

# Leveraging Work-Related Stressors for Employee Innovation: The Moderating Role of Enterprise Social Networking Use

Completed Research Paper

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## Abstract

*Enterprise social networking (ESN) techniques have been widely adopted by firms to provide a platform for public communication among employees. This study investigates how the relationships between stressors (i.e., challenge and hindrance stressors) and employee innovation are moderated by task-oriented and relationship-oriented ESN use. Since challenge-hindrance stressors and employee innovation are individual-level variables and task-oriented ESN use and relationship-oriented ESN use are team-level variables, we thus use hierarchical linear model to test this cross-level model. The results of a survey of 191 employees in 50 groups indicate that two ESN use types differentially moderate the relationship between stressors and employee innovation. Specifically, task-oriented ESN use positively moderates the effects of the two stressors on employee innovation, while relationship-oriented ESN use negatively moderates the relationship between the two stressors and employee innovation. In addition, we find that challenge stressors significantly improve employee innovation. Theoretical and practical implications are discussed.*

**Keywords:** Enterprise social networking, task-oriented ESN use, relationship-oriented ESN use, challenge-hindrance stressors, employee innovation

## Introduction

Employee innovation has been considered as one of the most important sources for firms to remain competitive in a dynamic business environment (Wang et al. 2015; Yuan and Woodman 2010). To explore how promote employee innovation, researchers have paid increasing attentions to work stressors (Byron et al. 2010). Work stressors reflects the environmental conditions or demands that evoke the stress process and the negative consequences of stress, such as anxiety and burnout (Folkman 1984; Jex 1998).

However, the existing findings about the role of work stressors in affecting employee behaviours and performance are inconsistent and mixed. Some scholars presented stressors' negative influence (Baron 1986; Byron et al. 2010; Vecchio 1990), while some proposed stressors' positive effects (Anderson et al. 2004). Under this condition, scholars increasingly focused on exploring how the effects of work stressors on employee innovation could be leveraged by a number of different factors, such as demographic characteristics, personality traits, social environment (Jex and Bliese 1999).

One potential moderator variable has been widely mentioned over the years is IT usage. This focus on IT is not surprising, given that the use of IT could facilitate employees to acquire and process various information, and then help them change perception of work environment (Gupta et al. 2013). Recently, the use of enterprise social networking (ESN) has been reached quite extensively but, as yet, has received relatively limited attentions in the work stressor literature. Over the past several years, ESN techniques have been widely adopted by firms to provide a public communication platform for employees (DiMicco et al. 2008). The platform enables employees to view each other's messages and social network (Leonardi 2014). Staw (1995) argues that work communication can provide information that help employees deal with stressful situation by reducing or moderating employees' perceptions of anxiety and burnout from stressors. In particular, ESN can be used to post and communicate not only professional and work information, but also personal and general information (Liu et al. 2014).

Different ESN usage orientation may separately influence employees' perceptions and reactions to stressors. The existing literature has categorized ESN usage into the types of task-oriented ESN use and relationship-oriented ESN use (Kwon and Wen 2010; Liu et al. 2014). Task-oriented ESN users tend to do work-related communication containing a great deal of professional information, including project updates, recommendations, and summaries of past projects (Leonardi 2014; Liu et al. 2014). This type of visible communication could make employees reduce the feelings of anxiety and burnout, and perceive stressors as challenges. In contrast, the influencing mechanism of relationship-oriented ESN use is more complex. Relationship-oriented ESN users tend to use ESN for personal communication, such as request for help, encourage each other, and provide emotional support (Brzozowski 2009; Liu et al. 2014). Although this type of visible communication could shape individual anxiety and burnout, it distracted employees and their peers from work. That means high level of relationship-oriented ESN usage may destroy attentiveness produced by the certain extent of stressors. This indicates that exploring the potential various moderating effects of task-oriented and relationship-oriented ESN use on the relationship between work stressors and employee innovation is necessary and interesting. However, no study has empirically investigated the above influencing mechanism.

To this end, this study aims to investigate the team-level contextual factors of ESN use as well as their cross-level moderating effects on the relationship between work stressors and employee innovation. Specifically, we propose and test a multi-dimensional cross-level model, with task-oriented and relationship-oriented ESN use as the moderators for the influence of challenge-hindrane stressors on employee innovation. Based on the transactional theory of stress, we adopt the challenge-hindrane stressors categorization, and argue that both these two stressors induce anxiety and burnout yet differ significantly in influencing employee innovation (Cavanaugh et al. 2000; LePine et al. 2005; Nahrgang et al. 2011).

Further, we apply the communication visibility theory to argue that the visible communication allows the third parties to improve the awareness of who knows what and who knows whom and further facilitates new ways of working (Leonardi 2014). In this view, the current study develops a framework for exploring the different moderating roles of task-oriented ESN use and relationship-oriented ESN use in the relationship between stressors and employee innovation. This study could extend the research on various ESN uses by specifying their cross-level moderating role in leveraging the relationship between work stressors and employee innovation. The findings could represent our response to the calls for more attention to the cross-level effects of multiple contextual factors in the research on stressors and employee innovations.

