Transformational Leadership and Employee Innovation in the Context of Telecommuting During the Post-pandemic Era in China: The Mediating Effect of Proactive Behaviors

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Abstract. This study investigates the relationship between transformational leadership, employees' proactive behaviors and employee innovation in the context of telecommuting during the post-pandemic era in China. The author surveyed telecommuters based in Chongqing and Sichuan of China and altogether received 160 useful responses. The result shows that transformational leadership has a significantly positive impact on employee innovation, and proactive behaviors of employees partially mediate the process. The study expands the context in which transformational leadership can prosper and suggest leaders or managers to incorporate the cultivation of subordinates' proactivity in innovation strategies.

Keywords: Transformational leadership · Employee innovation · Proactive behaviors · Telecommuting · COVID-19

1 Introduction

One significant alternative work arrangement recent years is the flexibility in where employees accomplish their work [1]. Telecommuting, or remote work is found to be a growing trend among workers. In 2005, China has only 1.8 million remote workers, but the figure almost tripled to 4.9 million in 2018 [2]. However, the outbreak of COVID-19 further pushes it into mainstream. It was reported that nearly 69% of employees in the U.S. were involved in telecommuting during the peak of COVID-19 [3], and it is predicted that the duration of this crisis may be much longer than what is expected [4]. The pandemic has completed a critical shift to turn the nature of telecommuting into a replacement of working in offices from simply a supplement [5]. There is an assertion that following years will witness a big rise of telecommuters in China [6], which requires managers to be prepared for the revolution [7].

Telecommuting is a disruptive innovation to conventional working mode. It enables employees to work at home or other places out of offices [8]. However, beyond altering working places, it has greatly changed people dynamics within the organization, giving rising to new challenges both to employees and managers. Change itself introduces the stress and uncertainty. Telecommuters need to connect with co-workers by using

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information and communication technologies [9]. While young people can easily adapt to new technologies, it takes time for the middle-aged or older to accept them. It also complicates the communication process as all communications are virtual and work relationships might not be so solid as working in physical offices [10]. Such lack of F2F interaction may also engender loneliness [11] and nervousness because telecommuters need to perform their work duty alone without timely and direct help from co-workers. Furthermore, it poses a vital challenge for managers to control employees effectively. Employees can be less engaged when working at home as there is no direct supervision from managers and colleagues [12]. All of those, if happen, will have a negative impact on employees' work productivity. Unfortunately, the outbreak of COVID-19 seems to magnify those adverse factors. One aspect is the increasingly uncertain and complex internal and external environment. Considering the volatile situation of virus, governments and enterprises are bound to constantly upgrade their strategies and policies, introducing distress and challenges to employees [4]. Studies have shown that the pandemic contributed to increased anxiety levels and depression symptoms among Chinese public [13]. The psychological pressure arising from the pandemic deserves special attention. In this circumstance, employees find it hard to keep the working passion as before. It is more likely for them to adopt conservative and safe approaches to avoid risks, thus damaging their innovation vitality. However, in today's knowledge-based and globalized world, innovation gradually becomes the core competence for organizations, and employees are the ones who create intellectual and operating capital for their organizations using their individual knowledge and talent [14]. Therefore, managers should take effective strategies to ensure that employees can still maintain a satisfying innovation performance when telecommuting during the pandemic. The shift of leadership style is set on the agenda.

Previous studies have found a range of leadership styles, but transformational leadership stands out to be the most effective for explaining behaviors and attitudes of employees [15]. Currently, in the context of post-pandemic era, transformational leadership is expected to embrace the turbulent environments [16]. Transformational leaders can also strategically help employees see the opportunity in the crisis, continually strengthen their self-confidence and self-efficacy to adapt to the new work environment, and generate creative output [16]. Therefore, whether from the perspective of external environment, or the employees' psychological state, transformational behaviors will engender more desirable outcomes. Thus, the aim of this study is to examine how transformational leadership contributes to telecommuters' innovation during this difficult period.

Previous research on the relationship between transformational leadership and employee innovation in China is mainly set in the traditional working environment, focusing on how the relationship exists and functions in different industries, but lack the discussion in remote work environment during COVID-19. There are empirical studies targeting the members of scientific research teams [17], tech industry [18, 19], manufacturing industry [20] and start-up companies in China [21]. This study will introduce new situational variables: telecommuting work arrangement and COVID-19 to fill in the research gap.

