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The influence of flexible work arrangements on innovative employee behaviour in China: a perspective of person-job fit

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ABSTRACT

Using the perspective of person-job fit, this study identifies the heterogeneous effects of flexible work arrangements on innovative employee behaviour. Applying polynomial regression with response surface analysis, this study analyses a sample of 315 paired executives and employees from 26 IT enterprises in China. The research finds that (1) the level of innovative employee behaviour is higher when the organizational supply for flexible work fits their needs and the organizational demand for flexible work fits their ability than when they are incorrectly fit. (2) A higher level of supply-need fit leads to a higher level of innovative employee behaviour. (3) The level of innovative employee behaviour approaches its summit when the demand-ability fit is at the moderate level.

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innovative employee
behaviour; flexible work;
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Introduction

Nowadays, owing to a complex and changeable policy environment and technological blockades from developed countries (Chen et al. 2019), Chinese enterprises are facing a series of uncertainties (Wei, Yang, and Han 2021). To cope with these uncertainties and obtain sustainable competitive advantage, Chinese entrepreneurs need to stimulate innovative employee behaviour in a continuous way and implement effective innovation strategies (Pang and Plucker 2013). Flexible work, as a work arrangement that attracts or retains talent and promotes employees' creativity (Azar, Khan, and Van Eerde 2018), has drawn great attention from contemporary Chinese enterprises (Raghuram and Fang 2014). During the COVID-19 pandemic in particular, flexible work arrangements have been widely implemented in China. However, despite the popularity of flexible work in the Western literature, the issue of how to design flexible work in order to stimulate innovative employee behaviour in the context of China is still overlooked (Long, Kuang, and Buzzanell 2013). Furthermore, some studies have shown that flexible work arrangements are affected by cultural factors such as individualism-collectivism, power distance, uncertainty avoidance, etc. (Masuda et al. 2012; Raghuram, London, and Larsen 2001). However, since there are significant cultural differences between the East and the West (Hofstede 2001), the question of whether

the existing findings about flexible work research are applicable to Chinese enterprises remains unanswered. Therefore, an exploration of the relationship between flexible work arrangements and innovative employee behaviour in the context of China is necessary.

Extant studies have found that flexible work time and location elasticity give employees more job discretion, which can promote intrinsic motivation and creative activities (Coenen and Kok 2014; Sripirabaa and Maheswari 2015). However, other scholars believe that flexible work can also have negative results – such as reduction of social interaction, willingness to share knowledge, and creativity – and hence decreases the likelihood of innovative employee behaviour (Raghuram 1996; Chang, Huang, and Choi 2012). These inconsistent conclusions not only puzzle scholars, but also mislead practitioners. Thus, this paper aims to re-examine the relationship between flexible work arrangements and innovative employee behaviour.

In the classical interaction model of creativity (Woodman and Schoenfeldt 1990), individual innovative behaviour depends not only on the individual but also on the job environment, and cannot be independently examined by individual or organizational factors (Zhou and Hoever 2014). Some studies on person-job fit also hold that a good fit between individual and job environment can induce individual positive results, including innovative behaviour (Shalley, Zhou, and Oldham 2004; Livingstone, Nelson, and Barr 1997), and that an incompatibility between personal characteristics and job characteristics will have negative results (Kristof-Brown, Zimmerman, and Johnson 2005). Moreover, different employees have different preferences for flexible work and different ability levels in terms of successfully implementing flexible work; this results in different innovative outputs (Shockley and Allen 2010). Hence, we could infer that the impact of flexible work on innovative employee behaviour depends on the compatibility of flexible work characteristics and employees' individual characteristics. In other words, the issue of whether the demand for flexible work is commensurate with employees' ability (in brief, demand-ability fit) and whether the supply of flexible work from organizations is commensurate with employees' needs (in brief, supply-need fit) could influence innovative employee behaviour. Meanwhile, existing research on the interaction between individuals and job environment has traditionally used the moderation effect method to analyse the effect of individual and environmental factors on individual behaviours, and this method cannot reflect the differential impact of multiple combinations of individual characteristics and work characteristics on innovative employee behaviour (Shanock et al. 2010). Therefore, it is necessary to apply a new analysis method that can bring a more comprehensive understanding to the relationship between flexible work arrangements and innovative employee behaviour.

