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6-26-2018

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Completed Research Paper

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Abstract

Drawing upon transformational leadership and job characteristics theory, this study develops a research model to examine the impact mechanism of direct supervisor's leadership behaviors on employees' extended use of information systems. A field survey was conducted in China and empirical data was collected from 299 employees from both IT and non-IT industries. Structural equation modelling analysis results suggest that transformational leadership is positively associated with employees' perception of job autonomy, which in turn promote IS extended use. Specifically, IT innovativeness is identified as a significant moderator that strengthens the relationship between transformational leadership and IS extended use. Theoretical and practical implications are discussed in the final section.

Keywords: Transformational Leadership; IS Extended Use; Job autonomy; IT Innovativeness

Introduction

Over the past decade, rapid technological advances in digitization and data analytics have reshaped the business landscape and enabled the emergence of new business innovations and fierce cross-boundary competitions (McKinsey Global Institute, 2017). With the intense competition and globalization of external marketing environments, organizations are faced with transformation with new forms of information technologies to achieve competitive advantage in the digital age (Albanese & Manning, 2016). In the past few years, many firms have implemented and utilized information systems, such as cloud computing-based customer management systems and data-driven business intelligence system in support of business strategies and operations. According to the statistics of Gartner, the global IT investment has achieved 3,470 billion dollars in the year of 2017. It is estimated that organizations' investments in digital information technologies will keep growing in the next few years (McKinsey Global Institute, 2017).

Despite organizations have devoted a large amount of financial and human resources in deploying information systems, the effectiveness of IT investment is not satisfactory. Because of the deficiency of operational and management capability, many firms have failed in harnessing the power of the emerging information technologies to achieve success (Albanese & Manning, 2016). The extant literatures suggest that employees' cognitive belief and behavioral intention play a significant role in promoting the assimilation of information systems into their daily work (Liu et al., 2011). In order to fully realize the benefits of information systems, employees are expected to make an extended use of system functionalities to accomplish their routine tasks more efficiently and effectively (Liang et al., 2015).

Previous studies have examined the significant antecedents that promote IS extended use from different theoretical perspectives. Drawing upon expectation confirmation theory, Hsieh and Wang (2007) found that confirmation is positively associated with individuals' extended use of IS, mediated by perceived usefulness and perceived ease of use. In another study, Chou et al. (2012) examined individual differences regarding IS extended use. The empirical results suggested that users' personal innovativeness of IT and computer self-efficacy positively affect their extended use of IS, while users' computer anxiety negatively affects their IS extended use. While in a recent study, Liang et al. (2015) developed a theoretical model based on adaptive structuration theory, and empirically examined the joint influences of job autonomy, system complexity and task variety on IS extended use.

Although the extant literatures have examined the critical antecedents of IS extended use in different research contexts, to our knowledge, few studies have examined the impact mechanism of leadership behaviors on employees' IS extended use. In the past few years, the influence of leadership on organizational level information systems success has arose the attention of IS scholars, and transformational leadership was identified as a significant antecedent that promote information systems success. Empirical results suggested that top managers' specific leadership behaviors are beneficial to promote the adoption, implementation and assimilation of informational systems within the organization (Ke et al., 2008; Shao et al., 2012; Shao et al., 2016; Shao et al., 2017a). However, it is still unclear regarding what specific leadership behaviors are most beneficial in promoting IS extended use and how do the influence occur. Given the significance of leadership behaviors in facilitating IS success, there is a need to conduct a theory-driven empirical study to examine its impact mechanism on individual level assimilation of information systems (Liu et al., 2011).

Drawing upon the extant literatures, this study aims to unpack the impact mechanism of transformational leadership on IS extended use from a job characteristics theoretical perspective. In particular, job autonomy is introduced in the research model as a significant mediator between the two constructs. In addition, employees' IT innovativeness is considered as a significant moderator in the research model, in order to examine if there exist differences of leadership influence when users possess different innovative tendencies of information technology.