2 Hypothesis Development

2.1 Transformational Leadership and Employee Innovation

Burns (1978) describes transformational leaders as the ones who are capable of intrinsically motivating employees through promoting inspiring values and visions, rather than using the charm of material needs [22]. As an expansion, Bass and Avolio (1995) construct a four-dimensional model to define transformational leadership: idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration [23], which has become the mainstream in academia [24]. Employee innovation occurs when employees generate novel but feasible ideas, channel their creativity into practical behaviors and then produce innovative outcomes beneficial to organizations [14]. The positive relationship between transformational leadership and employee innovation has been widely solidified by a range of empirical investigations [17, 25–29]. The four dimensions of transformational leadership all have a significant impact on employee innovation. Charismatic leaders usually have exceptional capacity and ethical standards, which can attract respect and affection from their followers. Followers develop an emotional attachment to their leaders and show deep trust and confidence in what they believe and promote [30]. As transformational leaders are more likely to have breakthrough thinking and innovative mind, their followers will emulate their behaviors [17]. Inspirational motivation occurs when leaders clearly convey organizational visions to followers [17]. Transformational leaders do well in using dramatic symbols to inspire followers. This helps followers to see the meaning and logic of working hard and innovatively. Intellectual stimulation is the process to which transformational leaders encourage and guide their followers to challenge the status quo, recognize problems in a critical way and identify innovative solutions [17]. Subordinates' curiosity and creativity will be celebrated by transforming leaders. They gradually learn to look at old problems from new perspectives and feel fulfilled when fresh things are put forward [30]. Individualized consideration focuses on informal relationship between leaders and followers. According to the developmental needs and concerns of each subordinate, transformational leaders provide highly personalized support, encouragement and coaching [17]. Such consideration can help clear barriers on the path to innovation for followers. **Accordingly, transformational leadership is positively correlated with employee innovation** (Hypothesis 1).

2.2 The Mediating Effect of Proactive Behaviors

Prior studies have achieved certain results on the positive relationship between transformational leadership and employee innovation in China, but the mediating mechanism needs to be further explored. Guo, Song and Zhu (2018) have conducted a literature review and summarized that transformational leadership can positively affect employee innovation through three types of mediators: intrinsic motivation and self-efficacy, psychological state and job engagement [31]. This research will introduce a new mediator: proactive behaviors. The academia has given various definitions to this concept, and they have different focuses. It is stated that people with proactivity can not only anticipate the future and define new problems, they also actively find and implement solutions

[32]. Other studies portray proactive individuals as the ones who face turbulent work environment but dare to change their work situations, work roles and even themselves to achieve extraordinary results [33]. In summary, proactive employees are future-oriented, self-directed, change-oriented, and courageous. In contrast to emotion-focused coping, proactive behaviors are more needed in the context of COVID-19 and telecommuting as global employees are undergoing an unprecedentedly turbulent and stressful working environment which cannot be simply overcome by reducing negative emotions [4].

On the one hand, present studies have shown that transformational leadership can stimulate proactive behaviors of employees. Through idealized influence, employees' proactivity can be cultivated by appreciating and emulating their proactive leaders [30]. Through inspirational motivation, employees are guided to center on the accomplishment of future goals, instead of struggling with present challenges [17]. Through intellectual stimulation, subordinates are encouraged to think and behave in an unconventional way [21]. Employees propose new approaches and implement them, thus becoming more self-directed and change-oriented. Through giving individualized consideration to followers, they feel grateful, encouraged and being valued, thereby more likely to act constructively and go beyond the leaders' expectations [21]. There is also a line of empirical evidence for the positive association between transformational leadership and employees' proactive behaviors [34–36]. **Accordingly, transformational leadership is positively correlated with employees' proactive behaviors** (Hypothesis 2).

On the other hand, the positive effect of employees' proactive behaviors on innovation has been widely discussed by scholars. Employee innovation demands not only creative ideas, but also practical behaviors that can generate tangible values for the organization [14]. Future-oriented and change-oriented mindsets, as two dimensions of proactivity, motivate employees to be unaffected by present environmental constraints and devise innovative ideas for long-term objectives of the organization. They will actively make preparation for the future and anticipate effecting changes instead of dwelling on present challenges [4]. With regard to another significant dimension of proactivity—being self-directed, which is congruent with individualized working environment provided by telecommuting, is the key for employees to convert creative ideas into tangible outcomes. One study has found that proactive employees pay special attention to information update and spontaneously generate innovative ideas, and then achieve practical outcomes through independently accessing and investigating relevant information, appropriately exchanging ideas with colleagues, cleverly obtaining needed resources and support [37]. Courage, as a kind of psychological capital, permeates and supports the process. One meta analysis conducted by Fuller and Marler in 2009 shows that proactive personality is positively associated with individual creativity [38]. A series of empirical research demonstrates the positive relationship as well [39–41]. **Accordingly, employees' proactive behaviors are positively correlated with employee innovation** (Hypothesis 3), and **serve as a mediator between transformational leadership and employee innovation** (Hypothesis 4).