Using the perspective of person-job fit and polynomial regression with response surface analysis methodology, this paper identifies the interaction mechanism of individual characteristics and work characteristics on innovative employee behaviour in a nonlinear manner and analyses the heterogeneous effect of flexible work arrangements on this behaviour under different states of supply-need fit and demand-ability fit. By clarifying the relationship between flexible work arrangements and innovative employee behaviour, the findings of this study contribute theoretically to individual innovation research and provide enlightenment regarding a flexible work management practice that encourages innovative behaviour among employees.

Theoretical model and research hypothesis

Theoretical model

Work design has been primarily considered an element that influences employee creativity (Oldham and Cummings 1996; Langfred and Moya 2004; Hammond et al. 2011). Flexible work, as a form of work design, gives employees more options in terms of working hours, workplace, and methods of task performance, and has furthermore been regarded as an effective means to improve employee creativity and innovative behaviour (Kossek, Thompson, and Lautsch 2015; Thurlings, Evers, and Vermeulen 2015). Drawing on the job demand-resource model (JD-R) (Demerouti et al. 2001), some researchers have argued that flexible work can increase employees' work resources by empowering them with more autonomy and thus promoting innovative behaviour (Coenen and Kok 2014; Sripirabaa and Maheswari 2015). Flexible work can also relieve employees' role conflicts and work-family conflicts, and decrease their level of exhaustion, which helps to boost their creativity (Vega 2015). However, some researchers have argued that flexible work has negative effects on innovative employee behaviour due to work resources around autonomy (Langfred 2004; Chang, Huang, and Choi 2012; Wong and Giessner 2018). They have also concluded that demand from flexible work is not always negatively related to innovative employee behaviour (Unsworth and Clegg 2010; Shin, Yuan, and Zhou 2017).

This inconsistency in studies regarding the effect of flexible work on innovative employee behaviour is because the JD-R is confined to job characteristics (Crawford, Lepine, and Rich 2010; Van den Broeck et al. 2013). Therefore, some scholars have called for more consideration of individual diversity in research (e.g. Shockley and Allen 2010; Schaufeli and Taris 2014). Moreover, the form of individual characteristics required for the job characteristics of work resources and work demand is still unclear.

The research on person-job fit has shown that there is a compatible form of individual characteristics and work characteristics. It states that when employees' needs, wishes, and preferences are satisfied by the work performed or when employees' ability, effort, and time meet the demands of this work, employees will produce positive results (Edwards 1991). Integrating these research results with the JD-R model, we can deduce that flexible work is a supply of work resources for employees, its influence on innovative employee behaviour depends on their needs, and that the influence of flexible work demand on this behaviour depends on employees' ability to perform the work. Thus, this study, in respect of supply-need fit and demand-ability fit, establishes a relationship between flexible work arrangements and innovative employee behaviour by dividing the supply-need fit and the demand-ability fit into different states respectively, as shown in Figure 1.

As can be seen in Figure 1, the supply-need fit for a flexible work combination is divided into four states: high supply-high need fit, low supply-low need fit, over-supply, and under-supply. The demand-ability fit for a flexible work combination is divided into a further four states: high demand-high ability fit, low demand-low ability fit, over-demand, and under-demand. The different state of supply-need fit implies the extent to which employees' needs are met by the supply of flexible work, and the different state of demand-ability fit implies the extent to which employees' ability meets the demand of flexible work. Thus, this study proposes that employees experiencing different states of supply-need fit and demand-ability fit for flexible work will have different levels of innovative behaviour. By analysing the heterogeneous effects of flexible work on