## **Theoretical Background and Hypotheses**

According to communication visibility theory, the visible communication nature of ESN enables the third parties to improve the awareness of who knows what and who knows whom and further facilitates new

ways of working (Leonardi 2014). Specifically, using ESN for routine communication could increase the transparent of communication messages and enhance translucence of communication networks (Leonardi 2014). Message transparent and network translucence would facilitate employees to find coworkers' expertise. This advantage would allow employees to avoid to do jobs that had already been done and to take time to learn something that a coworker had already learned and could share (Leonardi 2014). Under this condition, employees could overcome tedious work, decrease workload, and reset their role. Meanwhile, communication visibility theory propose that communication visibility offers employees an advantage that they could easily identify the existing knowledge within the organization, and then effectively acquire the knowledge from those who held it (Leonardi 2014). In this view, although scholars have indicated that ESN use may not directly help employees to develop creativity, such use could provide a transparent communication environment to facilitate employees to acquire and integrate knowledge and information. When they try to deal with task and job creatively, the ESN use could help them leverage the potential influence of workload, job complexity, role conflict, job insecurity which strain from work stressors.

### ***Enterprise social networking***

ESN reflects the implementation of Social Networking Sites (SNS) within an organization, which could form corporate communities for creating and exchanging content and facilitating relationship building and maintenance among employees (Fulk and Yuan 2013; Kügler and Smolnik 2014; Kim et al. 2010; Von Krogh 2012). Specifically, SNS refer to “web-based services that allow individuals to 1) construct a public or semi-public profile within a bounded system, 2) articulate a list of other users with whom they share a connection, and 3) view and traverse their list of connections and those made by others within the system” (Ellison 2007, p.221). In this view, ESN is different from traditional computer-mediated communication technologies in organization, such as e-mail, teleconferencing, intranets, and instant messaging (Grudin 2006; Steinhüser et al. 2011). Specifically, ESN is designed for employees to communicate messages with specific coworkers or broadcast messages to everyone in the organization and to post, edit, and sort text and files linked to themselves or others (Leonardi et al. 2013). The most important feature of ESN is that employees could view the messages, connections, text, and files communicated, posted, edited and sorted by anyone else in the organization at any time (Leonardi et al. 2013).

Most traditional information systems are task-oriented, while ENS can be used as either task-oriented or relationship-oriented (Kwon and Wen 2010). In this view, scholars have differentiated ESN use into task-oriented and relationship-oriented ESN use, which could be different in affecting employees' motivation, behaviours, information, and social ties (Liu et al. 2014). Specifically, task-oriented ESN users would use the ESN to plan, clarify and monitor their tasks, share professional and work information, and build instrumental ties with each other. In contrast, relationship-orientated ESN use emphasizes building and maintaining personal relationships. Relationship-orientated ESN users would apply the ESN to listen, encourage and support each other within the team, share the personal and general information, and then build expressive ties (Fiedler et al. 1976; Liu et al. 2014; Yukl 1994). Therefore, task-oriented ESN use makes the task process, work-related information, and instrumental tie visible, while relationship-orientated ESN use focuses on general communications and makes employees' social ties visual to each other.

### ***Work Stressors***

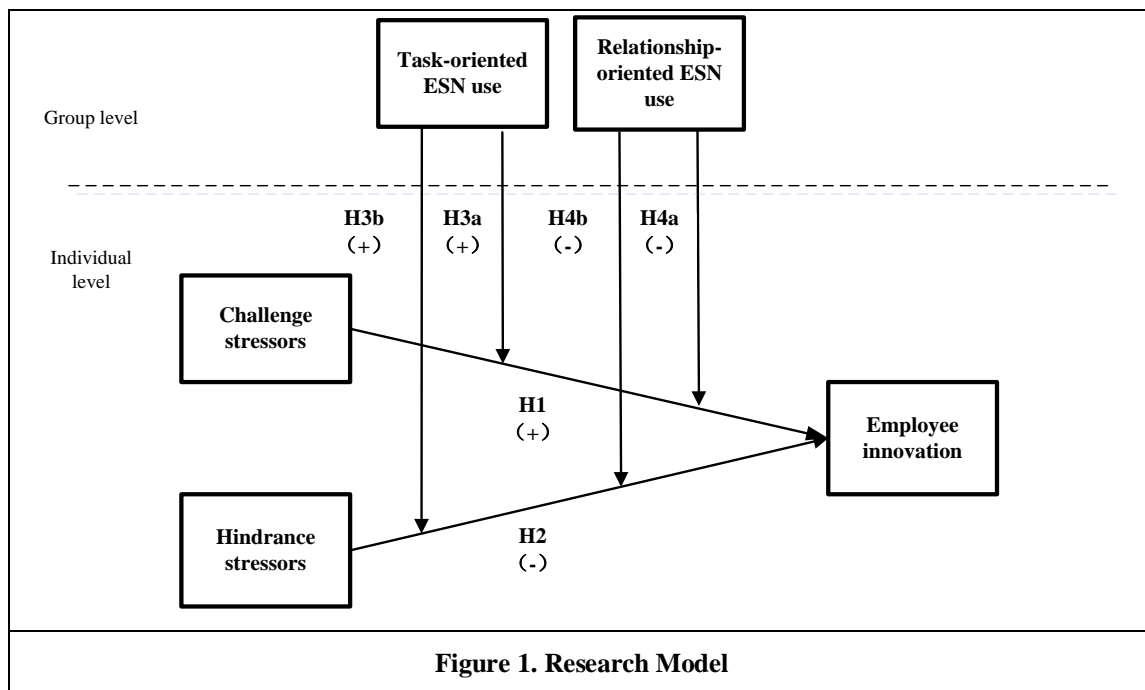
Work stressors are initially defined as the environmental conditions or demands that evoke the stress process, and the negative consequences of stress, such as anxiety, depression, and burnout (Jex 1998; Spaccarelli 1994). It is suggested that work stressors can lead to a generalized negative outcome (Gilboa et al. 2008). However, the existing empirical evidence has revealed mixed results of the relationship between work stressors and employee outcomes (e.g., satisfaction, performance, and turnover). In particular, Cavanaugh et al. (2000) indicate that the mixed findings might be due to that work stressors are typically conceptualized as one-dimensional, such that positive and negative stressors were collapsed into the same measure thereby cancelling out differential effects.

