	-0.001	-0.029	0.024
	Full sample	0.138*	0.048*	0.006	0.099
ESM usage \rightarrow TI \rightarrow KCC	Pre	0.301**	0.183**	0.082	0.306
	Post	-0.098	0.003	-0.019	0.034
	Full sample	0.143*	0.043*	0.008	0.088

Note(s): * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ (two-tailed test)
Source(s): Author's own creation

Table 6.
Summary of the results

Hypothesis	Effects examined	Predicted sign	Result	Supported or not
H1	ESM usage \rightarrow KCC	+	+***	Supported
H2a	ESM usage \rightarrow Psychological safety	+	+***	Supported
H2b	ESM usage \rightarrow Team identification	+	+***	Supported
H3a	Psychological safety \rightarrow KCC	+	+***	Supported
H3b	TI \rightarrow KCC	+	+***	Supported
H4a	ESM usage \times Post-COVID-19 period \rightarrow KCC	+	-***	Not supported
H4b	ESM usage \times Post-COVID-19 period \rightarrow Psychological safety	+	-***	Not supported
H4c	ESM usage \times Post-COVID-19 period \rightarrow Team identification	+	-***	Not supported
Post-hoc mediation analysis	ESM usage \rightarrow Psychological safety \rightarrow KCC		+	+
	ESM usage \rightarrow Team identification \rightarrow KCC		+	+

Note(s): * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ (two-tailed test)
Source(s): Author's own creation

5. Discussion and conclusions

5.1 Discussion

Our results reveal that ESM usage has a positive relationship with team members' KCC and this relationship is partially mediated by psychological safety and team identification. On the one hand, the positive effect of ESM usage on team members' KCC lends empirical support to prior literature highlighting that the use of ESM in the workplace opens an avenue for team members to exchange immediate information and knowledge, thus facilitating idea generation and knowledge creation (Rasheed *et al.*, 2023; Safari *et al.*, 2022; Wang *et al.*, 2021b). This finding is in line with the tenet of the theory of communication visibility that ESM usage is conducive to offering a more visible and transparent working environment for team members (Leonardi, 2014), which can facilitate continuous knowledge sharing and acquisition among them (Engelbrecht *et al.*, 2019) and thus enhance their KCC. On the other hand, the partial mediation effects of psychological safety and team identification indicate that both psychological and cognitive factors function as an important bridge connecting ESM usage and team members' KCC. Our study empirically verifies that ESM usage can enhance team members' psychological and cognitive conditions (i.e. psychological safety and team identification), which in turn facilitate their knowledge sharing and acquisition behaviors (Cao and Ali, 2018; Luqman *et al.*, 2021) and thus their KCC. This finding resonates with recent research calling for a fine-grained understanding of how ESM usage affects team members' knowledge sharing and acquisition (Cui *et al.*, 2020; Sun *et al.*, 2020a; Zhao *et al.*, 2020).

In addition, our results indicate that the effects of ESM usage on team members' KCC, psychological safety, and team identification are stronger in the post-COVID-19 period than those in the pre-COVID-19 period. Intriguingly, these findings are contrary to our hypotheses. Although several researchers posit that the communication visibility afforded by ESM is more effective during the COVID-19 pandemic (Chakraborty *et al.*, 2021), our study demonstrates that the efficacy of ESM usage is attenuated in the post-COVID-19 period. The plausible explanation is that the outbreak of the COVID-19 pandemic exacerbates team members' reliance on ESM and increases their exposure to heavier information overload (Liu *et al.*, 2021), which poses additional challenges to their information processing abilities (Liu *et al.*, 2021) and interrupts their cognitive loads (Islam *et al.*, 2020). Hence, team members may suffer from poorer KCC in the post-COVID-19 period. In addition, researchers pinpoint that misinformation and fake news that are prevalent in social media during the COVID-19 crisis can impair human's psychological well-being (Reizer *et al.*, 2022) that further undermines team members' creativity and performance (Islam *et al.*, 2020). This could exert a detrimental impact on their knowledge sharing behaviors and thus lower their KCC. Overall, our findings offer valuable insights into the mediation mechanisms through which ESM usage affects team members' KCC and how the efficacy of ESM usage could be modified in pre- and post-COVID-19 periods.

5.2 Theoretical implications

Our study makes multiple contributions to the extant literature. First, it advances the ESM literature by empirically unpacking the mediation effects of psychological safety and team identification on the relationship between ESM usage and team members' KCC. The extant literature has mostly examined the impact of ESM usage on employees' task performance (Deng *et al.*, 2021; Kuegler *et al.*, 2015), creative performance (Sun *et al.*, 2020a), work efficiency (Yang *et al.*, 2021), job performance (Cui *et al.*, 2020; Jafar *et al.*, 2019), and job satisfaction and turnover intention (Zhang *et al.*, 2019). Nevertheless, there is scarce empirical evidence regarding the mechanisms through which ESM usage influences team members' KCC. The implication of ESM usage for team members' KCC has sparked a hot debate in academia with controversial views (Chen *et al.*, 2020; Cui *et al.*, 2020; Ma *et al.*, 2020; Sun *et al.*, 2021b). This

results in a fragmented literature in the area of ESM, hampering research and further progress. Our research opens this black box by attesting to the mediating mechanisms of psychological safety and team identification that explain how the value of ESM usage is transferred to KCC, which provides a more nuanced understanding of the ESM–KCC linkage. To our best knowledge, this study is the first to empirically verify psychological safety and team identification as critical mechanisms for team members to transform the value of ESM into improved KCC, which greatly advances the ESM literature.

