The Effect of Virtuality on Work Engagement through Social Presence: Moderated Mediation Effect of Team Members' Perception of Identity Entrepreneurship

Sun Min Ha[1], Hee Je Yun[2], Hyeon ji Park[3], Ji Hoon Song[4*]

[1,2,3,4]Department of Educational Technology, Hanyang University, South Korea

ABSTRACT

This study aims to verify the effects of virtuality in the workplace and social presence on work engagement and the moderated mediating effects of leaders' identity entrepreneurship perceived by team members. This study used a quantitative approach to collect and analyze cross-sectional survey data of remote workers in South Korea. An online survey was conducted on remote workers and 300 questionnaires were analyzed. The research findings confirmed that social presence mediated the relationship between virtuality and work engagement. Furthermore, the moderating effect of leaders' identity entrepreneurship was significant in the relationship between virtuality and social presence. As hypothesized, the moderating effect of the leaders' identity entrepreneurship perceived by the team members was confirmed. Based on the result, this study proposes the necessity of the social presence of members in a remote work environment with high virtuality. Although this study overlooked causal relationships between the variables and remote workers' home context, this study enlightens the importance of team leaders' identity entrepreneurship quality in enhancing social presence among employees in the virtual working environment. The implications of the findings were facilitating virtual communication training programs and developing identity entrepreneurship training programs for team leaders. For virtual teams, it is necessary to find the most suitable virtual communication tool for each different task.

The workplace interaction of employees is a key factor in forming a strong social identity and raising employees' level of work engagement (Kahn, 1990). Individuals define not only their identity but also the identity of other interactors when expressing themselves (Weinstein & Deutschberger, 1963), and one's identity is recognised when the image of oneself and others' match (Gioia et al., 2000). Therefore, all interaction partners in their self-representation process not only define their own identities but also the identity of the other (Lührmann & Eberl, 2007; Weinstein & Deutschberger, 1963). However, when context and relationship changes, identities are constantly being invented and reinvented (Gergen, 1991; Lührmann & Eberl, 2007). Such an identity exchange is composed of reciprocal and mutually reinforcing identities of leaders and followers. It is a social component that can change the identity of leaders and followers according to the time and situation due to interactions between individuals and various contextual factors, not the individuals' self-concepts (Derue & Ashford, 2010). Therefore, the identity-building of leaders and followers contributes to the quality of leader–follower relationships (Graen & Uhl-Bien, 1995).

Individuals who perceive social support form trust, identity, and a sense of belonging to the organisation and members to create psychological stability and become more engaged in their tasks (May et al., 2004). Work engagement is defined as the special belief that employees have about their job that leads them to devote physical, emotional, and cognitive energy to their job (Christian et al., 2011). Previous studies on the factors affecting work engagement, especially organisational factors, have found that social support formed by leadership and interaction with supervisors and colleagues in the organisation is a key factor (Bakker & Demerouti, 2008; Bakker et al., 2002; Halbesleben, 2010). When leadership establishes leader and follower identity, the leader and follower identity interaction is less concentrated, and role expectation stabilises. Thus, leaders and followers can focus on their work and tasks, and the possibility of conflict in leader–follower relationships is greatly reduced (Lührmann & Eberl, 2007). In a remote working environment, leaders must promote geographically dispersed team members' "social presence" to promote closeness with each other. To raise the level of work engagement, it is crucial to create an environment in which team members feel strongly connected (Bakker et al., 2011). However, the increased use of advanced technology in work environments can cause obstacles to work engagement (Palumbo, 2020).

Teamwork is valued in terms of productivity, flexibility, and collaboration, and organisations are adopting more team-based organisational structures to improve performance (Offerman & Spiros, 2001). The number of companies that conduct work from home or allow remote work as alternative work modes has also increased to prevent the spread of the Coronavirus Disease 2019 (COVID-19) pandemic worldwide since late 2019. The rapid improvement in the accessibility and function of ICT has allowed the construction of a virtual world, and face-to-face interaction has been replaced by interaction through media communication technology (Dixon & Panteli, 2010). However, while ICT can promote interaction and collaboration among members online, remote workers cannot replace face-to-face interactions with ways that can promote intimate social relationships for developing friendly and close relationships (Vayre & Pignault, 2014). There is a need to explore and develop an understanding of the impact of face-to-face and remote work on teams (Dixon & Panteli, 2010) and to examine the importance of leaders' role within social interactions in a hybrid working environment. Interaction and communication through the technology of remote

work form unstable relationships among members, leading to a decline in work engagement (Lee-Kelley, 2006; Panteli et al., 2019). Meanwhile, work engagement positively affects an organisation's effectiveness; therefore, the organisation needs to manage it based on a clear understanding of the virtual work team. This study aims to explore how team members can stay engaged in their work in a virtual working environment, which has been transitioned in the context of the COVID-19 pandemic. In this context, this study focuses to emphasise social presence as an important factor to contribute to the existing research on team-based work environments and work efficiency through ICT and to verify the capabilities of leaders as a role to enhance social presence.

This study investigates the structural relationships among the degree of work virtuality, work engagement, social presence, and leader identity entrepreneurship that is perceived by members from the perspective of social presence, based on the recognition of problems raised in social interactions among geographically dispersed remote workers. This study is designed to verify the moderating mediating effect of leader identity entrepreneurship that is perceived by remote workers and to identify the mediating effect of social presence in the virtual work environment and the influence of leader identity entrepreneurship that controls these mediating effects.

Theoretical Background and Hypotheses
Virtuality and Work Engagement
Work engagement is a positive, fulfilling, work-related state of mind associated with positive organisational outcomes (Schaufeli & Bakker, 2004). The main characteristics of work engagement are vigour, dedication, and absorption (Schaufeli & Bakker, 2004). Work engagement is associated with key organisational results such as job performance (Bakker & Bal, 2010; Halbesleben & Wheeler, 2008) and financial returns (Xanthopoulou et al., 2009). Work engagement is usually explained within the job demands-resources (JD-R) model. Job resources are positive elements that foster employees' work engagement, including feedback, social support, and autonomy (Schaufeli & Bakker, 2004).

Remote workers usually work online with communication tools to interact with their supervisors or coworkers. According to Sardeshmukh et al. (2012), higher telecommuting was associated with increased role ambiguity, poor feedback, and low social support, which negatively affected work engagement. Remote workers have diminished feedback and support from supervisors/coworkers due to the physical separation and limited communication/interaction (Gunawardena, 1995; Mackie-Lewis, 1998; Sardeshmukh et al., 2012), which makes them difficult to recognise the presence of their colleagues (Bickle et al., 2019), and consequently feel isolated (Galanti et al., 2021). This makes it difficult for remote workers to obtain the information needed for their tasks and the expectations from supervisors, colleagues, or organisation (Sardeshmukh et al., 2012), which negatively impacts work engagement caused by decreased job resources and increased job demands. In the same vein, Nagata et al. (2021) argued that low-intensity remote work was associated with work engagement, while high-intensity remote work was not related to work engagement.