Literature Review

Transformational Leadership

Transformational leadership has been identified as one of the most effective approaches to manage employees' behaviors in the past decades (Piccolo et al., 2006). The theoretical framework of transformational leadership was originally introduced by Burn (1978) in political studies. Bass (1985) applied the framework in organizational behavioral research to study managers' leadership behaviors. It was argued that transformational leadership are proactive than reactive in their thinking, and can inspire employees' creativity by appealing to their ideals and values (Piccolo et al., 2006).

Previous literatures have examined the relationship between transformational leadership and employees' motivation and creative behaviors. Specifically, Piccolo et al. (2006) found that transformational leadership is beneficial to promote employees' organizational citizenship behavior and task performance through the mechanisms of job characteristics and intrinsic motivation. Gumusluoglu and Ilsev (2009) indicated that transformational leaders are good at broadening and elevating the interests of employees by providing support for autonomy and innovation. In a recent study, Qu et al. (2015) reported a positive relationship between transformational leadership and follower creativity, mediated by relational identification. Given the significance of leadership behaviors in influencing individuals' creative behaviors, this study applied transformational leadership in the context of IS usage to examine its impact mechanism on employees' extended use of information systems.

Extended Use

IS extended use refers to using more of the information systems' functionalities and features to accommodate a comprehensive set of work tasks (Saga & Zmud, 1993; Hsieh & Wang, 2007). The conceptualization of extended use originates from the theory of technology diffusion. There are six

stages when an information technology is introduced in an organization, including initiation, adoption, adaptation, acceptance, routinization and infusion (Copper & Zmud, 1990). The last stage of infusion represents a higher level of system use, and refers to the state of embedding the system functionalities deeply and comprehensively within an individual's daily work (Cooper & Zmud, 1990). After experiencing the learning process in the previous stages, individuals have the potential to use the system in a more comprehensive and sophisticated manner though the accumulated experiences. The way that goes beyond routine and standardized usage is conceptualized as an extended use (Saga & Zmud, 1993).

Previous studies have examined the critical factors of information systems extended use in different research contexts, and job autonomy was identified as a significant antecedent. It was found that job autonomy motivates employees and allows them to have self-discretion in undertaking creative and innovative activities outside their routine task requirements (Liang et al., 2015). Thus this study included job autonomy as a significant mediator in the research model, which will be described in the next section.

Research Model and Hypotheses

Drawing upon the extant literatures, this study developed a research model to examine the joint influences of transformational leadership and job autonomy on IS extended use. Specifically, this study considered IT innovativeness as a significant moderator in the research model, and argued that the relationship between transformational leadership and IS extended use will be strengthened when employees possess a higher level of IT innovativeness. The research model is described in Figure 1. The theoretical logic of the path relationships will be described in the next section.
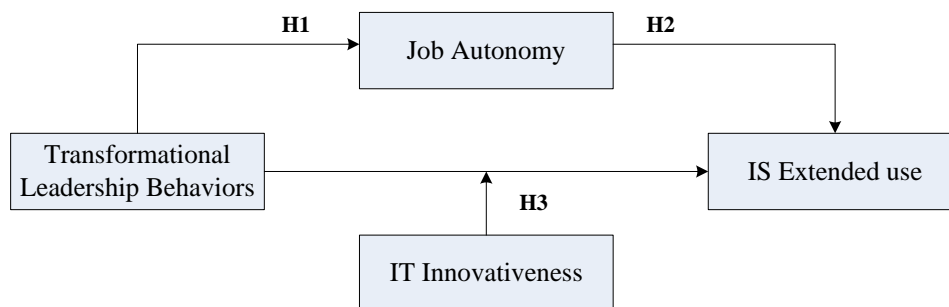

Figure 1. Research Model

The Influence of Transformational Leadership on Job Autonomy

Transformational leadership was recognized as a significant antecedent that promotes employees' perception of work environment. Previous literatures suggested that transformational leaders are likely to offer a greater extent of autonomy by enabling employees' freedom and independence in decision-making, and encouraging them to seek new perspectives and develop new ways to perform job tasks (Bass & Avolio, 1990; Carless et al., 2000; Bass & Riggio, 2006; Piccolo & Colquitt, 2006). In addition, transformational leaders can also provide individualized consideration by coaching and teaching. This is beneficial to enable followers to see more freedom and feedback in their jobs (Bass & Avolio, 1990; Yammarino, 1994; Piccolo & Colquitt, 2006).