Table 1. Demographic Information

Demographic Variables	Sample (n = 160)	**Industry**	
Gender		Education	37 (23.13%)
Male	64 (40%)	Health-care	26 (16.25%)
Female	96 (60%)	Consulting	17 (10.63%)
Age		IT	15 (9.38%)
18-29 years old	82 (51.25%)	Manufacturing	15 (9.38%)
30-39 years old	50 (31.25%)	Retailing	11 (6.88%)
40-49 years old	19 (11.88%)	Real estate	6 (3.75%)
50-59 years old	8 (5%)	Entertainment	5 (3.13%)
60 and older	1 (0.63%)	Media/Art	5 (3.13%)
		Others	23 (14.38%)

3 Method

3.1 Sample and Procedure

The author sampled telecommuters based in Chongqing and Sichuan of China. These two regions were not high-risky areas during the time of data collection but had more or less experienced some pandemic interference before, and could represent the average safety level in China. All participants were recruited to have an online self-administered survey through So Jump (a Chinese professional data collection platform). The survey was available from February 14th to 28th, 2022. A total of 187 participants completed and submitted the online survey, but 27 cases were dropped due to lacking telecommuting experience during the pandemic, selecting the same option for every item, too short time for completing the questionnaire (less than 60 s) and other abnormal situations. Eventually, there were a total of 160 useful responses. The demographic information for respondents is demonstrated in Table 1.

3.2 Measurements

All items of the survey are measured on a five-point Likert scale asking participants how strongly they agree or disagree with a particular item. "1" stands for "strongly agree", while "5" stands for "strongly disagree".

3.2.1 Transformational Leadership

This research used localized four-dimensional transformational leadership matrix established by Chen and Zhang (2010) to measure transformational leadership, which better suits Chinese social and cultural situations [42]. The matrix has 14 items altogether.

3.2.2 Employee Proactive Behaviors

This research used Greenglass, Schwarzer, Jakubiec, Fiksenbaum and Taubert's (1999) proactive coping scale to measure employees' proactive behaviors [43]. Its cultural validation to Chinese population has been established by Wu, Chen and Yao in 2008 [44]. After removing reverse and overlapping items, the scale is reduced to have 9 items.

Table 2. Comparison of Measurement Models

Model	Factor	χ^2	*df*	CFI	IFI	TLI	RMSEA	SRMR
Three-factor model	all variables are unique factors	888.484	461	.826	.828	.813	.076	.069
Two-factor model	proactive behaviors and employee innovation are combined into one factor	896.491	463	.824	.826	.811	.077	.069
Two-factor model	transformational leadership and proactive behaviors are combined into one factor	1194.958	463	.702	.706	.681	.100	.097
Two-factor model	transformational leadership and employee innovation are combined into one factor	1200.095	463	.700	.704	.679	.100	.096
One-factor model	all variables are combined into one factor	1247.728	464	.681	.685	.659	.103	.099

3.2.3 Employee Innovation

The research used Zhou and George's (2001) 13-item creativity scale to measure employee innovation [45]. Considering that some items may overlap in content, the scale is reduced to have 9 items.

3.2.4 Control Variables

This research selected age, gender and industry as control variables. Age and gender have been found to confound the results [46], and industry is related to the capacity of telecommuting and the need for innovative performance.

4 Results

4.1 Reliability

To ensure the internal consistency of measurements of the three main variables, the author calculated Cronbach's alpha for every measurement scale, and all of them reached a good validity level ($\alpha 1 = 0.893$, $\alpha 2 = 0.870$, $\alpha 3 = 0.879$).

4.2 Discriminant Validity

To ensure the discriminant validity, the author conducted a confirmatory factor analysis (CFA) on the three main variables. The results indicate that the three-factor model has a more acceptable fit index than other models ($\chi 2[461] = 888.484$, CFI = 0.826, IFI = 0.828, TLI = 0.813, RMSEA = 0.076, SRMR = 0.069), thereby adopting the three-factor model. Specific data is summarized in Table 2.

4.3 Hypothesis Analysis

The descriptive statistics and correlations for each variable are demonstrated in Table 3, and the output of regression analysis is presented in Table 4. As is presented in the

Table 3. Descriptive Statistics and Correlations of the Variables

	Mean	SD	Mode	gender	age	transformational leadership	proactive behaviors	employee innovation
gender	1.600	.491	2.000	-	-.334**	.045	.095	.109
age	1.725	.904	1.000	-	-	-.069	-.009	-.069
industry	-	-	3.000	-	-	-	-	-
transformational leadership	2.125	.592	2.000	-	-	-	.529**	.568**
proactive behaviors	2.267	.640	2.444	-	-	-	-	.762**
employee innovation	2.247	.676	2.000	-	-	-	-	-

two tables, there is a moderate positive association between transformational leadership and employee innovation, with a significant result ($r = 0.568$, $\beta = 0.649$, $p < 0.01$), which supports Hypothesis 1; There is a moderate positive association between transformational leadership and employees' proactive behaviors, with a significant result ($r = 0.529$, $\beta = 0.573$, $p < 0.01$), which supports Hypothesis 2; There is a strong positive association between employees' proactive behaviors and employee innovation, with a significant result ($r = 0.762$, $\beta = 0.805$, $p < 0.01$), which supports Hypothesis 3.