Second, our research complements the ESM literature by offering novel insights into the differential effects of ESM usage in the situations of pre- and post-COVID-19 periods. Previous studies have investigated how the COVID-19 outbreak influences employee performance (Narayanamurthy and Tortorella, 2021) and firms' strategic decision-making (Chen *et al.*, 2022). Recent research has urgently called for more investigation that delineates the effect of this global crisis in the context of ESM (Karanasios, 2021; Kaya, 2020) as it is helpful to broaden our understanding of how the pandemic context may shape employee behaviors and transform outcomes (Wang *et al.*, 2021a). Our study echoes this appeal by deeply elucidating the varying effects of ESM usage on team members' KCC, psychological safety, and team identification in pre- and post-COVID-19 periods. Overall, our study expands the ESM literature by untangling the potential dark side of ESM usage in the context of the post-COVID-19 pandemic.

Finally, this study enriches the theory of communication visibility by unveiling the mediation effects of psychological safety and team identification on the ESM–KCC link and disentangling how such effects differ in pre- and post-COVID-19 periods. Prior literature has mainly adopted the theory of communication visibility to examine how ESM usage influences task performance (Deng *et al.*, 2021; Kuegler *et al.*, 2015), job performance (Cui *et al.*, 2020), and employee agility and creativity (Rasheed *et al.*, 2023). Yet, there is a dearth of research that invokes the theory of communication visibility to articulate how ESM usage affects team members' KCC through psychological and cognitive factors. In this sense, our study enriches this theory by elucidating that communication visibility afforded by ESM can enhance team members' sense of psychological safety and boost their belongingness and emotional attachment to the team, which is beneficial for promoting their knowledge sharing and creation behaviors and thus KCC. Furthermore, the literature has offered little knowledge regarding how external environmental characteristics alter the efficacy of ESM usage (Cui *et al.*, 2020). We therefore extend the theory of communication visibility by revealing that the efficacy of communication visibility on team members' KCC and psychological and cognitive conditions is conditional on external environmental change (i.e. the outbreak of the COVID-19 pandemic in this study). In short, our research contributes to the theoretical advancement of the theory of communication visibility by empirically elucidating the underlying mechanisms through which ESM usage influences team members' KCC and external environmental change that reshapes these mechanisms.

5.3 Managerial implications

This study also offers some important practical implications to firms. First, our findings suggest that ESM usage has a direct positive impact on team members' KCC. Meanwhile, psychological safety and team identification mediate the ESM–KCC linkage. These findings assist firms in making better decisions on the investment, usage, and management of ESM platforms in order to enhance team members' KCC. Although several practitioners worry about the detrimental effect of ESM usage on team members' KCC, we highlight that the communication visibility afforded by ESM can positively affect team members' psychological and cognitive conditions, which in turn yield desirable outcomes in terms of improved KCC. These findings can restore firms' confidence in the pivotal role of ESM in fostering team members' KCC through the enhancement in their psychological safety and

team identification. Therefore, it is highly advisable that firms take advantage of ESM to build a visible and open team climate where team members feel psychologically safe and are emotionally connected to the team.

Second, firms need to be more wary of the detrimental effect induced by the COVID-19 pandemic in the context of ESM usage. This pandemic poses unparalleled challenges to team members' working styles and may adversely influence their psychological status. Our empirical results imply the dark side of ESM usage on team members' KCC, psychological safety, and team identification in the situation of post-COVID-19 pandemic. To mitigate such a negative effect, we highly advise that communication established in ESM is needed to create boundaries between visibility and "hypervisibility" by avoiding information overload and misinformation. Moreover, firms are recommended to formulate favorable work policies to help team members avoid the excessive reliance on the use of ESM during the COVID-19 period in order to relieve their strain and stress.

5.4 Limitations and future research directions

This research is not without limitations, which can be addressed by future research. First, our sample comprises companies in Malaysia, which may impede the generalizability of our findings to other countries with different cultural and institutional environments. Hence, we call for future studies to further examine the effects of ESM usage in the scenarios of other economies. Second, to enhance the rigor of our model, future research can further include team members' work experience and ESM use experience as control variables to alleviate potential confounding effects. Third, whereas we investigate the mediating effects of team members' psychological safety and team identification, it would be worthwhile for future studies to unravel other mediation mechanisms through which ESM usage influences team members' KCC. Finally, this study considers the contingency role of external environmental change induced by the COVID-19 pandemic. While COVID-19 is a sudden event, our study has a relatively long time span to test how the efficacy of ESM usage varies across pre- and post-COVID-19 periods. To further add insights into the value of ESM, an avenue for future research is to delve into other moderating factors (e.g. team culture and digital capability) that may alter the effect of ESM usage on team members' KCC.

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