Recently, scholars have widely categorized work stressors into challenge stressors and hindrance stressors. Challenge stressors refer to job demands that are appraised by employees as potentially promoting their

personal growth and achievement (Cavanaugh et al. 2000). Hindrance stressors are defined as “job demands viewed as obstacles to personal growth or demands that interfere with one’s ability to achieve work-related goals (Cavanaugh et al. 2000). According to Lazarus and Folkman (1984), transactional theory of stress provides a useful rationale for different emotional reactions and coping styles to challenge and hindrance stressors. Although both types of stressors lead to distress emotions, such as strain, anxiety and burnout (Cohen 1980; Zhang et al. 2013). Employees might have opportunity to gain personal growth and achievement if they overcome challenge stressors. Therefore, challenge stressors could also evoke positive emotions such as feelings of eagerness and confidence that trigger offsetting effects and result in an active problem-solving style of coping (e.g., effort expenditure) (Lazarus and Folkman 1984; Wallace et al. 2009). Hindrance stressors could only trigger negative emotions such as feelings of threat, anxiety, and apprehension which in turn lead to more emotion-focused coping strategies to regulate distressing emotions (e.g., withdrawal, retaliation, distraction) (Lazarus and Folkman 1984; Wallace et al. 2009).

### ***The Impact of Challenge Stressors on Employee Innovation***

Figure 1 shows the cross-level concept model. Challenge and hindrance stressors and employee innovation are individual-level variables. Task-oriented ESN use and relationship-oriented ESN use are team-level variables (Liu et al. 2014). Specifically, drawing upon the communication visibility theory, this study aims to examine how different types of ESN use (i.e., task-oriented and relationship-oriented ESN use) moderate the relationship between challenge-hindrance stressors and employee innovation. Based on their underlying rationale, the following sections present the detailed hypotheses related to these relationships. And then, we test the model with data from seven technical support companies using hierarchical linear regression. Last, we conclude by discussing implications for knowledge management research and practice.



Challenge stressors reflect work conditions that provide opportunities for personal achievement and growth, such as high levels of assignment workloads and responsibility, or “stretch” assignments that serve as stepping stones for promotion (Cavanaugh et al. 2000). Such challenges make employees become more fully engaged and embedded in their work and thus are more likely to result in raises, improved status, and promotions (Firth et al. 2013). Accordingly, we expect that challenge stressors will positively impact employee innovation by triggering employees’ positive emotional reactions and leading an active

problem-coping style. Specifically, innovation usually entails hard work and requires employees to take initiative and to exert high levels of effort and persistence (Staw 1995). Challenge stressors can improve employees' motivations to adopt an active coping style to engage in work, such as persistence of effort toward work and further improve employee innovation (LePine et al. 2005). Moreover, it has been indicated that the tight deadlines and high workloads that employees perceive in their capability stimulates creative solutions (Ohly and Fritz 2009), which can improve employee effectiveness in current and future work. In addition, although challenge stressors may trigger a certain extent of strain, such negative emotions may promote innovation under certain conditions (George and Zhou 2002). Thus, we propose:

**Hypothesis 1:** Challenge stressors are positively related to employee innovation.

### ***The Impact of Hindrance Stressors on Employee Innovation***

Hindrance stressors are perceptions of the work conditions, such as low job security, organizational unfairness, and role conflicts at work, which are likely to obstruct and limit personal achievement and growth (Cavanaugh et al. 2000). Previous studies have showed that hindrance stressors reduce individual job satisfaction, organizational commitment and job performance, and further trigger turnover and withdrawal behavior (LePine et al. 2005; Podsakoff et al. 2007; Zhang et al. 2013). In this view, we expect that high levels of hindrance stressors would negatively impact employee innovation by leading negative emotions and in turn adopting emotion-focused coping strategies. Employees believe that hindrance stressors are not under their control and will interfere with obtaining personal achievement and growth, which lead to heightened psychological strain (Firth et al. 2013). Therefore, employees devote more resources toward dealing with negative affective states instead of focusing problem-solving. The existing studies indicate a negative relationship between stressors, such as organizational politics and job insecurity (i.e., hindrance stressors) and creativity (ARYEE et al. 2009; Probst et al. 2007). For example, Zhang et al. (2013) further argue that hindrance stressors can lead to perceptions of unfairness, which in turn results in the withholding of performance-related contributions, such as creative behavior. Consequently, we predict:

**Hypothesis 2:** Hindrance stressors are negatively related to employee innovation.

### ***The Moderating Impact of Task-oriented ESN use***

We expect task-oriented ESN use to strengthen the positive relationship between challenge stressors and employee innovation by providing visible professional communication. Specifically, task-oriented ESN use emphasizes posting the professional and work related information, such as the planning clarify and monitoring of individuals tasks (Liu et al. 2014). According the communication visibility theory (Leonardi 2014), we expect that visible professional and work-related communication would be prevalent in the organization becomes that ESN provide the open and visible communication platform. When a team relies on ESN to communicate, employees in this team will have more opportunities to observe other team members' work-related message and to achieve summaries of past projects, work experience and other useful professional information. Under this condition, employees' attention would be constantly overtaken by the visible professional communication. That means, employees would pay more efforts and persistence in their work and creative thinking when they face higher challenge stressors.