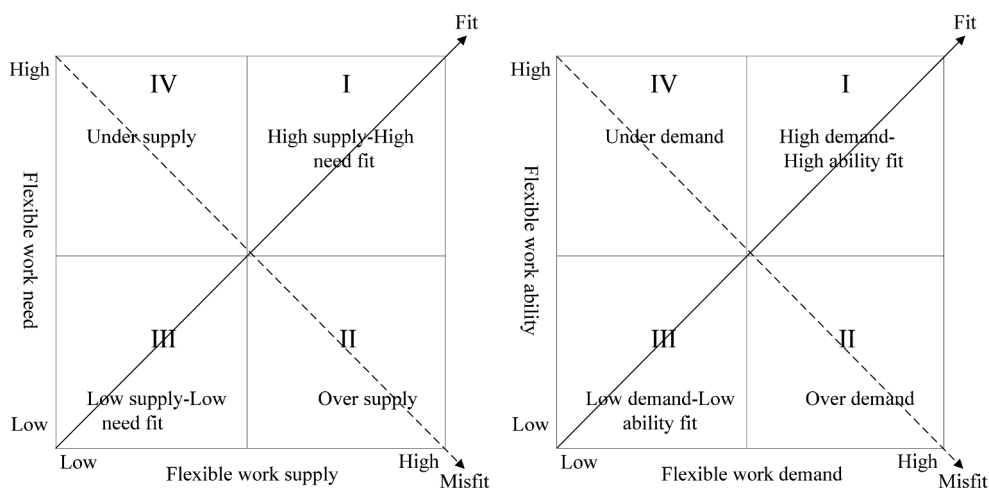


Figure 1. The fit patterns of supply-need and demand-ability for flexible work.

innovative employee behaviour under different states of supply-need fit and demand-ability fit, this study clarifies the complex relationship between flexible work arrangements and innovative employee behaviour. The research model is illustrated in Figure 2.

Influence of flexible work supply-need fit on innovative employee behaviour

One of the important means of promoting innovative employee behaviour is stimulating their intrinsic motivation (Amabile 1997; Hammond et al. 2011). Relevant studies have pointed out that, by improving employees’ sense of work autonomy, flexible work supply can improve their responsibility and intrinsic motivation to complete tasks (Joo, Yang, and Mclean 2014; Vega 2015). Furthermore, the implementation of flexible work also improves employees’ initiative and willingness to take independent risks, which makes them more willing to try other, more efficient, working methods and thus produce creative output (Sripirabaa and Maheswari 2015).

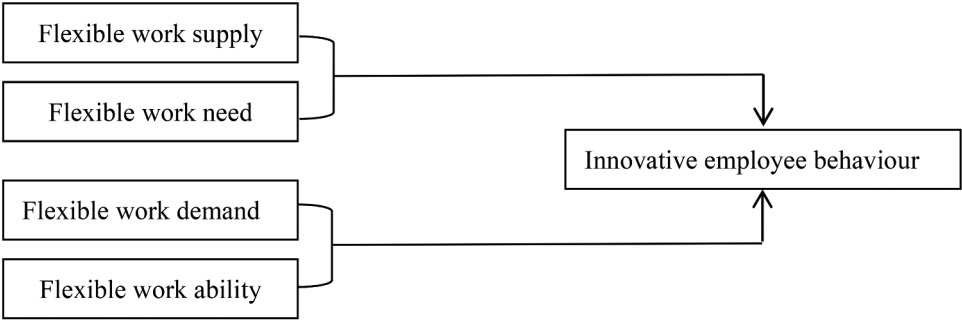


Figure 2. Research model.

However, other studies have suggested that flexible work does not always have a positive impact on innovative employee behaviour, and in some cases may have a negative effect. For example, Chang, Huang, and Choi (2012) found that employees with high work autonomy did not display more innovative behaviour, while some with low task autonomy showed higher creativity. Wu, Parker, and De Jong's (2014) study further found that the effect of flexible work on employees' innovative activities was not significant.

To explain the above inconsistent research conclusions, drawing upon studies on person-job fit (Edwards 1991) and the interaction model of creativity (Woodman and Schoenfeldt 1990), this paper analyses the impact of flexible work on innovative employee behaviour in terms of both supply of work and needs of employees. According to the self-determination theory (Deci, Olafsen, and Ryan 2017), an autonomous environment can enhance individuals' internal motivation and level of innovative behaviour by meeting their basic psychological needs. A supply of flexible work can meet employees' need for autonomy to some extent, and this promotes their intrinsic motivation formation and likelihood of innovative behaviour (Parker, Wall, and Jackson 1997; Coenen and Kok 2014). Therefore, it is only when employees have a need for flexible work and this need is satisfied by a flexible work arrangement – as in the case of supply-need fit as shown in quadrant I and quadrant III on the left side of Figure 1 – that a flexible work arrangement can play an effective role in promoting innovative employee behaviour.