However, teleworking may influence work engagement positively through increased autonomy (Fujimoto et al., 2016; Galanti et al., 2021; Sardeshmukh et al., 2012; Palumbo, 2020), which means less supervision with more flexibility on time, location, and methods of working (Bailey & Kurland, 2002; Mann et al., 2000). For example, remote workers may work

during the time that they are less disturbed by family issues (Galanti et al., 2021) and can save commuting time, which allows them to utilise saved time efficiently for family responsibilities or recreational activities, leading to reduced stress from work (Kim et al., 2020; Mann et al., 2000).

As discussed earlier, the impact of remote work on work engagement is inconsistent. Therefore, it is worth reevaluating the impact of virtual work on work engagement during remote work due to COVID-19.

Despite the development of ICT, remote workers have limited face-to-face interaction with their supervisor/coworkers and have difficulties in getting immediate feedback and support, leading to less information and role clarity. In line with these considerations, we propose:

H1: *Virtuality of remote workers is negatively associated with work engagement.*

Mediating Effect of Social Presence

Changes in work arrangements alter teleworkers' job demands and resources, which differ from those of traditional office workers, leading to changes in the level of work engagement (Sardeshmukh et al., 2012). In terms of effectiveness in a virtual environment, social presence is one of the key factors for participants to complete their tasks.

Short et al. (1976) established the concept of social presence as "salience of the other" in communication, which is important for the success of online learners (Sung & Mayer, 2012) and virtual teams (Bickle et al., 2019) determined by intimacy and immediacy (Short et al., 1976). Intimacy results from eye contact, physical proximity, topic intimacy, and accounts of smiling (Argyle & Dean, 1965), whereas immediacy refers to the directness and intensity of the relationship between two individuals (Mehrabian, 1967).

Remote workers are difficult to make eye contact with their colleagues and to recognise nonverbal signals such as facial expressions and gestures (Gunawardena, 1995) and have fewer opportunities for spontaneous, informal interactions with coworkers (Mackie-Lewis, 1998). Thus, it is difficult for remote workers to perceive the presence and support from their supervisors/coworkers (Bickle et al., 2019), leading to lower intimacy and immediacy. In addition, remote workers find it difficult to acquire timely assistance for their tasks from supervisors/coworkers, causing role ambiguity and, consequently, lower levels of concentration on their tasks (Sardeshmukh et al., 2012).

According to media richness theory, face-to-face communication is the richest medium because it has many nonverbal signals and immediate feedback (Daft & Lengel, 1986; Daft & Wiginton, 1979). Therefore, remote workers will likely have lower media richness than office workers.

Although, several scholars argue that virtual environments do not always have a lower social presence. Fonner and Roloff (2012) examined the relationships among media type, social presence, stress from interruptions, and organisational identification, and no differences were found in social presence. Gunawardena (1995) observed that graduate students who participated in global conferences and communicated only through computer-based messaging, which has low media richness, had an adequate social presence. Regarding this phenomenon, even in social presence theory, it is uncertain whether the low social presence of a specific media is due to the characteristics of the media itself or the user's perception of the media (Walther, 1992).

Hence, it is reasonable to see social presence as a result of the subjective experience of someone caused by an interplay of physical proximity, mutual understanding, and intimacy (Biocca et al., 2003; Kettinger & Grover, 1997).

Trust is essential for virtual workers (Germain & McGuire, 2014) and can be strengthened when team members recognise each other to be "present", and with trust, remote workers can focus on team performance (Croes et al., 2016; Shin & Kim, 2010). Therefore, fostering interpersonal relationships, developing trust, and encouraging members to engage are efficient means of improving social presence (Croes et al., 2016; Shin & Kim, 2010). Web conferences, Google Docs, Google Hangouts, Skype, or Dropbox provide social spaces and collaborative workplaces to virtual workers (Aritz et al., 2018; Nafukho et al., 2010). Such a social space promotes virtual workers' social presence through various collaborative media technologies (Kauppila et al., 2011; Shin & Kim, 2010), and with collaborative online social space, virtual workers can exchange verbal/nonverbal cues, thereby facilitating social interactions (Kreijns et al., 2004; Maduka et al., 2018).

Given the research reviews discussed above, social presence should be considered critically in the online work environment. However, most social presence research has been conducted in online learning environments. To the best of our knowledge, no studies have examined the role of social presence in the relationship between remote work and work engagement.

As discussed above, remote workers in the virtual environment experience changes in job demands and resources, and these changes affect their work engagement. In this process, social presence arose from various communication technologies can provide additional job resources. Drawing on these arguments, we propose:

H2: *Social presence mediates the relationship between virtuality and work engagement.*

Moderated Mediating Effect of Identity Entrepreneurship

According to social presence theory, social presence is a process that improves mutual understanding and intimacy (Kettinger & Grover, 1997) because it is a subjective and psychological experience of the user rather than an objective phenomenon (Biocca et al., 2003). Social presence is crucial in a virtual environment, and Gunawardena (1995) emphasised that the role of a moderator is important in this process. Remote workers may recognise a relatively low social presence owing to the nature of the virtual environment. However, when the moderator facilitates social cohesiveness among communicating parties, they experience a sense of community belonging and higher social presence (Gunawardena, 1995). In light of Gunawardena's (1995) finding, the fact that remote workers have trouble understanding what their supervisors, coworkers, or organisations expect from them (Sardeshmukh et al., 2012) and that they feel isolated (Galanti et al., 2021) may be regarded as an issue of identity. Taken together, remote workers' social presence depends on the extent to which they recognise their identity. The moderator, the remote worker's supervisor or leader, plays an important role in identity development. Therefore, the competency of a leader or supervisor to make remote workers aware of their identity is important; this is known as identity leadership (Steffens et al., 2018).

Pianese et al. (2023) argued that remote workers tend to struggle to find their work identity and suggested that management should consider practical initiatives to influence remote

workers' identity regulation. In response to Pianese et al. (2023), we expect identity leadership to have practical implications for remote workers.

Identity leadership is a leadership theory and concept that approaches leadership from the perspective of social identity. Social identity provides a conceptual foundation for a new understanding of leadership and is a theoretical argument that makes all types of meaningful collective actions possible (Steffens et al., 2018). Identity leadership is a multifaceted process that focuses on a leader's capacity to establish, construct, and internalise a common social identity among the group members (Haslam et al., 2011). Steffens et al. (2014) identified four characteristics of identity leadership: leader prototypicality, identity advancement, identity entrepreneurship, and identity impresarioship. Among these, identity entrepreneurship binds people together by creating a shared feeling of "we" and "us" within a group, making them feel like they belong to the same group and fostering a sense of cohesiveness and inclusiveness among the group members (Steffens et al., 2014). As discussed, even in virtual environments, if individuals have an identity of belonging to a community, they may not feel isolated from one another (Gunawardena, 1995). Therefore, leaders of these communities or organisations need to play the role of identity entrepreneurs daily; their words and actions might contribute to the formation of a shared identity among their followers (Reicher & Hopkins, 2001). Through this process, a sense of commonality and the formation of a group identity should be fostered (Haslam & Platow, 2001).