We also expect that task-oriented ESN use could weaken the negative relationship between hindrance stressors and employee innovation because of the visible professional communication. Specifically, individual employee normally has limited mental resources. Under this condition, an employee needs to devote most mental resources to address hindrance stressors, which force the employee to leave limited mental resources to support work (Firth et al. 2013; Teichner et al. 1963). Task-oriented ESN use could help employee acquire and process the useful information for their work. For example, because of the visibility of ESN, task-oriented ESN users could check others' task process and work experience. This would allow employees to rely on ESN to process the necessary information, while depends on their own mental resources. Meanwhile, task-oriented ESN use would force employees to focus on their work because of the peer pressures. This use allows employees to acquire the information about the update of their work, and to check other team members' work stage. This visibility may increase the peer pressures for developing creative ideas. Meanwhile, it helps an employee with high hindrance stressors clearly know

her/his role in the team. In summary, the task-oriented ESN use could decrease the strain produced by job insecurity, role conflict and role ambiguity. Consequently, employees will divert attention away from emotion control. Thus, we propose:

**Hypothesis 3a:** Task-oriented ESN use strengthens the positive relationship between challenge stressors and employee innovation.

**Hypothesis 3b:** Task-oriented ESN use weakens the negative relationship between hindrance stressors and employee innovation.

### ***The Moderating Impact of Relationship-Oriented ESN use***

Relationship-oriented ESN use may weaken the positive relationship between challenge stressors and employee innovation by providing visible personal communication. Relationship-oriented ESN use emphasizes building and maintaining personal relationships through sharing personal and general information (Fiedler et al. 1976; Liu et al. 2014). Such personal communication post on ESN would attract employees' attention, and attract them to frequently browse and check the non-work related information and communication. However, this attention would distract employees from their task (Zhang and Bartol 2010). That is, such distraction would be likely to decrease employees' task attentions, and then lead them to pay less efforts and persistence in work.

Meanwhile, we propose that relationship-oriented ESN use can strengthen the negative relationship between hindrance stressors and employee innovation by providing visible personal communication. ESN could provide a public communication platform for employees to share each other's complaints. These visible communications make employees easily understand that some bad experiences, such as receiving conflicting requests from superiors (i.e., role conflict) and having to complete unnecessary paperwork (i.e., hassles), are common in their team. Under this condition, employees would develop some negative feeling about the team. For example, the visibility of most team members' complaints would make employees believe that their work conditions can't help them achieve personal growth or future gaining. Therefore, employees will have no motivation to do creative thinking. Therefore, we predict:

**Hypothesis 4a:** Relationship-oriented ESN use weakens the positive relationship between challenge stressors and employee innovation.

**Hypothesis 4b:** Relationship-oriented ESN use strengthens the negative relationship between hindrance stressors and employee innovation.

## **Research Methodology and Analysis**

### ***Sample and Data Collection***

We conducted a survey through the business enterprise sector from multiple organizations (e.g. pharmaceutical, financial, or IT firms) in eastern China to test our hypotheses. Eastern China is one of the most developed regions in China and an increasing number of firms have adopted social networking in their routine work. Therefore, eastern China is considered as an ideal setting to conduct research on ESN use. We collaborated with some middle management in different firms. With their assistance, we facilitated the data collection through e-mail. A total of 244 individuals from 62 groups (The groups were the department in the present study) responded. After discarding the incomplete responses and groups with fewer than three individual responses (excluding the team leader), we finally got 222 individuals in 61 groups (41% response rate). Table 1 provides the demographic information of the survey participants.

<b>Table 1. Sample demographic</b>					
Individual			Group		
	freq.	Percent		freq.	Percent
Gender			Group size		
Male	130	58.6	1-5	8	13.1

Female	92	41.4	6-10	29	47.6
Age			11-15	20	32.7
Less than 30	162	73.0	16 or more	4	6.6
31-40	57	25.7	Group age		
More than 40	3	1.4	3 months or less	1	1.6
Education			3-6 months	5	8.2
Associate degree	18	8.1	6-12 month	14	23.0
Bachelor	130	58.6	1-3 years	16	26.2
Master/PhD	74	33.3	3 years or more	25	41.0
Duty					
Production	10	4.5			
R&D	85	38.3			
marketing	33	14.9			
Human Resource	14	6.3			
Purchasing	3	1.4			
financing	11	5.0			
Administration/logistics	10	4.5			
Others	56	25.2			
Total	222	100.0		61	100.0

## Measures

All the measurement items were adopted/ adapted from validated items from the existing literature. Since the current study was conducted in China, two bilingual management scholars were employed to translate all measures into Chinese and then back-translated all measures into English to ensure consistency of meaning (Brislin 1980). All the items in this survey were scored using a Likert response scale format in which “1” was “strongly disagree” and “7” was “strongly agree.”