In a state of under-supply, employees lack work discretion, as shown in quadrant IV on the left side of Figure 1. Their behaviours are limited by work procedures and methods, and so their innovative ability is stifled (Volmer, Spurk, and Niessen 2012). A low level of flexible work supply will leave employees' needs unsatisfied and result in tension, conflict, and negative emotions due to feelings of unhappiness and dissatisfaction (Edwards, Caplan, and Harrison 1998; Taris and Feij 2001). This psychological resource loss will restrain employees from fully exerting their innovative potential (Chilton, Hardgrave, and Armstrong 2010).

Meanwhile, in a state of over-supply, as shown in quadrant II on the left side of Figure 1, autonomy exceeds employees' needs. This will lead to job-based uncertainty stemming from a lack of supervision and guidance (Warr 1994; Yu and Davis 2016), and become a burden in terms of stimulating innovative employee behaviour (Parker 2007; Buch et al. 2015). Moreover, an excess supply of flexible work also intensifies the role conflict of employees and makes them feel 'blind' to their work or 'not valued' (Wong and Giessner 2018); this is not a conducive state for employees to perform innovative behaviour.

Thus, we propose the first hypothesis:

Hypothesis 1. Compared with the states of under-supply and over-supply, innovative employee behaviour is higher in the state of supply-need fit for flexible work.

According to the expectation theory (Vroom 1964), employees with different degrees of need for flexible work will have different valence in terms of flexible work supply, which will result in a differentiation of cognitive process, psychological state, and behaviour performance. Considering that internal motivation originates from the satisfaction of individual basic needs (Ryan and Deci 2000), when the flexible work needs of employees are met by an organization to a greater extent, they will have higher internal motivation,

and their innovative behaviour will be encouraged. Employees with a high need of autonomy that is met by work design will think highly of the autonomy, have a greater sense of agency (Spreitzer and Sonenshein 2004), and display self-guiding and creativity when resolving problems (Wong, Škerlavaj, and Černe 2017).

However, in the situation that organizations do not provide employees with enough flexible work supply or employees do not have enough flexible work needs, even if the work supply and individual needs match, employees will not have much internal motivation, and will likely have a narrower orientation towards work (Labianca, Gray, and Brass 2000; Parker 2007). In other words, in a state of low supply-low need fit, flexible work arrangements will have less impact on innovative employee behaviour than they will in a state of high supply-high need fit.

Thus, we put forward the second hypothesis as below:

Hypothesis 2. Compared with the state of low supply-low need fit for flexible work, the state of high supply-high need fit for flexible work will result in higher innovative employee behaviour.

Influence of flexible work demand-ability fit on innovative employee behaviour

There are two opposite views on the relationship between job demand and innovative employee behaviour. One is part of the activation theory (Gardner 1990), which suggests that job demand helps employees generate a need for creative solutions and provides employees with cognitive stimulation and incentive arousal necessary for creative thinking, thus enhancing their innovative behaviour (Bunce and West 1995; Janssen 2000). The other view is part of the distraction arousal theory (Teichner, Arees, and Reilly 1963), which asserts that job demand increases employees' work stress. The researchers suggested that if limited resources are used to cope with stress, the available resources for other tasks will be reduced, resulting in a narrow focus of attention, simpler cognitive strategies, and path dependence, which will destroy innovation (Eysenck 1995; Zhang et al. 2017).

Within these two inconsistent views, some scholars have proposed that the relationship between job demand and innovative employee behaviour depends on the degree and the nature of job demand (Amabile et al. 1996; Byron, Khazanchi, and Nazarian 2010; Crawford, Lepine, and Rich 2010). Amabile et al. (1996) suggested that moderate job demand could promote creativity and innovative behaviour among employees. Other scholars believe that if individuals evaluate job demand not as a challenge but as a hindrance, they will actively implement innovative behaviours in order to deal with it (Crawford, Lepine, and Rich 2010; Ren and Zhang 2015).