Leader identity entrepreneurship can reduce group members' burnout and increase their work engagement, which positively impacts group performance (Steffens et al., 2014). Moreover, leaders who demonstrate strong identity entrepreneurship improve members' sense of belonging and foster collaboration (Steffens et al., 2018). Self-efficacy increases when group members feel strongly connected, which can positively affect empowerment and engagement (Greco et al., 2006; Schermuly & Meyer, 2016). Hence, leaders' identity entrepreneurship is expected to have an effect on social presence in the relationship between virtuality and work engagement. In line with these considerations, we propose:

H3: *Identity entrepreneurship moderates the relationship between virtuality and social presence.*

H4*: Identity entrepreneurship moderates the mediating effect of social presence on the relationship between virtuality and work engagement.*

Based on the relationships proposed above, we conceptualised the following research model, illustrated in Figure 1.

Figure 1

Research Model
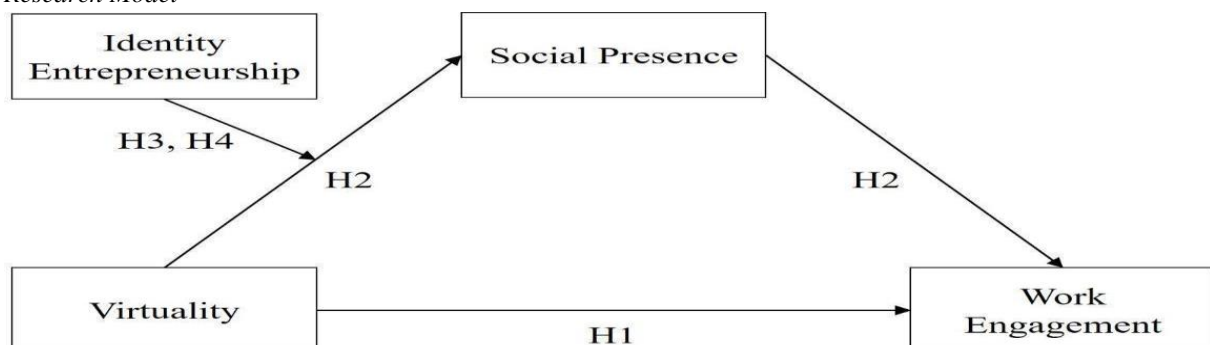
Method
Sample

This study collected survey data from employees of various organisations that conducted remote work in South Korea through an online survey agency from November 20 to December 4, 2021. The focus is on the experience of highly virtualised business activities in spatially and geographically dispersed environments. Therefore, the target participants of this study were remote workers who had worked remotely for more than three months. In order to collect data from employees that have similar periods of time of remote working experience, we restricted the participants to having at least three months of remote working experience. In addition, we limited the participants to those who worked for at least three months, considering the adaptation time for interactions in a remote working environment. Three hundred employees from organisations of different sizes participated in this study. The participants worked remotely more than three times a week. As shown in Table 1, among the 300 participants, 143 worked remotely three times a week (47.7%); 56 worked four times a week (18.7%); 92 worked five times a week (30.7%); four worked six times a week (4%), and five worked seven times a week (1.7%).

Table 1

Demographic Information

		Total	
		Frequency	%
Gender	Male	146	48.7
	Female	154	51.3
Organisation Size	Large	58	19.3
	Medium	91	30.3
	Small to medium enterprise	121	40.3
	Public institute/enterprise	19	6.3
	Education/Research	5	1.7
	Etc.	6	2.0
Remote working (per week)	Three times a week	143	47.7
	Four times a week	56	18.7
	Five times a week	92	30.7
	Six times a week	4	1.3
	Seven times a week	5	1.7
Team size	1 to < 5	26	8.7
	5 to < 10	68	22.7
	10 to < 15	65	21.7
	15 to < 20	41	13.7
	20 to < 25	32	10.7
	25 to < 30	68	22.7
Job	Management support	70	23.3
	Sales/Distribution	23	7.7
	Production/Research	36	12.0
	IT/Data	59	19.7
	Design	20	6.7
	Service/Customer management	52	17.3
	Specialised job	18	6.0
	Others	22	7.3

Instruments

Virtuality. This study's participants responded to the 12-item Virtuality Index Scale developed by Chudoba et al. (2005). The questionnaire was measured on a five-point Likert scale (1 = not at all, 5 = completely). The selected measurement scale was used after completing the reverse translation process and was reviewed by two experts with an overseas master's degree. The

virtuality scale comprises six sub-factors: geography (four items), temporal (two items), cultural (two items), work practice (three items), organisation (three items), and technology (four items). Cronbach's α was used to measure the reliability of the items on the scale. The Cronbach's α for the current research measurement was .89.

Identity entrepreneurship. The participants responded to four items that assess perceived leader identity entrepreneurship from the seven-point Identity Leadership Inventory Scale (1 = not at all, 7 = completely) developed by Steffens et al. (2014). The selected measurement scale was used after completing the reverse translation process and was reviewed by two experts with an overseas master's degree. Cronbach's α of the current research measurement was .91.

Social presence. The participants responded to the seven-point Social Presence Scale (1 = not at all, 7 = completely) developed by Hwang (2007). The scale consists of 21 items and five sub-factors: mutual perception, mutual understanding, dispersion of attention/concentration, emotional bonds, and common sense of space. This study used the following scales (and corresponding items): mutual perception (4 items), mutual understanding (4 items), dispersion of attention/concentration (6 items), emotional bond (4 items), and common sense of space (3 items). Cronbach's α of the current research measurement was .81.

Work engagement scale. Participants responded to the Korean version of the nine-item Utrecht Work Engagement Scale (UWES) developed by Schaufeli and Bakker (2003). Kim et al. (2017) validated the seven-point Likert scale Utrecht Work Engagement-Korean version (UWES-K). The scale has three sub-factors: vigour, dedication, and absorption. This study used the following scales (and corresponding items): vigour (3 items), dedication (3 items), and absorption (3 items). Cronbach's α for the current research measurement was .91.

Analysis Method

The data analysis was conducted using SPSS 21.0, SPSS Process Macro (v.3.5), AMOS 21.0 and the following procedures were followed. First, the correlation was confirmed by Pearson's correlation analysis between the descriptive statistics and variables of virtuality, identity entrepreneurship, social presence, and work engagement using SPSS. Confirmatory factor analysis (CFA) was conducted using AMOS to verify the construct validity of the measurement tool. Next, a multiple regression analysis was performed to verify the mediating effect of social presence on the relationship between virtuality and work engagement. The significance test of the mediating effects was verified by the bootstrapping method using SPSS Process Macro. Multiple regression analysis was conducted to examine the interaction effect between virtuality and identity entrepreneurship. Finally, the moderating mediating effect was verified using SPSS Process Macro to check whether the mediating effect of virtuality on work engagement through social presence was affected by identity entrepreneurship.

Results
Descriptive Statistics

First, the descriptive statistics of virtuality, identity entrepreneurship, social presence, and work engagement show that the average response value to identity entrepreneurship was the highest at 4.68, and the standard deviation was the highest at 1.26. There was a large deviation between the responses to identity entrepreneurship, as shown in Table 2.