Previous literatures have empirically examined the relationship between transformational leadership behaviors and employees' perception of work environment. Shamir et al. (1993) found that leaders who exhibit transformational behaviors can influence how followers judge a work environment by clearly articulating the value of an organization's mission. Likely, Judge and Bono (2003) indicated that transformational leaders are beneficial to influence followers' autonomous motivation by expressing high expectations and confidence in followers' ability, which in turn increase the extent to which followers view their work as self-regulation. While in a recent study, Rezvani et al. (2017) reported that transformational leadership can motivate users toward continued usage of information systems through influencing their intrinsic motivations.

In the context of IS usage, direct supervisors' leadership behaviors play a significant role in influencing followers' cognitive beliefs and behavioral intentions regarding systems usage (Liu et al., 2011; Rezvani et al., 2017). For example, direct supervisors can promote followers to seek creative and innovative ways of problem solving in the usage of information systems by communicating inspirational expectations, promoting intelligence and providing personal attention. This is beneficial to improve employees' perceived sense of autonomy when using information systems in support of daily tasks (Rezvani et al., 2017). Thus, we propose the following hypothesis:

Hypothesis 1: Transformational leadership is positively associated with employees' perception of job autonomy.

The Influence of Job Autonomy on IS Extended Use

Job autonomy refers to "the degree to which the work provides substantial freedom, independence and discretion to the individuals in scheduling the work and in determining the procedures to be used in carrying it out" (Hackman & Lawler, 1971, p. 265). Job autonomy was identified as a significant antecedent that motivates individuals' work devotion, effort expenditure and creativity in the context of organizational studies (Hackman & Oldham, 1975; Tyagi, 1985; Bandura and Cervone, 1986; Wang and Netemeyer, 2002; Shalley and Gilson, 2004; Cleavenger and Munyon, 2013). Since autonomy enables employees to feel self-determined and free from external pressures, it is beneficial to stimulate new combinations among multiple dimensions of task (Deci et al., 1989; Oldham and Cummings, 1996). Previous literatures found that highly autonomous employees are more likely to engage in risk taking, creative thinking and innovative problem solving when they have more freedom and control over daily work scheduling (Amabile and Gitomer, 1984; Tierney and Farmer, 2002).

The relationship between job autonomy and IS usage has arose the attention of IS scholars in the past few years. Specifically, Liang et al. (2015) found that perception of job autonomy is beneficial to facilitate employees' exploration of system functionalities (Liang et al., 2015). Since IS extended use requires a fully understanding and realization of systems benefits, employees are expected to use multiple functions of the system to accomplish their job tasks more efficiently (Liang et al., 2015). A perception of higher job autonomy can allow employees to have more self-discretion and authority in trying out new ways of system usage to deal with daily tasks (Burton-Jones and Grange, 2013; Liang et al., 2015).

In the context of IS usage, job autonomy plays a significant role in influencing individuals' behavioral intentions. The scope of information systems usage will be extended if employees are granted more autonomy to find new ways of system functionalities in performing job tasks (Robey et al., 2002). An extended use of information systems requires individuals to use more of the systems' features to support their existing and new job tasks (Hsieh et al., 2011). Employees with higher job autonomy can have more freedom and authority to decide task domains that the system should represent, and appropriately adapt system functionalities to make an effective use of information systems (Burton-Jones and Grange, 2013). The above analysis leads to the following hypothesis:

Hypothesis 2: Job autonomy is positively related to IS extended use.

The Moderating Effect of IT Innovativeness

IT innovativeness refers to an individual's personal trait to try out new information technologies and apply IT in novel ways to support his or her daily tasks (Agarwal and Prasad, 1998). Previous literatures suggested that individuals' IT innovativeness plays a significant role in achieving an extended use of system functionalities. Since information systems implementation is usually associated with uncertainty and complexity, the potential business value of system functionalities cannot be fully realized until they are extensively assimilated in an organization (Liang et al., 2007). When information systems implementation enters the post-adoption phase, users' IT innovativeness enables them to engage in an extended use of system functionalities that may not be explored at the initial adoption stage (Ahuja and Thatcher, 2005, Jasperson et al., 2005; Liu et al., 2011; Chou et al., 2012).