In light of the above arguments, the degree and the nature of flexible job demand affect the relationship between flexible job demand and innovative employee behaviour. However, the evaluation of the degree and the nature of flexible work demand is affected by employees' ability to perform flexible work, because this ability gives them a unique cognition of job demand (Crawford, Lepine, and Rich 2010). Employees do not consider flexible work to be an overload or a hindrance when their ability matches the demand of the flexible work, and they adjust their creative level according to the work demand in order to correspond to task requirements (Bunce and West 1995; Choi 2004). Employees whose ability matches the demand of their work are thought to have enough

comprehension and resources to meet their work demand, and have strong endowment in innovative process management (Huang, Yuan, and Li 2019), positive affectivity, and intrinsic motivation, resulting in more innovative behaviours (Afsar, Badir, and Khan 2015). Therefore, in states of demand-ability fit (as shown in quadrant I and quadrant III on the right side of Figure 1), the flexible work arrangement will play an effective role in promoting innovative employee behaviour.

As shown in quadrant II on the right side of Figure 1, in a state of over-demand for flexible work, the excessive work demand will give rise to employee work stress, more resources will need to be put into the stress response, and the cognitive resources needed for innovative behaviour will be encroached upon. Obviously, this is not beneficial for the cultivation of employees' competence in risk-taking, alternative thinking, and problem-solving (Choi 2004). The excessive work demand also aggravates employees' risk perception of innovative behaviour and passive coping styles, such as risk aversion and compliance with conventions (Choi and Price 2005; Luthans et al. 2007). Employees will find it difficult to achieve the expected positive results and reduce the self-efficacy of their innovation if their ability does not match the demand of flexible work (Yuan and Woodman 2010; Byron, Khazanchi, and Nazarian 2010; Shin, Yuan, and Zhou 2017).

However, as shown in quadrant IV on the right side of Figure 1, in a state of under-demand for flexible work, insufficient job demand will discourage employees from generating the cognitive stimulation and motivation arousal necessary for creative thinking (Choi 2004). That is, a situation where employees can easily cope with flexible work demand without needing to find creative solutions is not conducive to the generation of innovative behaviour. Livingstone, Nelson, and Barr (1997) and Crawford, Lepine, and Rich (2010) also showed that a situation where employees' ability exceeds the demand of their work will harm their perceived work meaning. The perception of work meaning is an important aspect that stimulates innovative employee behaviour (Zhang and Bartol 2010).

Thus, the following hypothesis is put forward:

Hypothesis 3. Compared with the states of under-demand and over-demand, innovative employee behaviour is higher in the state of demand-ability fit for flexible work.

As mentioned above, a certain degree of work demand is helpful, as it stimulates employees' intrinsic motivation and triggers innovative behaviour. Therefore, employees with a higher level of demand-ability fit will perform a higher level of innovative behaviour. However, according to the activation theory (Gardner 1990), when activation is at the moderate level, the individual is assumed to be the 'best stimulus', because the moderate activation level matches the 'characteristic' activation level, which can maximize the use of cognitive resources for the most creative endeavours. By the same token, either too much or too little job demand will deviate from employees' feature activation level and result in cognitive interference or lack of participation, which is not conducive to complex tasks such as creative activities (Baer and Oldham 2006; Byron, Khazanchi, and Nazarian 2010). Although employees' work ability can buffer the negative effects of high job demand to a certain extent, as resource conservation theory has pointed out (Hobfoll and

Ford 2007), resource loss is more prominent than resource retention in both the degree and the speed of its impact on individuals' behaviour. Thus, employees' ability cannot completely offset the negative effects of high job demand. Therefore, we deduce that a high level of demand-ability fit is not the optimal state for innovative employee behaviour. Moreover, drawing on Warr and Bryan (1987) vitamin model, De Jonge and Schaufeli (1998) also found that either an insufficient or an excessive demand of work will make employees feel anxious and emotionally exhausted, even if the demand matches the employees' ability. These negative emotions are not conducive to employees performing creative activities (Zhou and Hoever 2014; Hammond et al. 2011).

Based on the above analysis, we can deduce that an excessively high or low level of demand-ability fit for flexible work may result in suboptimal stimulation. However, in a state of moderate level demand-ability fit, innovative employee behaviour may approach its highest.

Thus, we propose hypothesis 4:

Hypothesis 4. In contrast to the states of low level and high level of demand-ability fit for flexible work, moderate level of demand-ability fit for flexible work causes innovative employee behaviour to approach its highest.