Table 2

Descriptive Statistics, Correlations, and Reliabilities

Variables	1	2	3	4
1. Virtuality	(.89)			
2. Identity entrepreneurship	.58**	(.91)		
3. Social presence	.40**	.57**	(.81)	
4. Work engagement	.54**	.58**	.63**	(.91)
Mean	3.21	4.69	4.44	4.62
Standard deviation	0.79	1.26	0.59	1.03

*Note. N = 300. Reliability estimates are shown in parentheses. * means p < .05, and ** means p < .01.*

Validity and Reliability Analysis

CFA was conducted to verify the construct validity of the measurement tool and the fit of the research model. Virtuality, as an independent variable, and social presence, as a mediation variable, are composed of several sub-factors and items. As such, the complexity of the model may cause problems such as model conformity. Therefore, this study used the item parcelling method to increase model suitability and reliability (Yu, 2015). In the bundle of items approach, when a factor is measured using several items, a bundle of new items is created through the sum or mean of the measured items (Hair et al., 2006). This study used a method of creating item bundles, which is one approach to deal with multidimensionality. This is a method of creating a bundle of items for each constituent concept using a mean or total score with each item of the constituent concept of a factor (Kishton & Widaman, 1994). The CFA results are X^2 = 343.70, df = 168, CFI = .95, TLI = .94, RMSEA = .06, and SRMR = .06, which determined that this study model was suitable (see Table 3).

Table 3

Measurement Model

	χ^2	df	TLI	RMR	CFI	SRMR	RMSEA
Measurement model	343.70	168	.94	.07	.95	.06	.05
Fit criteria	-	-	> .90	< .08	> .90	< 1	< .07

Hypotheses Testing

The Mediating Effect of Social Presence

Process Macro Model 4 was used to verify the mediating effect of social presence on the relationship between virtuality and work engagement. In the results of the verification, virtuality had a positive effect on social presence (β = .09, $p < .001$). This means that the higher the virtuality, the greater the social presence. Virtuality positively affected work engagement (β = .45, $p < .001$). Therefore, Hypothesis 1 is rejected. Finally, virtuality and social presence had a positive (+) influence on work engagement (β = .84, $p < .001$). This means that the higher the virtuality, the greater the level of social presence, and the mediating effect of work engagement was significant, as shown in Table 4.

Table 4

Mediating Effects of Social Presence in the Relationship between Virtuality and Work Engagement

Variables	Dependent (Social Presence)			Dependent (Work Engagement)		
	β	SE	t	β	SE	t
(Constant)	3.45	.13	26.39***	-.58	.32	-1.81
Virtuality	.30	.03	7.73***	.45	.05	7.75***
Social presence	-	-	-	.84	.07	10.85***
	R^2 = .16, F = 59.79, p = .000			R^2 = .49, F = 148.14, p = .000		

*Note. *** denotes p < .001; **, p < .01; and *, p < .05.*

A bootstrapping test was conducted to confirm the statistical significance of the mediating effect of social presence (see Table 5). According to the results of the bootstrapping test, the confidence interval did not include 0, indicating that the mediating effect of social presence was statistically significant, as shown in Table 5.

Table 5

Mediating Effect of Social Presence, Bootstrapping Result

Mediating Effect Coefficient (Index)	SE (BootSE)	95% Confidence Level	
		BootLLCI	BootULCI
.25	.04	.18	.34

The Moderating Effect of Identity Entrepreneurship

This study analysed the moderating effect of identity entrepreneurship on the relationship between virtuality and social presence using Process Macro Model 1. The result of analysing virtuality and social presence by mean-centring revealed that virtuality had a positive (+) effect on social presence ($\beta = .43$, $p < .001$). Identity entrepreneurship had a positive (+) effect on social presence ($\beta = .37$, $p < .001$), and the virtuality and identity entrepreneurship interaction term had a significant effect on social presence ($\beta = .13$, $p < .001$). Therefore, H3 is supported. In summary, the effect of virtuality on social presence is controlled by the degree of identity entrepreneurship, as shown in Table 6.

Table 6

Moderating Effect of Identity Entrepreneurship in the Relationship between Virtuality and Social Presence

Model	Unstandardized Coefficient		t
	β	SE	
(Constant)	4.54	.04	91.93***
Virtuality	0.43	.06	6.20***
Identity Entrepreneurship	0.37	.04	8.26***
Virtuality × Entrepreneurship	0.13	.03	3.77***
Increase by interaction effect	$R^2 = .02$, F = 14.23, $p = .0002$		

*Note. *** denotes p < .001; **, p < .01; and *, p < .05.*

The value of the added interaction term was .27 ($p < .001$), which means that the interaction term explained 27% of the total change in the scores of virtuality and social presence. Therefore, the relationship between virtuality and social presence was statistically significant. The moderating effect of identity entrepreneurship is thus confirmed. The analysis of the conditional effect of the independent variables on the dependent variables in the value of specific moderating variables (Table 7) showed that the identity entrepreneurship value did not include 0 in the confidence interval of each M-ISD, M, and M + ISD level, which was statistically significant. Therefore, Hypothesis 2 is supported.

Table 7

Verification of the Conditional Indirect Effect on the Moderating Effect of Identity Entrepreneurship with Virtuality and Social Presence

Conditional Indirect Effect	Effect	SE	BootLLCI	BootULCI
M-ISD(-1.2608)	.26	.07	.10	.41
M(.0000)	.43	.06	.29	.56
M+ISD(1.2608)	.60	.08	.43	.77

The Moderating Mediating Effect of Identity Entrepreneurship

Process Macro Model 7 was used to investigate the moderating mediating effects of social presence and identity entrepreneurship on the relationship between virtuality and work

engagement (see Table 8). A reliability interval of 95% was set by designating 5,000 bootstrapping iterations, and the mean centring analysis results for the independent and control variables are shown in Table 8. A bootstrapping method was used to verify whether the path of virtuality to work engagement through social presence would show a moderating mediating effect by identity entrepreneurship. We confirmed that 0 was not included in the confidence interval, indicating that the moderating mediating effect index was statistically significant. As shown in Table 8, virtuality had a positive (+) effect on social presence ($\beta = .09$, $p < .001$), and social presence had a positive (+) effect on work engagement ($\beta = .84$, $p < .001$). Virtuality and social presence were statistically significant and had a mediating effect. Additionally, the interaction term of virtuality and identity entrepreneurship had a significant positive (+) effect on social presence ($\beta = .07$, $p < .001$), which showed a moderating effect. In other words, identity entrepreneurship controlled the intensity of the mediating effect in the relationship between virtuality and work engagement, and the moderating mediating effect was statistically significant.