In the context of IS usage, IT innovativeness was identified as a significant personal factor that moderates the relationship between individuals' intrinsic motivation and behavioral intention to adopt and innovate with a new information technology (Leonard-Barton and Deschamps, 1988; Agarwal and Prasad, 1998; Wang et al., 2013).

Drawing upon contingency theory, the effectiveness of leadership behaviors is contingent upon context factors, and individuals' personal trait was identified as a significant contingent factor in the previous literatures (Ogbonna and Harris, 2000; Hai and Mohamed, 2013). In the context of IS usage, the relationship between transformational leadership behaviors and IS extended use may be strengthened by individuals' IT innovativeness. Specifically, employees with a higher tendency of IT innovativeness are more likely to be influenced by transformational leaders who exhibit inspirational motivation, intellectual stimulation and interpersonal consideration leadership behaviors (Scott and Bruce, 1994; West, 1990; Yuan and Woodman, 2010). Previous literatures posited that transformational leaders are more effective in stimulating risk taking and creative thinking behaviors for followers who prefer to try out new information technologies. The fit between transformational leadership and followers' IT innovativeness can create a positive reinforcement effect that accelerates their innovative behaviors regarding IS usage (Tierney and Farmer, 2002). Thus, this study proposes the following hypothesis:

Hypothesis 3: IT innovativeness moderates the relationship between transformational leadership behaviors and IS extended use, such that the relationship is stronger when IT innovativeness is higher.

Research Methodology

Questionnaire Design

This study refers to the extant literatures to design the instrument, and all the constructs were measured using seven points Likert scale, ranging from "strongly disagree" to "strongly agree". Specifically, the four dimensions of transformational leadership were operationalized based on Bass and Avolio (1995)'s Multifactor Leadership Questionnaire. Job autonomy was operationalized drawing upon Ahuja and Thatcher (2005)'s study. While IS extended use and IT innovativeness were adapted from Hsieh & Wang (2007) and Agarwal & Prasad (1998)' study respectively. Several items were refined to better adapt to the research context of information systems usage.

A pretest was conducted before the final data collection to examine if there exists content ambiguity of the designed instrument. A total of 60 respondents were invited to complete the questionnaires, and several items were revised based on the feedback from the respondents. The final instrument and corresponding references are illustrated in Table 1.

Table 1 Constructs and Items

Constructs		Items	References
Transformational Leadership	Idealized Influences	IF1-IF8	Bass & Avolio (1995)
	Inspirational Motivation	IM1-IM4	
	Intellectual Stimulation	IS1-IS4	
	Interpersonal Consideration	IC1-IC4	
Job Autonomy		JA1-JA3	Ahuja & Thatcher (2005)
IS Extended Usage		EU1-EU3	Hsieh & Wang (2007)
IT Innovativeness		IV1-IV3	Agarwal & Prasad (1998)

Data Collection

The final data collection was conducted during October to December in the year of 2017 in China. Questionnaires were distributed to employees who are using information systems in support of daily tasks. The firms were selected from both industry of IT and non-IT (retails, finance, manufacture, real estate and healthcare) to guarantee a diversity of industry type, as suggested in the previous literatures (Liang et al., 2015). The respondents were firstly asked to complete the section of personal information regarding gender, age, work experience and industry type. Then they were required to evaluate the

leadership behaviors of their direct supervisors and perception of job autonomy in the work environment. Finally, they were asked to provide a self-evaluation of IS extended use and personal IT innovativeness. Each respondent was provided with a red envelope for rewards after completing the questionnaire online. A total of 319 questionnaires were distributed to employees in different job positions, in order to guarantee a broad cross-section of job types. We deleted the questionnaires with missing and dirty data (with all data of 7 or 1), and finally got 299 valid datasets for analysis. Table 2 illustrates the demographics of the respondents. As described in Table 2, the number of males is slightly higher than females, and most of the respondents are younger people with a bachelor or master educational background. This is consistent with the demographics of the employees in the millennium age.