**Work stressor.** The items used to measure work stressors were adapted from Cavanaugh et al. (2000). An example of the six-item challenge stressors scale was “The volume of work that must be accomplished in the allotted time.” An example of the five-item hindrance stressors scale was “The lack of job security I have.”

**Employee innovation.** We measured employee innovation using the three-item scale reported by Durcikova et al. (2011). A sample item is “I believe I am usually very creative in my solutions to work problems.”

**ESN use.** We measured ESN use based on the items adopted from Liu et al. (2014). An example of the ten-item task-oriented ESN use scale is “Deciding how to go about our team's work.” An example of the eight-item relationship-oriented ESN use scale is “Encouraging team members when they're upset.”

**Control variables.** In order to account for the heterogeneity of the sample, we controlled for gender, age, education, duty, team age, and team size (Tierney and Farmer 2002).

## Validation of Multilevel Data Structure

This study included both individual-level and group-level constructs.

For the group-level constructs, namely task-oriented ESN use and relationship-oriented ESN use, we assessed within-and between-group homogeneity to determine if aggregation is viable within naturally occurring groups (Bliese 2000). First, we assessed within-group homogeneity by rwg (j) statistic. Our task-oriented ESN use and relationship-oriented ESN use data were all normally distributed, and the

mean rwg (j) of them are 0.85 and 0.86, respectively. According to James et al. (1984), if rwg (j) is equal to or greater than 0.70, there is sufficient within-group agreement. Second, we computed an analysis of variance and associated intraclass correlation coefficients (ICCs) to further assess homogeneity. The ICC (1) value means the proportion of variance explained by group membership, and ICC (2) is an estimate of the reliability of the means (Raudenbush and Bryk 2002). If ICC (2) is greater than or equal to 0.70, we can assume that group means are reliably different. Using the formulas reported in Bliese (2000), ICCs for task-oriented ESN use were ICC (1) = 0.22 > 0.12, ICC (2) = 0.50; ICCs for relationship-oriented ESN use were ICC (1) = 0.14 > 0.12, ICC (2) = 0.38. Because all other indices supported aggregation and the smaller ICC (2) value could be attributed to small group sizes and the subpar ICC (2) score was compensated for by the high rwg.

To provide a more comprehensive test of a multilevel data structure, we performed an important advance in analytic techniques, namely, multilevel factor analysis (Dyer et al. 2005). Specifically, we used five-step procedure (Dyer et al. 2005) to assess the data structure. First, we used LISREL to perform confirmatory factor analysis. As shown in table 2, we constructed a model with five factors and the fit indices were acceptable (five-factor model:  $\chi^2=933.09$ ,  $df=419$ ,  $p<0.01$ ,  $RMSEA=0.075$ ,  $CFI=0.97$ ,  $IFI=0.97$ ,  $NFI=0.94$ ). Second, we tested four-factor model that had task-oriented ESN use and relationship-oriented ESN use collapsed into one ESN use factor (four-factor model:  $\chi^2=2345.65$ ,  $df=423$ ,  $p<0.01$ ,  $RMSEA=0.143$ ,  $CFI=0.92$ ,  $IFI=0.92$ ,  $NFI=0.89$ ). Third, the three-factor model separately collapse moderators and independent variables (three-factor model:  $\chi^2=2799.18$ ,  $df=426$ ,  $p<0.01$ ,  $RMSEA=0.159$ ,  $CFI=0.90$ ,  $IFI=0.90$ ,  $NFI=0.87$ ). Fourth, the two-factor model collapsed all moderators and independent variable in one factor (two-factor model:  $\chi^2=4439.33$ ,  $df=428$ ,  $p<0.01$ ,  $RMSEA=0.206$ ,  $CFI=0.83$ ,  $IFI=0.83$ ,  $NFI=0.81$ ) and a one-factors model (one-factor model:  $\chi^2=4844.33$ ,  $df=429$ ,  $p<0.01$ ,  $RMSEA=0.216$ ,  $CFI=0.82$ ,  $IFI=0.82$ ,  $NFI=0.80$ ). These data modeled at individual level demonstrated that the five-factor provided a good fit and had a better fit than other models.

These data modeled at the individual level. For provide sufficient basis to test the multilevel structure of the data, we demonstrated the convergent and discriminant validity of the constructs. The composite reliability and Average Variance Extracted (AVE) were used to assess the convergent validity. As illustrated in the Table 2, composite reliability ranges from 0.894 to 0.962, which were all above 0.7. The AVE ranges from 0.679 to 0.782, were also above 0.5. Furthermore, we assessed discriminant validity by examining the square root of the AVE. As shown in Table 2 and Table 3, the value of the square root of the AVE were all higher than the correlations between constructs, indicating reasonable discriminant validity.

Measures	Items	Loadings	Cronbach's alpha	Composite Reliability	AVE
Task-oriented ESN use	10	0.813-0.905	0.963	0.961	0.756
Task-oriented ESN use	8	0.849-0.903	0.954	0.962	0.759
Challenge stressors	6	0.827-0.912	0.936	0.950	0.759
Hindrance stressors	4	0.767-0.848	0.841	0.894	0.679
Employee innovation	3	0.874-0.899	0.859	0.915	0.782

## Results

We followed Harman's one factor test to analyze common method bias. The results showed that all the items could be categorized into five constructs with eigenvalues greater than 1.0, and accounting for 75.91% of the variance. The first construct did not account for the majority of the variance (24.85%). This result suggests that the common method bias was not a serious issue in our study.