Table 8

Verification of the Moderating Mediating Effect of Identity Entrepreneurship

Model	Unstandardized Coefficient			95% Confidence Level	
	β	SE	t	BootLLCI	BootULCI
Mediating Variable Model (Dependent Variable: Social Presence)					
(Constant)	4.39	.03	145.04***	4.33	4.45
Virtuality	0.09	.04	2.31***	0.01	0.18
Identity Entrepreneurship	0.26	.02	9.56***	0.20	0.31
Virtuality × Identity Entrepreneurship	0.07	.02	3.41**	0.03	0.11
	$R^2 = .36$, F = 57.00, $p = .0000$				
Dependent Variable Model (Dependent Variable: Work Engagement)					
(Constant)	.86	.34	2.49*	.18	1.55
Virtuality	.45	.05	7.75***	.33	.56
Social Presence	.84	.07	10.85***	.69	.99

*Note. *** denotes $p < .001$; **, $p < .01$; and *, $p < .05$.*

Moreover, using the bootstrapping method, the conditional indirect effect (see Table 9) was analysed according to the level of the moderating variable. As the M-ISD, M, and M+ISD moderating variables increased, the size of the mediating effect increased, and the mediating effect was significant at low and high levels. Therefore, Hypothesis 4 is supported.

Table 9

*Analysis of the Moderating Mediating Effect Index*

Moderating Mediating Effect Index	SE(BootSE)	95% Confidence Level	
		BootLLCI	BootULCI
.06	.02	.01	.11

However, when the moderating variable value was low, the lower limit of the bootstrapping confidence interval was -.09 (and -.00), and the upper limit was .10 (and .16), which was not significant because the confidence interval contained 0 (see Table 10). This study used floodlight analysis, a Johnson–Neyman technique, to determine the level of identity entrepreneurship that had a significant moderating effect (Spiller et al., 2013).

Table 10

Conditional Effect of Virtuality on Identity Entrepreneurship

Identity Entrepreneurship	Effect	SE	t	95% Confidence Level	
				BootLLCI	BootULCI
-1.2608	.00	.05	.62	-.09	.10
.0000	.08	.04	2.40	-.00	.16
1.2608	.16	.05	3.64	.05	.27

The floodlight analysis method presented a significant mediating effect area and a non-significant area (see Figure 2) in the whole section of the moderating variable identity entrepreneurship.

Figure 2

Verification of the Moderating Mediating Effect
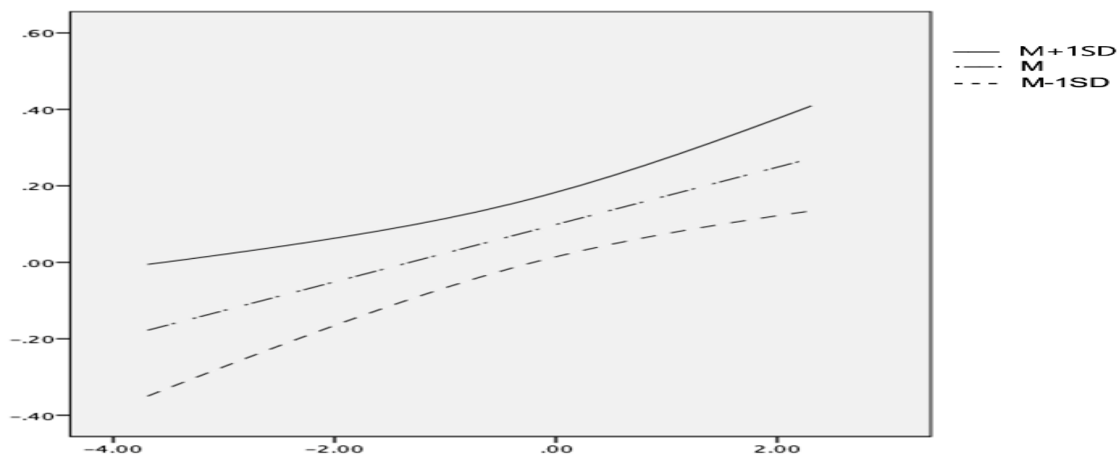
Figure 2 confirms that the conditional indirect effect of virtuality on work engagement was significant for those with high leader identity entrepreneurship awareness through the moderating effect of social presence. However, the conditional indirect effect was no longer significant in the area of identity entrepreneurship awareness of -.38 or less. Therefore, social presence had a positive (+) mediating effect on work engagement, except in the area where the awareness of identity entrepreneurship was low. In particular, the mediating effect of social presence on work engagement was moderated in a positive (+) direction by the awareness of identity entrepreneurship, and work engagement increased as the interaction between identity entrepreneurship awareness and social presence increased. All of the tested hypotheses are shown in Figure 3.

Figure 3

Results of the Moderated Mediation Effects
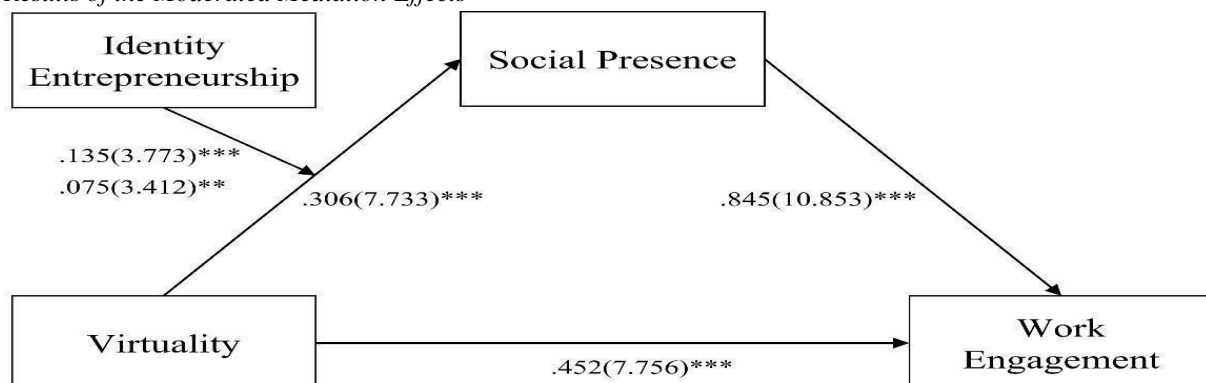
Discussion

Implications for Theory and Research

The theoretical implications of this study are as follows. First, it was confirmed that social presence mediates the relationship between virtuality and work engagement. This means that the higher the social presence among team members, the more the work engagement of team members with high virtuality can recognise. These results support those of previous studies that showed a positive relationship with peer network participation in work situations with high virtuality, which is characterised by spatial dispersion and a dynamic structure (Weber & Kim, 2015). We argue that employees working in spatially dispersed environments are more likely to form relationships with colleagues to pursue knowledge than employees working in the same space (Weber & Kim, 2015). Additionally, previous studies have estimated that high levels of virtuality are associated with more collaborative technology use (Chudoba et al., 2005). We propose that remote workers would have had frequent exchanges with geographically dispersed colleagues to obtain and adapt information, owing to uncertain work environments, to prepare for rapidly switching work environments. The results of this study suggest that workers who worked in remote environments would have been actively engaged in information exchange with their team members to handle their work in a new work environment. Simultaneously, social interactions would have occurred constantly.