Table 2 Sample Demographics

Demographics	Categorization	Number	Percentage
Gender	Females	109	57.4%
	Males	190	42.6%
Age	Below 30	220	73.6%
	30-45	68	22.7%
	Above 45	11	3.7%
Work Experience	Senior high school and below	32	10.7%
	Bachelor	146	48.8%
	Master and above	121	40.5%
Industry Type	Information Technology(IT)	136	39.1%
	Non-IT	163	60.9%

Structural Equation Model Analysis

SmartPLS was selected as a primary statistical tool to analyze the structural equation model since the partial least square (PLS) method is more suited for theory exploration and prediction compared with covariance-based SEM methods (Gefen et al., 2000). In addition, PLS can accommodate smaller data samples without requiring normal distribution of the data. The sample size of 299 can satisfy the requirements of PLS-either 10 times the larger measurement number within the same construct or 10 times the larger construct number affecting the same construct (Chin et al., 2003).

Measurement Modelling Analysis

The measurement model was examined to analyze the reliability and convergent validity of the constructs. As noted in Table 3, the Cronbach's alpha of each construct has exceeded 0.75, demonstrating an internal consistency of the items. Meanwhile, the item loadings of each construct have exceeded 0.7, and the average variance extracted (AVE) for each construct is higher than 0.5, indicating an adequate convergent validity of the measurement model (Chin et al., 2003; Yi & Davis, 2003).

Table 3. Construct Reliability and Validity Analysis

Construct	Items	Factor Loadings	Cronbach's alpha	AVE
Idealized Influences (IF)	IF1	0.75	0.83	0.55
	IF2	0.76		
	IF3	0.77		
	IF4	0.71		
	IF5	0.72		
	IF6	0.73		
Inspirational Motivation (IM)	IM1	0.91	0.88	0.81
	IM2	0.88		
	IM3	0.91		
Intellectual Stimulation (IS)	IS1	0.85	0.81	0.72
	IS2	0.86		
	IS3	0.84		
	IC1	0.80		

Interpersonal Consideration (IC)	IC2	0.88	0.80	0.72
	IC3	0.86		
Job Autonomy (JA)	JA1	0.88	0.83	0.74
	JA2	0.85		
	JA3	0.85		
IS Extended Usage (EU)	EU1	0.89	0.87	0.80
	EU2	0.90		
	EU3	0.88		
IT Innovativeness (IV)	IV1	0.84	0.83	0.75
	IV2	0.89		
	IV3	0.86		

This study then conducted a correlation analysis to examine the discriminant validity of the constructs, following Chin et al. (2003)'s procedure. Table 4 suggests that the square root of the AVE for each construct (the values on the diagonal) is higher than that construct's correlation with other constructs, thus provides evidence for the discriminant validity of the measurement model (Chin et al., 2003; Yi & Davis, 2003).

Table 4. Correlation Analysis

	IF	IM	IS	IC	JA	EU	IV
IF	**0.74**						
IM	0.63	**0.90**					
IS	0.62	0.57	**0.85**				
IC	0.55	0.53	0.64	**0.85**			
JA	0.39	0.39	0.42	0.45	**0.86**		
EU	0.40	0.44	0.48	0.55	0.55	**0.89**	
IV	0.28	0.34	0.36	0.36	0.43	0.53	**0.87**

(Note: Values on the diagonal are square root of AVEs)