Table 3 shows mean, standard deviations, and correlations among variables. As show in Table 3, one inter-construct correlation was higher than the benchmark of 0.60. We conducted a multicollinearity test. The results showed that the highest Variance Inflation Factor (VIF) was 1.722 and the lowest tolerance value was 0.581. The values of VIF are all less than 10 and tolerance values are all higher than 0.10. Therefore, multicollinearity did not appear to be a significant problem in our study.

Hypotheses 3a, 3b, 4a and 4b (stating that two types of ESN use moderate the relationship between challenge-hindrance stressors and employee innovation) are cross-level interaction hypotheses. Therefore, we used hierarchical linear modeling (HLM) to test the hypotheses. Specifically, we group-mean-centered individual-level (level 1) variables, excepting for the gender variables. Team-level (level 2) variables were not centered to reduce possible problems with multicollinearity (Raudenbush and Bryk 2002).

**Table3. Mean, Standard Deviations, and Correlations Among Study Variables**

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11
1. Gender	1.41	0.494	NA										
2. Age	2.24	0.481	-0.135*	NA									
3. Education	3.25	0.594	-0.028	-0.014	NA								
4. Duty	4.21	2.593	0.194**	-0.163*	0.033	NA							
5. Group size	2.42	1.118	0.015	0.033	-0.023	-0.051	NA						
6. Group development	3.88	1.311	0.099	0.220**	-0.013	0.046	0.032	NA					
7. Task-oriented ESN use	3.80	1.509	0.011	-0.164*	-0.110	0.193**	0.046	-0.029	<b>0.870</b>				
8. Relationship-oriented ESN use	4.49	1.559	0.058	-0.177**	-0.051	0.136*	-0.040	-0.038	0.623**	<b>0.871</b>			
9. Challenge stressors	4.65	1.191	-0.125	0.040	-0.075	-0.028	-0.031	0.083	0.235**	0.172*	<b>0.871</b>		
10. Hindrance stressors	3.64	1.409	-0.105	-0.079	-0.018	0.122	0.071	0.109	0.168*	0.121	0.225**	<b>0.824</b>	
11. Employee innovation	4.89	1.170	-0.051	0.089	-0.096	-0.032	-0.036	-0.079	0.234**	0.185**	0.361**	-0.126	<b>0.884</b>

Note.  $n = 222$ . Task-oriented ESN use and relationship-oriented ESN use scores were calculated as group-level means and assigned back to individual employees. The square roots of the AVE are shown on the diagonal in bold. (\* $p < 0.05$ ; \*\* $p < 0.01$ )

Table 4 summarizes the results of HLM analysis. First, we tested a null model in which no predictors were entered. Next, we introduced the individual-level variables (step 1), the team variables (step 2), and finally we simultaneously tested all cross-level interactions (step 3).

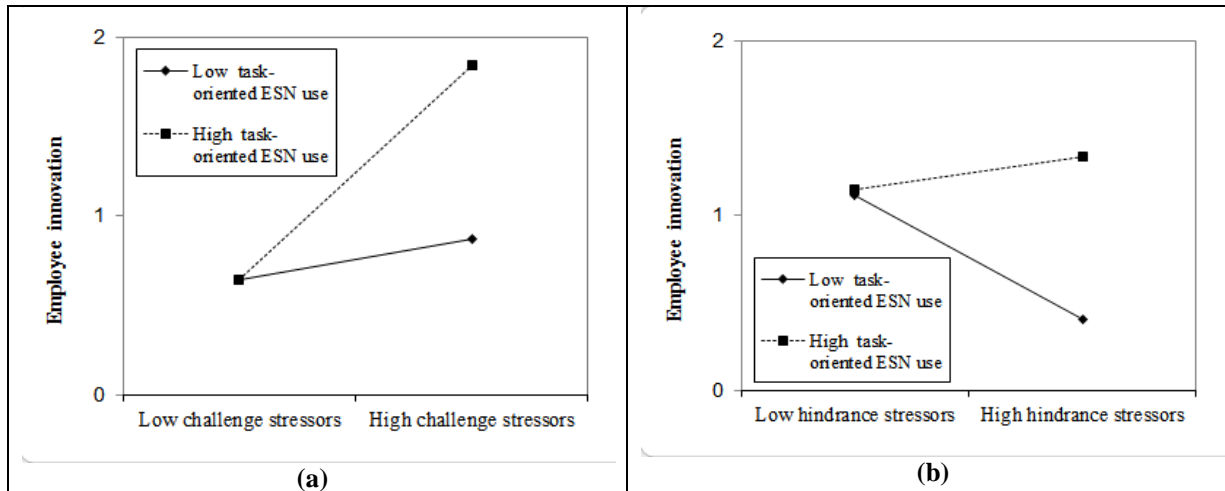
**Individual-level results.** Hypothesis 1 predicted that challenge stressors are positively related to employee innovation. The result indicated that challenge stressors had a significant and positive relationship with employee innovation ( $\gamma = 0.358$ ,  $p < 0.05$ ), and thus supporting Hypothesis 1. Meanwhile, hindrance stressors were also significantly related to employee innovation ( $\gamma = -0.132$ ,  $p < 0.05$ ). Hence, Hypothesis 2 was also supported.