Second, the research findings confirm that the identity entrepreneurship of the leader recognised by team members acts as a moderating variable in the relationship between work virtuality and social presence. These results support previous studies showing that perceived identity entrepreneurship reduces the burnout of team members and increases work engagement (Steffens et al., 2018). Furthermore, a previous study emphasised that leaders enhance the importance of group identity and increase identification by emphasising groups through a comprehensive language (i.e., "we;") (Shamir et al., 1998). Notably, leaders' use of a comprehensive language ("we") in communication with followers is especially important in expressing social identity (Seyranian & Bligh, 2008; Wilbert et al., 2023). The word "we" connotes a process of cultivating one to think of oneself as a member of a larger group rather than being just an individual. Thus, leaders need to motivate the team to achieve consensus on shared identity centred on identity entrepreneurship so that even if team members are in geographically dispersed working environments, they can identify core values, norms, and ideals and feel like members of the same group.

Third, the mediating effect of social presence on the relationship between work virtuality and work engagement was confirmed to have a moderating effect according to the identity entrepreneurship of the leader as perceived by team members. This means that the higher the identity entrepreneurship of the leader as perceived by employees, the stronger the impact of virtuality on work engagement through social presence. In other words, when team members perceive social presence during remote work, this positively affects work engagement, and the leader's level of identity entrepreneurship plays an important role in this relationship. More clearly, the higher the level of the leader's identity entrepreneurship, the higher the social presence, and the higher the work environment, the higher the work engagement. Accordingly, to increase the work engagement of a remote working team, leaders must demonstrate strong identity entrepreneurship to strengthen the sense of belonging of team members and promote communication to enhance social presence (Steffens et al., 2018).

Implications for Practice

The following summarises the results of this study, and the implications that can be applied to HR practice are as follows. First, it is necessary for remote work teams to find out the most effective and efficient communication media that are best suitable for their task. This can help remote workers to sense a high level of social presence, and thus they will be able to focus on their tasks. The level of social presence of members of remote work teams may be decreased in a virtual working environment (Miao & Ma, 2022). Therefore, team leaders need to set up regular meetings via online platforms to build intimacy among remote working team members in order to ask after each other and share their knowledge and new ideas.

Second, in order to facilitate interactions and conversations among members of remote work teams, HR practitioners need to provide communication training programmes for team leaders. In a virtual working environment, it is more challenging to communicate intuitively compared to in-person communication. Therefore, HR practitioners should support team leaders to utilise the most appropriate communication methods for their teams. In addition, not only real-time communication media but also asynchronous communication media such as emails, chats, and discussion boards can help remote workers to communicate efficiently (Pan & Sullivan, 2005; Watts, 2016). Because non-real-time communication media are less distracting than real-time media which means that it allows remote workers to concentrate on their task and improve productivity. Hence, HR practitioners may offer some training programmes related to asynchronous communication methods for leaders of remote work teams.

Finally, we propose that HR practitioners should provide training programmes for leaders of remote work teams to develop identity entrepreneurship. It is difficult for remote workers to sense a shared sense of 'we' in a virtual working environment. Remote team leaders are necessary to remind their team members of their identity constantly and periodically. Therefore, remote work team leaders are expected to have the capability to facilitate a sense of belonging among team members through the training programme related to identity entrepreneurship.

Conclusions

This study analyses the effects of virtuality and social presence of remote workers on work engagement and the moderated mediating effect of the leader identity entrepreneurship perceived by team members. In this study, the research findings showed that in the context of a virtual work environment, leaders with a high level of identity entrepreneurship strengthened the social presence of team members, and this social presence effect increased the level of team members' work engagement.

The limitations and recommendations for future research of this study are as follows. This study is a cross-sectional correlational study, causal relationships could not be identified. In future studies, it will be crucial to validate the causal relationships among the variables using a longitudinal design. Second, because we mainly focused on work-related factors, we overlooked the remote workers' home context. Third, one component of supervisor leadership was used as a moderator variable. However, since all variables were collected from the same source, the possibility of common variance bias must be acknowledged. Fourth, this study does not show the effect of different levels of remote working. Therefore, it is necessary to examine the relationship between social presence, identity entrepreneurship, and work engagement

according to remote working style (low remote, median remote, and total remote working) in subsequent studies.

Declarations
Acknowledgements

Disclosure Statement
No potential conflict of interest was reported by the authors.

Ethics Approval
Not applicable.

Funding Acknowledgements

Citation to this article
Ha, S. M., Yun, H. J.., Park, H. J., & Song, J. H. (2023). The effect of virtuality on work engagement through social presence: Moderated mediation effect of team members' perception of identity entrepreneurship. *International Journal of Organizational Leadership, 12*(4), 468-486. https://doi.org/10.33844/ijol.2023.60390

Rights and Permissions

References

Argyle, M., & Dean, J. (1965). Eye-contact, distance and affiliation. *Sociometry, 28*, 289–304. https://doi.org/10.2307/2786027

Aritz, J., Walker, R., & Cardon, P. W. (2018). Media use in virtual teams of varying levels of coordination. *Business and Professional Communication Quarterly, 81*, 222–243. https://doi.org/10.1177/2329490617723114

Bailey, D. E., & Kurland, N. B. (2002). A review of telework research: Findings, new directions and lessons for the study of modern work. *Journal of Organisational Behaviour, 23*(SpecIssue), 383–400. https://doi.org/10.1002/job.144

Bakker, A. B., Albrecht, S. L., & Leiter, M. P. (2011). Work engagement: Further reflections on the state of play. *European Journal of Work and Organisational Psychology, 20*(1), 74–88. https://doi.org/10.1080/1359432X.2010.546711

Bakker, A. B., & Bal, M. P. (2010). Weekly work engagement and performance: A study among starting teachers. *Journal of Occupational and Organisational Psychology, 83*(1), 189–206.

Bakker, A. B., & Demerouti, E. (2008). Towards a model of work engagement. *Career development international, 13*(3), 209–223. https://doi.org/10.1108/13620430810870476

Bakker, A. B., Demerouti, E., & Schaufeli, W. B. (2002). Validation of the maslach burnout inventory--general survey: An internet study. *Anxiety, Stress & Coping: An International Journal, 15*(3), 245–260. https://doi.org/10.1080/1061580021000020716

Bickle, J. T., Hirudayaraj, M., & Doyle, A. (2019). Social presence theory: Relevance for HRD/VHRD research and practice. *Advances in Developing Human Resources, 21*(3), 383–399. https://doi.org/10.1177/1523422319851477

Biocca, F., Harms, C., & Burgoon, J. (2003). Toward a more robust theory and measure of social presence: Review and suggested criteria. *Presence: Teleoperators and Virtual Environments, 12*(5), 456–480. https://doi.org/10.1162/105474603322761270

Christian, M. S., Garza, A. S., & Slaughter, J. E. (2011). Work engagement: A quantitative review and test of its relations with task and contextual performance. *Personnel psychology, 64*(1), 89–136. https://doi.org/10.1111/j.1744-6570.2010.01203.x

Chudoba, K. M., Wynn, E., Lu, M., & Watson-Manheim, M. B. (2005). How virtual are we? Measuring virtuality and understanding its impact in a global organisation. *Information Systems Journal, 15*(4). https://doi.org/10.1111/j.1365-2575.2005.00200.x

Croes, E. A. J., Antheunis, M. L., Schouten, A. P., & Krahmer, E. J. (2016). Teasing apart the effect of visibility and physical co-presence to examine the effect of CMC on interpersonal attraction. *Computers in Human Behavior, 55*, 468–476. https://doi.org/10.1016/j.chb.2015.09.037

Daft, R. L., & Lengel, R. H. (1986). Organisational information requirements, media richness and structural design. *Management Science, 32*(5), 554–571.