Structural Modelling Analysis

The structural model was analyzed to examine the path relationship between the constructs, as hypothesized in the research model. We first considered transformational leadership as a second-order construct in the structural model, and used bootstrapping procedure method to calculate the statistical significance of the parameter estimates (Temme et al., 2006). Gender, age and work experience were included in the structural model as control variables, as suggested in the previous literatures (Liang et al., 2015). The analysis result is described in Figure 2.
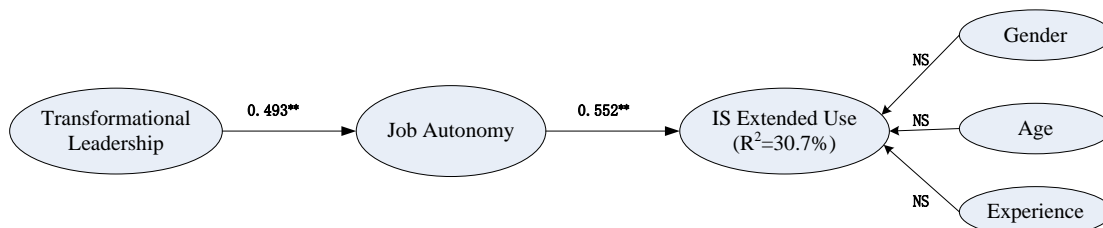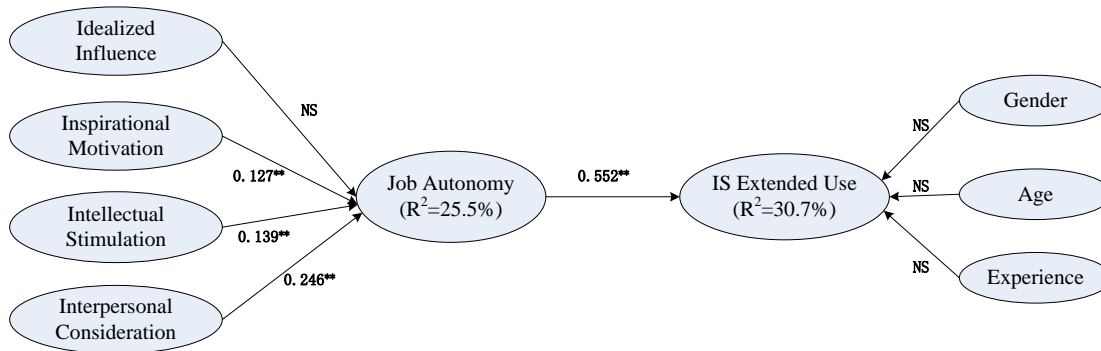

(Notes: ** represents p < .01; * represents p < .05; NS represents not significant)

Figure 2. Structural Model Analysis I

As illustrated in Figure 2, transformational leadership is positively associated with job autonomy (β=0.493, p<0.01), which in turn is positively related with IS extended use (β=0.552, p<0.01). The empirical results can provide support for hypothesis H1 and H2.

In order to further examine which dimension of transformational leadership behaviors are more beneficial to enhance employees' perception of job autonomy, we then added the four dimensions of transformational leadership, regarding idealized influence, inspirational motivation, intellectual

stimulation and inspirational motivation, as first-order constructs in the structural model. The analysis results of the structural model are illustrated in Figure 3.
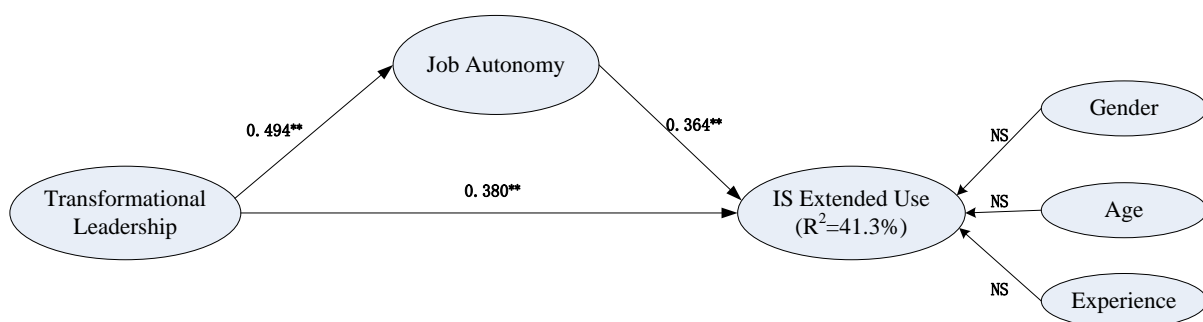