**Cross-level interactions.** We estimated models in HLM to assess the moderating effect of task-oriented ESN use and relationship-oriented ESN use on the relationship between work stressors and employee innovation. The results are presented in the final section of Table 4.

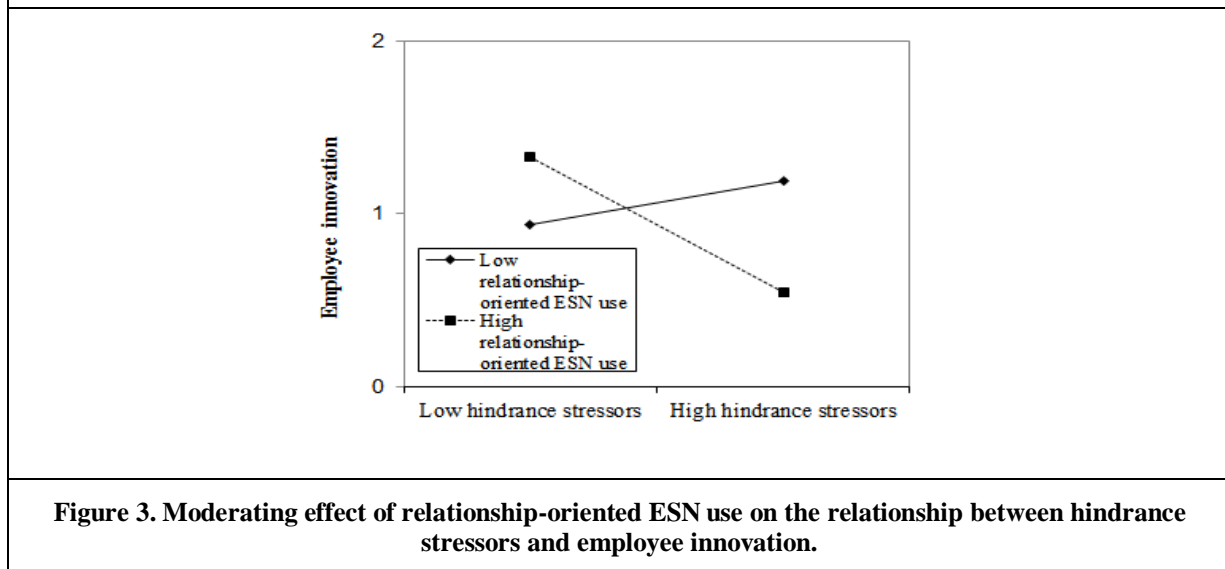
Hypothesis 3a states that task-oriented ESN use strengthens the relationship between challenge stressors and employee innovation. The interaction of task-oriented ESN use and challenge stressors was

significant ( $\gamma = 0.242$ ,  $p < 0.05$ ), supported hypothesis 3a. Hypothesis 3b predicts task-oriented ESN use weakens the negative relationship between hindrance stressors and employee innovation. This interaction was also significant ( $\gamma = 0.224$ ,  $p < 0.05$ ), thus hypothesis 3b was supported. Hypothesis 4a states relationship-oriented ESN use weakens the positive relationship between challenge stressors and employee innovation. This interaction was negatively significant ( $\gamma = -0.184$ ,  $p > 0.05$ ). Therefore, hypothesis 4a was not supported. Hypothesis 4b predicts that relationship-oriented ESN use strengthens the negative relationship between hindrance stressors and employee innovation. The interaction of relationship-oriented ESN use and hindrance stressors also was negative significant ( $\gamma = -0.258$ ,  $p < 0.05$ ), and therefore, hypothesis 4b received support. As shown in Figure 2 and 3, we followed the graphical procedure to further analyze the moderating effects.

Table 4 HLM Results					
Variable	Coefficient	S.E.	t	X2	Model Deviance
Null model					
Intercept	4.885***	0.093	52.497	60	0.000
Level 1 variables					
Gender	-0.050	0.154	-0.327	215	0.744
Age	0.213	0.190	1.120	215	0.264
Education	-0.052	0.175	-0.295	215	0.768
Duty	0.029	0.051	0.571	215	0.569
Challenge stressors (Chal)	0.358***	0.077	4,622	215	0.000
Hindrance stressors (Hind)	-0.132*	0.065	-2.013	215	0.045
Level 2 variables					
Group size	-0.018	0.119	-0.155	56	0.878
Group development	-0.058	0.091	-0.638	56	0.526
Task-oriented ESN use (TESN)	0.242*	0.119	2.043	56	0.045
Relationship-oriented ESN use (RESN)	-0.063	0.135	-0.470	56	0.640
Cross-level interactions					
Chal*TESN	0.242*	0.107	2.262	207	0.025
Chal*RESN	-0.184	0.105	-1.745	207	0.082
Hind*TESN	0.224*	0.102	2.190	207	0.030
Hind*RESN	-0.258*	0.107	-2.419	207	0.017



**Figure 2. Moderating effect of task-oriented ESN use on the relationship between challenge-hindrane stressors and employee innovation.**



**Figure 3. Moderating effect of relationship-oriented ESN use on the relationship between hindrance stressors and employee innovation.**

## Discussion

The present study reveals that different types of stressors have different effects on employee innovation. Specifically, the results indicate that challenge stressors are positively related to employee innovation. This is consistent with previous studies (Vecchio 1990). This finding further suggests that challenge stressors can be critical sources for employee innovation. The results also demonstrated that hindrance stressors are significantly negatively related to employee innovation. These findings are consistent with previous literature suggesting that work stressors can provide both “good” and “bad” influences on work-related outcome (Firth et al. 2013; LePine et al. 2005; Rodell and Judge 2009; Webster et al. 2010). The findings further reinforce the notion that “different stress stimuli may work through distinct mechanisms to differentially affect creativity” (Byron et al. 2010, p2).