Daft, R. L., & Wiginton, J. C. (1979). Language and organisation. *Academy of Management Review, 4*(2), 179–191. https://doi.org/10.5465/amr.1979.4289017

DeRue, D. S., & Ashford, S. J. (2010). Who will lead and who will follow? A social process of leadership identity construction in organisations. *The Academy of Management Review, 35*(4), 627–647. https://doi.org/10.5465/AMR.2010.53503267

Dixon, K. R., & Panteli, N. (2010). From virtual teams to virtuality in teams. *Human Relations, 63*(8), 1177–1197. https://doi.org/10.1177/0018726709354784

Fonner, K. L., & Roloff, M. E. (2012). Testing the connectivity paradox: Linking teleworkers' communication media use to social presence, stress from interruptions, and organisational identification. *Communication Monographs, 79*(2), 205–231. https://doi.org/10.1080/03637751.2012.673000

Fujimoto, Y., Ferdous, A. S., Sekiguchi, T., & Sugianto, L. F. (2016). The effect of mobile technology usage on work engagement and emotional exhaustion in Japan. *Journal of Business Research, 69*(9), 3315–3323. https://doi.org/10.1016/j.jbusres.2016.02.013

Galanti, T., Guidetti, G., Mazzei, E., Zappalà, S., & Toscano, F. (2021). Work from home during the COVID-19 outbreak: The impact on employees' remote work productivity, engagement, and stress. *Journal of Occupational and Environmental Medicine, 63*(7), e426–e432. https://doi.org/10.1097/JOM.0000000000002236

Gergen, K. (1991). *The Saturated Self: Dilemmas of Identity in Contemporary Life*. Basic Books.

Germain, M.-L., & McGuire, D. (2014). The role of swift trust in virtual teams and implications for human resource development. *Advances in Developing Human Resources, 16*, 356–370. https://doi.org/10.1177/1523422314532097

Gioia, D. A., Schultz, M., & Corley, K. G. (2000). Organisational identity, image and adaptive instability. *The Academy of Management Review, 25*(1), 63–81. https://doi.org/10.2307/259263

Graen, G. B., & Uhl-Bien, M. (1995). Relationship-based approach to leadership: Development of leader-member exchange (LMX) theory of leadership over 25 years: Applying a multi-level multi-domain perspective. *The Leadership Quarterly, 6*(2), 219–247. https://doi.org/10.1016/1048-9843(95)90036-5

Greco, P., Laschinger, H. K. S., & Wong, C. (2006). Leader empowering behaviours, staff nurse empowerment and work engagement/burnout. *Nursing Leadership, 19*, 41–56. http://dx.doi.org/10.12927/cjnl.2006.18599

Gunawardena, C. M. (1995). Social presence theory and implications for interaction and collaborative learning in computer conference. *International Journal of Educational Telecommunications, 1*, 147–166. http://www.learntechlib.org/p/15156/

Hair, J. F., Black, W. C, Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). *Multivariate data analysis (Vol. 6).* Pearson Prentice Hall.

Halbesleben, J. R. (2010). *Work engagement: A handbook of essential theory and research.* Psychology Press.

Halbesleben, J. R., & Wheeler, A. R. (2008). The relative roles of engagement and embeddedness in predicting job performance and intention to leave. *Work & Stress*, *22*(3), 242–256.

Haslam, S. A., & Platow, M. J. (2001). The link between leadership and followership: How affirming social identity translates vision into action. *Personality and Social Psychology Bulletin, 27*, 1469–1479. https://doi.org/10.1177/01461672012711008

Haslam, S. A., Reicher, S. D., & Platow, M. J. (2011). *The new psychology of leadership: Identity, influence and power.* Psychology Press.

Hwang. (2007). Development of social presence measurement of mediated social interaction: A case study of instant messaging. *Journal of Communication Science, 7*(2), 529–561.

Kahn, W. A. (1990). Psychological conditions of personal engagement and disengagement at work. *Academy of management journal, 33*(4), 692–724. https://doi.org/10.5465/256287

Kauppila, O.-P., Rajala, R., & Jyrämä, A. (2011). Knowledge sharing through virtual teams across borders and boundaries. *Management Learning, 42*, 395–418. https://doi.org/10.1177/1350507610389685

Kettinger, W. J., & Grover, V. (1997). The use of computer-mediated communication in an interorganizational context. *Decision sciences, 28*(3), 513–555. https://doi.org/10.1177/1350507610389685

Kim, J., Henly, J. R., Golden, L. M., & Lambert, S. J. (2020). Workplace flexibility and worker well-being by gender. *Journal of Marriage and Family, 82*(3), 892–910. https://doi.org/10.1111/jomf.12633

Kim, W. H., Park, J. G., & Kwon, B. (2017). Work engagement in south korea. *Psychological Reports, 120*(3), 561–578. https://doi.org/10.1177/0033294117697085

Kishton, J. M., & Widaman, K. F. (1994). Unidimensional versus domain representative parcelling of questionnaire items: An empirical example. *Educational and Psychological Measurement, 54*(3), 757–765. https://doi.org/10.1177/0013164494054003022

Kreijns, K., Kirschner, P. A., Jochems, W., & Van Buuren, H. (2004). Determining sociability, social space, and social presence in (a) synchronous collaborative groups. *CyberPsychology & Behavior, 7*(2), 155–172. https://doi.org/155-172.10.1089/109493104323024429

Lee-Kelley, L. (2006). Locus of control and attitudes to working in virtual teams. International *Journal of Project Management, 24*(3), 234–243. https://doi.org/10.1016/j.ijproman.2006.01.003

Lührmann, T., & Eberl, P. (2007). Leadership and identity construction: Reframing the leader—follower interaction from an identity theory perspective. *Leadership, 3*(1), 115–127. https://doi.org/10.1177/1742715007073070

Mackie-Lewis, S. A. (1998). *Changing place and the time of work: The impact of telecommuting on employees' personal networks and psychological well-being.* University of Michigan ProQuest Dissertations Publishing

Maduka, N. S., Edwards, H., Greenwood, D., Osborne, A., & Olusola, S. (2018). Analysis of competencies for effective virtual team leadership in building successful organisations. *Benchmarking: An International Journal, 25*, 696–712. https://doi.org/10.1108/BIJ-08-2016-0124

Mann, S., Varey, R., & Button, W. (2000). An exploration of the emotional impact of tele-working via computer-mediated communication. *Journal of Managerial Psychology, 15*(7-8), 668–686. https://doi.org/10.1108/02683940010378054

May, D. R., Gilson, R. L., & Harter, L. M. (2004). The psychological conditions of meaningfulness, safety and availability and the engagement of the human spirit at work. *Journal of Occupational and Organisational Psychology, 77*(1), 11–37. https://doi.org/10.1348/096317904322915892

Mehrabian, A. (1967). Orientation behaviours and nonverbal attitude communication. *Journal of Communication, 17*(4), 324–332. https://doi.org/10.1111/j.1460-2466.1967.tb01190.x