(Notes: ** represents p < .01; * represents p < .05; NS represents not significant)

Figure 3. Structural Model Analysis II

As noted in Figure 3, interpersonal consideration leadership behavior has a strong influence on job autonomy (β=0.246, p<0.01), while inspirational motivation and intellectual stimulation are also positively associated with job autonomy (β_1=0.127, p<0.01; β_2=0.139, p<0.01). The above empirical results indicate that employees' perception of job autonomy will be greatly increased if their direct supervisors can communicate high expectations, promote intelligence and give personal attention in the work environment. However, idealized influence is not significantly associated with job autonomy. Considering idealized influence refers to the degree to which leaders behave in characteristic ways that cause followers to identify with them, it may be more important in fostering goal congruence and group cohesiveness in the adoption and implementation phases of IS (Wang et al., 2005; Neufeld et al., 2007; Shao et al., 2016).

Mediating Test

In order to examine if there exists a full or partial mediating effect between transformational leadership and IS extended use, this study conducted the following analysis in the structural model based on Liang et al. (2007)'s procedure: (1) Remove job autonomy (mediator) from the structural model and establish a direct link between transformational leadership (independent variable) and IS extended use (dependent variable). (2) Include job autonomy in the structural model and establish a direct link between transformational leadership and IS extended use.

(Notes: ** represents p < .01; * represents p < .05; NS represents not significant)

Figure 4. Mediating Test

Following the mediation test procedure, we first removed job autonomy from the research model and added a direct link between transformational leadership and IS extended use. The analysis results suggests that transformational leadership is directly associated with IS extended use (β_1=0.563, p<0.01). We then added job autonomy in the research model and established a direct link between transformational leadership and IS extended use. As described in Figure 4, the path coefficient between transformational leadership and IS extended use reduces from 0.563 (p<0.01) to 0.380 (p<0.01). The

above analysis results indicate that job autonomy partially mediates the influences of transformational leadership on IS extended use, according to Baron and Kenny (1986)'s criterion.

Moderating Test

This study then added the construct of IT innovativeness in the structural model to examine its moderating effect between transformational leadership behaviors and IS extended use. Drawing upon Chin et al. (2003)'s study, interaction variables were added in the structural model by multiplying the standardized indicators of the independent variable and the moderator. The interaction variable should be significant in the structural model for the moderating effect to be interpretable (Henseler and Fassott, 2010). Figure 6 illustrates the PLS analysis results of the moderating effect. As noted in Figure 5, the interaction variable of transformational leadership * IT innovativeness is significantly associated with IS extended use (β=0.142, p<0.01), suggesting that IT innovativeness can further strengthen the influence of transformational leadership.
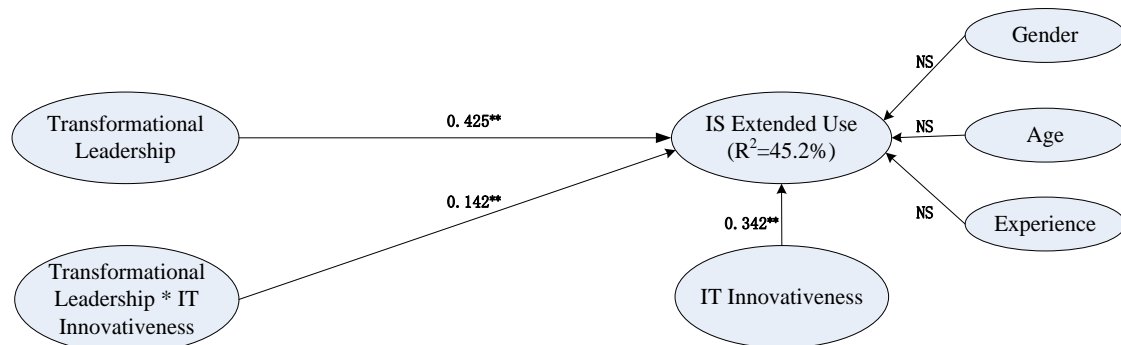
(Notes: ** represents p < .01; * represents p < .05; NS represents not significant)