In addition, our results indicate that task-oriented ESN use and relationship-oriented ESN use have different moderating effects on the relationships between challenge-hindrane stressors and employee innovation. Specifically, the findings indicate that task-oriented ESN use strengthens the positive relationship between challenge stressors and employee innovation. Also, task-oriented ESN use weakens the negative relationship between hindrance stressors and employee innovation. In contrast, relationship-

oriented ESN use strengthens the negative relationship between hindrance stressors and employee innovation. Surprisingly, the results do not support the negative effects of relationship-oriented ESN use on the positive relationship between challenge stressors and employee innovation. One possible explanation may be that the attraction of personal growth and future gains promote by challenge stressors strong enough to stimulate employees to do creative works. That means, when employees focuses on challenge, they might be not so easily distracted by others' personal and general information and communication posted on ESN.

## **Implications and Limitations**

This study makes several major theoretical contributions. Specifically, our findings lend support to the moderating effects of ESN use on the relationship between challenge-hindrance stressors and employee innovation. In the extant literature, few studies have examined how ESN use may leverage the role of work stressors in affecting employee performance. To the best of our knowledge, the present research is among the first studies that investigate the various impacts of challenge-hindrance stressors on employee innovation in the ESN context. Also, we find that ESN use, as an increasing popular application of social networking techniques, moderates the effects of stressors on employee innovation. Thus, this study sheds a new light on the role of ESN use in affecting employees' employee innovation through the communication visibility theory. Our research opens the "black box" of stressors and ESN use simultaneously and finds different effects of ESN use on the relationships between "good" stressors and "bad" stressors and employee innovation. Furthermore, we respond to calls of multilevel researchers for a more comprehensive understanding of how phenomena unfold at different levels of analyses by testing a model at both the individual and group levels.

The results of this study have several practice implications for managers. First, we suggest managers should increase challenges related stressors to employees' work since challenge stressors could stimulate employees to explore new solution to deal with the high levels of workloads and responsibility, or "stretch" assignments. Furthermore, managers may note that they need to encourage employees to use task-oriented use ESN when they are facing challenge stressors. However, hindrance stressors were negatively related to employee innovation when employees prefer to relationship-oriented use ESN. Thus, managers should encourage and push employees to use ESN to plan, clarify and monitor individuals task, namely, posting the professional and work related information for visibility of this kind of information and knowledge. At the same time, managers should control and restrain employees' relationship-oriented ESN use.

Our study has the following limitations that can be addressed in the future research. First, the current study collected data at one point and at the same time. A longitudinal study would enrich our understanding by offering information on the causal relationships between independent and dependent variables. In addition, a longitudinal design would help reduce the common method bias (Podsakoff and Organ 1986). Second, the construct of employee innovation and ESN use in this study are measured by the perception of individual respondents, which are inherently subjective. Although our analyses do not show that the common method bias is a serious problem, we urge future researchers to use objective data or collect data from multiple informants to ensure the robustness of our results. Third, this research model was empirically tested based on the responses of informants who came from eastern China. Therefore, scholars and managers should take cautions in generalizing our findings to other firms that located in different areas.

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## **Appendix A**

Constructs, item measures and related literature.

### **A. Challenge Stressors (Adapted from Cavanaugh et al. (2000))**

1. The number of projects and or assignments I have?
2. The amount of time I spend at work.
3. The volume of work that must be accomplished in the allotted time.
4. Time pressures I experience.
5. The amount of responsibility I have.
6. The scope of responsibility my position entails.

### **B. Hindrance stressor (Adapted from Cavanaugh et al. (2000))**

1. The inability to clearly understand what is expected of me on the job.
2. The amount of red tape I need to go through to get my job done.
3. The lack of job security I have.
4. The degree to which my career seems "stalled".

### **C. Task-oriented ESN use (Adapted from Liu et al. (2014))**

Our team use ESN mainly to...

1. Planning how the work gets done.
2. Deciding how to go about our team's work.
3. Setting our team's goals.
4. Organizing tasks so that work flows more smoothly.
5. Deciding on best course of action when problems arise.
6. Diagnosing problems quickly.
7. Using our team's combined expertise to solve problems.
8. Identifying problems before they arise.
9. Developing solutions to problems.
10. Solving problems as they arise.

**D. Relationship-oriented ESN use (Adapted from Liu et al. (2014))**

Our team use ESN mainly to...

1. Providing support to team members who need help
2. Encouraging team members when they're upset
3. Listening to complaints and problems of team members
4. Fostering a cohesive team atmosphere
5. Helping to develop each other's skills
6. Learning skills from all other team members
7. Being positive role models to new members of the team.
8. Helping out when a team member is learning a new skill.

**E. Employee innovation (Adapted from Durcikova et al. (2011))**

1. Innovativeness is a must in my work.
2. Most of the time I am quite innovative in solving work problems.
3. I believe I am usually very creative in my solutions to work problems.