Miao, J., & Ma, L. (2022). Students' online interaction, self-regulation, and learning engagement in higher education: The importance of social presence to online learning. *Frontiers in Psychology*, *13*, 815220. https://doi.org/10.3389/fpsyg.2022.815220

Nafukho, F. M., Graham, C. M., & Muyia, H. M. A. (2010). Harnessing and optimal utilization of human capital in virtual workplace environments. *Advances in Developing Human Resources, 12*, 648–664. https://doi.org/10.1177/1523422310394791

Nagata, T., Nagata, M., Ikegami, K., Hino, A., Tateishi, S., Tsuji, M., ... & Mori, K. (2021). Intensity of home-based telework and work engagement during the COVID-19 pandemic. *Journal of Occupational and Environmental Medicine, 63*(11), 907. https://doi.org/10.1097/JOM.0000000000002299

Offerman, L. R., & Spiros, R. K. (2001). The science and practice of team development: Improving the link. *Academy of Management Journal, 44*(2), 376–392. https://doi.org/ 10.5465/3069462

Palumbo, R. (2020). Let me go to the office! An investigation into the side effects of working from home on work-life balance. *International Journal of Public Sector Management, 33*(6/7), 771–790. https://doi.org/10.1108/IJPSM-06-2020-0150

Pan, C. C., & Sullivan, M. (2005). Promoting synchronous interaction in an eLearning environment: Technological horizons in education. *T.H.E.Journal, 33*(2), 27–30.

Panteli, N., Yalabik, Z. Y., & Rapti, A. (2019). Fostering work engagement in geographically-dispersed and asynchronous virtual teams. *Information Technology & People, 32*(1), 2–17. https://doi.org/10.1108/ITP-04-2017-0133

Pianese, T., Errichiello, L., & da Cunha, J. V. (2023). Organizational control in the context of remote working: A synthesis of empirical findings and a research agenda. *European Management Review, 20*(2), 326–345. https://doi.org/10.1111/emre.12515

Reicher, S. D., & Hopkins, N. (2001). *Self and nation: Categorization, Contestation, and Mobilisation.* Sage Publications.

Sardeshmukh, S. R., Sharma, D., & Golden, T. D. (2012). Impact of telework on exhaustion and job engagement: A job demands and job resources model. *New Technology, Work and Employment, 27*(3), 193–207. https://doi.org/10.1111/j.1468-005X.2012.00284.x

Schaufeli, W. B., & Bakker, A. B. (2003). *Test manual for the Utrecht work engagement scale.* Unpublished manuscript, Utrecht University.

Schaufeli, W. B., & Bakker, A. B. (2004). Job demands, job resources, and their relationship with burnout and engagement: A multi-sample study. *Journal of Organisational Behaviour: The International Journal of Industrial, Occupational and Organisational Psychology and Behavior, 25*(3), 293–315. https://doi.org/10.1002/job.248

Schermuly, C. C., & Meyer, B. (2016). Good relationships at work: The effects of leader–member exchange and team–member exchange on psychological empowerment, emotional exhaustion, and depression. *Journal of Organisational Behaviour, 37*(5), 673–691. https://www.jstor.org/stable/26610556

Seyranian, V., & Bligh, M. C. (2008). Presidential charismatic leadership: Exploring the rhetoric of social change. *The Leadership Quarterly, 19*(1), 54–76. https://doi.org/10.1016/j.leaqua.2007.12.005

Shamir, B., Zakay, E., Breinin, E., & Popper, M. (1998). Correlates of charismatic leader behavior in military units: Subordinates' attitudes, unit characteristics, and superiors' appraisals of leader performance. *Academy of Management Journal, 41*(4), 387–409. https://doi.org/10.5465/257080

Shin, H. K., & Kim, K. K. (2010). Examining identity and organisational citizenship behaviour in computer-mediated communication. *Journal of Information Science, 36*, 114–126. https://doi.org/10.1177/0165551509353376

Short, J. A., Williams, E, & Christie, B. (1976). *The social psychology of telecommunications.* John Wiley & Sons, Ltd.

Spiller, S. A., Fitzsimons, G. J., Lynch Jr, J. G., & McClelland, G. H. (2013). Spotlights, floodlights, and the magic number zero: Simple effects tests in moderated regression. *Journal of Marketing Research, 50*(2), 277–288. https://doi.org/10.1509/jmr.12.0420

Steffens, N. K., Haslam, S. A., Reicher, S. D., Platow, M. J., Fransen, K., Yang, J., Ryan, M. K., Jetten, J., Peters, K., & Boen, F. (2014). Leadership as social identity management: Introducing the identity leadership inventory (ILI) to assess and validate a four-dimensional model. *The Leadership Quarterly, 25*(5), 1001–1024. https://doi.org/10.1016/j.leaqua.2014.05.002

Steffens, N. K., Yang, J., Jetten, J., Haslam, S. A., & Lipponen, J. (2018). The unfolding impact of leader identity entrepreneurship on burnout, work engagement, and turnover intentions. *Journal of Occupational Health Psychology, 23*(3), 373–387. https://doi.org/10.1037/ocp0000090

Sung, E., & Mayer, R. E. (2012). Five facets of social presence in online distance education. *Computers in Human Behavior, 28*, 1738–1747. https://doi.org/10.1016/j.chb.2012.04.014

Vayre, E., & Pignault, A. (2014). A systemic approach to interpersonal relationships and activities among French teleworkers. *New Technology, Work and Employment, 29*(2), 177–192. https://doi.org/10.1111/ntwe.12032

Walther, J. B. (1992). Interpersonal effects in computer-mediated interaction: A relational perspective. *Communication Research, 19*(1), 52–90. https://doi.org/10.1177/009365092019001003

Watts, L. (2016). Synchronous and asynchronous communication in distance learning: A review of the literature. *Quarterly Review of Distance Education, 17*(1), 23–32. https://eric.ed.gov/?id=EJ1142962

Weber, M. S., & Kim, H. (2015). Virtuality, technology use, and engagement within organisations. *Journal of Applied Communication Research, 43*(4), 385–407. https://doi.org/10.1080/00909882.2015.1083604

Weinstein, E. A., & Deutschberger, P. (1963). Some dimensions of altercasting. *Sociometry, 26*(4), 454–466. https://doi.org/10.2307/2786148

Wilbert, J. B., Wesche, J. S., Handke, L., & Kerschreiter, R. (2023). Far but close: How leaders can strengthen social identification with virtual teams. *Behaviour & Information Technology*, 1–17. https://doi.org/10.1080/0144929X.2023.2272202

Xanthopoulou, D., Bakker, A. B., Demerouti, E., & Schaufeli, W. B. (2009). Work engagement and financial returns: A diary study on the role of job and personal resources. *Journal of Occupational and Organisational Psychology, 82*(1), 183–200. https://doi.org/10.1348/096317908X285633

Yu, J. P. (2015). The item parcelling bias of multi-dimensionality in the structural equation modelling. *Korean Management Review, 44*(4), 1131–1147. http://dx.doi.org/10.17287/kmr.2015.44.4.1131