Figure 5. Moderating Test

Theoretical and Practical Implications

For theoretical implications, this study makes at least three contributions to the extant literatures. Firstly, this study adapted the construct of job autonomy in the context of IS, and unpacked its mediating effect on transformational leadership and IS extended usage. Although previous studies have posited the significance of transformational leadership in achieving IS adoption and usage, to our knowledge, few studies have examined the mediating mechanism between the two constructs. The empirical research findings in this study can enrich the extant literatures of IS use from a job characteristics theoretical perspective. Secondly, this study further unpacked which dimension of transformational leadership behaviors are most beneficial in achieving an extended usage of information systems. Previous literatures mostly considered transformational leadership as a second-order construct, and the specific influences of the four leadership dimensions are unclear. In contrast to the previous literatures, this study considered the four dimensions of transformational leadership, regarding idealized influence, inspirational motivation, intellectual stimulation and interpersonal consideration, as first-order constructs in the research model, and empirically examined their specific influences on IS extended use. The empirical findings can extend the previous literatures of IS usage from a transformational leadership theoretical perspective. Thirdly, this study unpacked the moderating effect mechanism of IT innovativeness between transformational leadership and IS extended use. Previous literatures mostly examined the direct influence of IT innovativeness on IS usage behaviors while ignoring its moderating effect. This study found that IT innovativeness is a significant accelerator between transformational leadership behaviors and IS extended use. The empirical results can further extend the boundary condition of the proposed research model.

For practical implications, this study can provide guidelines to the organizations regarding the selection and training of front-line managers. Firstly, the board should recognize that direct supervisors' transformational leadership play a significant role in promoting followers' extended use of information systems by granting them more job freedom. Specifically, followers' perception of job autonomy will

be greatly enhanced when their direct supervisors exhibit inspirational motivation, intellectual stimulation and interpersonal consideration leadership behaviors. Thus, the board can consider the three dimensions of leadership behaviors as significant criterion when evaluating front-line managers' skills and capabilities. Meanwhile, the board can also provide leadership training programs and 360-degree feedback assessment to the front-line managers, in order to continuously improve their leadership effectiveness. Secondly, the board should recognize the contingent effect of IT innovativeness on direct supervisors' leadership behaviors and IS extended use. Since IT innovativeness is a stable personal trait which cannot be manipulated, managers who possess transformational leadership behaviors should pay attention to individuals' innovation tendency when recruiting and selecting employees in their work group. The managers should be aware that an appropriate match between leadership behaviors and followers' personal traits is beneficial to facilitate an extended use of information systems and achieve better work performance.

Conclusions

Drawing upon transformational leadership and job characteristics theory, this study developed a research model to examine: 1) the mediating mechanism of job autonomy between supervisors' transformational leadership and followers' IS extended use; 2) the moderating mechanism of IT innovativeness between supervisors' transformational leadership behaviors and followers' IS extended use. A survey was conducted in China and 299 valid data was collected from employees who use information systems to deal with daily work. Structural equation modelling method was used to examine the research model and the corresponding hypotheses. The empirical results demonstrated that direct supervisors' transformational leadership behaviors are beneficial to increase followers' perception of job autonomy, which in turn promote their extended use of information systems. Meanwhile, the influence of transformational leadership on IS extended use will be strengthened when employees possess a higher IT innovativeness. Although this study makes contributions to the extant literatures, there are still several limitations that leave open future research directions. Firstly, this study used cross-sectional data to examine the theoretical model. Future studies could take a longitudinal approach to examine the influence of transformational leadership behaviors on IS extended use over time. Secondly, this study mainly focused on direct supervisors' leadership behaviors. Future studies can include leadership behaviors from different management levels in the theoretical model to examine its cross-level effect on employees' IS usage behaviors. Thirdly, this study focused on IT innovative as a significant contingent factor in the research model. Future studies can also consider other personal factors, such as gender, age and cultural values, in order to further examine their moderating effect between transformational leadership behaviors and IS extended use.

Acknowledgements

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