4.4 Mediating Analysis

This research used a bootstrapping approach to test the mediating effect of proactive behaviors. The indirect effect index for 10,000 bootstrap samples is 0.461, and the 95% confidence interval is 0.322 ~ 0.592, not including zero. Thereafter, as is shown in Table 4, transformational leadership has a significant positive impact on proactive behaviors of employees ($\beta = 0.573$, $p < 0.01$); and employees' proactive behaviors also have a significant positive effect on employee innovation ($\beta = 0.805$, $p < 0.01$). Before adding the variable of proactive behaviors, the total effect of transformational leadership on employee innovation is marked ($\beta = 0.649$, $p < 0.01$). However, after controlling the variable of proactive behaviors, the direct effect of transformational leadership on employee innovation drastically drops ($\beta = 0.188$, $p < 0.01$). Therefore, employees' proactive behaviors serve as a partial mediator. The process is visualized in Fig. 1.

5 Conclusion

This study investigates the relationship between transformational leadership and employee innovation in post-pandemic era and burgeoning telecommuting in China, and tests the mediating effect of employees' proactive behaviors. The results suggest that transformational leadership is positively associated with employee innovation in the given context and employees' proactive behaviors serve as a partial mediator in this process.

Table 4. The Regression Analysis and the Indirect Effect of Proactive Behaviors

	proactive behaviors			employee innovation			employee innovation		
	B	p-value	SE	B	p-value	SE	B	p-value	SE
gender	.123	.234	.103	.150	.169	.109	-	-	-
age	-.006	.911	.056	-.052	.386	.059	-	-	-
transformational leadership	.573**	.000	.073	.649**	.000	.075	.188**	.001	.055
proactive behaviors	-	-	-	-	-	-	.805**	.000	.051

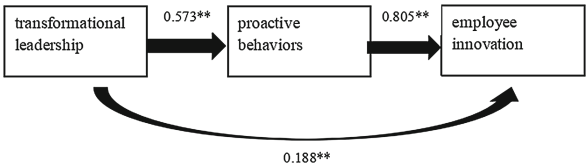

Fig. 1. The Mediating Model

The results of the study are consistent with findings of prior research on the relationship between transformational leadership and employee innovation and further indicates the importance of transforming or diversifying the leadership style in stimulating innovative performance. Thereafter, this study expands the context in which transformational leadership can be adopted and further recognizes the effectiveness of transformational leadership in the crisis or turbulent environments. Another aspect of theoretical contribution is the identification of proactive behaviors as a partial mediator. Compared with traditional mediators, proactivity that entails future-oriented inclination, self-directed courage and openness to change may be more suitable for current leadership situation (i.e., COVID-19 & telecommuting), and this provides a new research focus for future study.

This study also recommends some suggestions for today's leaders and managers in China. The primary one is that leaders are expected to cultivate a future time orientation of their followers. Instead of emphasizing existing distress and difficulties to compel employees to work hard, leaders should emphasize future plans and missions to switch the focus of employees. The specific practices include establishing long-term goals, frequently updating information about upcoming tasks, positively expressing the expectations of employees' future performance, and thereby followers are stimulated to draw plans and solutions in advance, and this will leave more room for careful consideration and innovation. Besides, leaders are recommended to be supportive to compensate for the lack of reliance and security of telecommuters. Leaders should offer sufficient intellectual, emotional and material resources to encourage their followers to translate their innovative ideas into tangible outcomes. Being supportive also requires leaders' quick responses to followers' difficulties. For example, technical issues taking place

during telecommuting can produce a lot of complaints. Leaders should clear those procedural and technical barriers for followers to play their talents. Finally, establishing emotional bonds with followers is a significant part in the remote work environment. Leaders can periodically have informal conversations with followers (both online and offline) to identify if there are any sources of resistance or stressors.

6 Limitations and Scope for Future Research

Some limitations of this study still remain. First, more than 50% of samples of the research are people at the age of 18–29 and nearly 25% of samples are education practitioners, which reduces the external validity of the study. Age has been found to influence individual preferences to telecommuting, with older people showing less preference to it [47]. Education practitioners may be not so representative in contrast to ones in IT industry in which telecommuting is more popular and innovative pressure is greater. Therefore, it would be essential for future research to have samples with a fair demographic structure and narrow the industry to the innovation-oriented one. Second, due to objective limitations, the study conducted surveys only on employees, and they were required to make evaluations for both their own behaviors and their leaders', which introduced problems of bias and social desirability. Future research can distinguish leaders and followers respondents to involve both self-report and other-report questionnaires for improving validity.

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