Research design

Research methods

Response surface analysis, an emerging technology that draws the results of polynomial regression in three-dimensional space, ascertains the relationship between the combination of two predictor variables and a result variable and has more explanatory potential (Shanock et al. 2010). Therefore, this study applied polynomial regression with response surface analysis in order to characterize the impact of both supply-need fit and demand-ability fit for flexible work on innovative employee behaviour. The basic research steps followed this process:

First, a polynomial regression equation including job characteristic variable X , individual characteristic variable Y , their square terms X^2 and Y^2 , their product term $X*Y$ and result variable Z are constructed as formula (1):

$$Z = a_0 + a_1X + a_2Y + a_3X^2 + a_4X * Y + a_5Y^2 + e_z \quad (1)$$

To obtain the regression coefficients, the variables of centralizing and regression analysis are used. With the help of a three-dimensional response surface graph, the three-dimensional relationship among job characteristic variable X , individual characteristic variable Y and result variable Z is visualized. The first step of the polynomial regression with response surface analysis is to use the slope and curvature of the equation $X = -Y$ to judge the state difference of Z when X and Y are at mismatched levels. The second step is to use the slope and curvature of the equation when $X = Y$ to judge the state difference of Z when X and Y are at matched levels.

Then, when the job characteristic variable X and the individual characteristic variable Y are mismatched, that is, $X = -Y$, the formula (1) can be transformed into:

$$Z = a_0 + (a_1 - a_2)X + (a_3 - a_4 + a_5)X^2 + e_+ \quad (2)$$

If the slope $m_1 = a_1 - a_2$ is significant and positive, it indicates that the combination of high X -low Y has a higher effect on Z than the combination of low X -high Y . If the curvature $m_2 = a_3 - a_4 + a_5$ is significant, it shows that the mismatch level between X and Y takes the form of a curvilinear relationship with Z . If m_2 is positive, it indicates that the curvilinear relationship is U-shaped and the influence of the mismatch level between X and Y on Z is small when X and Y are close to each other. If m_2 is negative, it indicates that the curvilinear relationship is inverted U-shaped and the influence of the mismatch level between X and Y on Z is large when X and Y are close to each other.

Similarly, when the job characteristic variable X and the individual characteristic variable Y are matched, that is, $X = Y$, the formula (1) can be transformed as follows:

$$Z = a_0 + (a_1 + a_2)X + (a_3 + a_4 + a_5)X^2 + e_- \quad (3)$$

If the slope $n_1 = a_1 + a_2$ is significant and positive, it indicates that the influence of the match level between X and Y on Z is positive. If the curvature $n_2 = a_3 + a_4 + a_5$ is significant, it means that the match level between X and Y takes the form of a curvilinear relationship with Z . If n_2 is positive, it indicates that the curvilinear relationship is U-shaped; if n_2 is negative, it indicates that the curvilinear relationship is inverted U-shaped. It is at the moderate match level that the influence approaches its highest.

Variable measurement

In order to overcome the defect of direct measurement with high consistency deviation (Edwards 2002), this study has adopted an indirect measurement method for both the supply-need fit and the demand-ability fit of flexible work by evaluating the degree of perception among employees of the need, supply, demand, and ability of flexible work respectively. Based on the research of Gainey and Clenney (2006) and Matthews, Barnes-Farrell, and Bulger (2010), this study has designed three questionnaire items on *flexible work supply*, e.g. 'I can control the hours, location and method in my work', and three questionnaire items on *flexible work need*, e.g. 'It's very important for me to control my work hours, location and method'. Furthermore, referring to Bledow's (2010) research, we also designed three questionnaire items on *flexible work demand*, e.g. 'In order to complete the flexible work demands of the organization, some knowledge and technical ability are required', and three questionnaire items on *flexible work ability*, e.g. 'I have the knowledge and technical ability to complete the flexible work objectives'. All items in the questionnaire were rated on a seven-point scale, from 1 (totally inconsistent) to 7 (totally consistent).

In terms of *innovative employee behaviour*, Scott and Bruce (1994) developed a scale including six items: creative search, creative generation, creative promotion, seeking implementation resources, creative implementation, and overall innovative perception. This study used this scale to measure innovative employee behaviour according to their supervisor's evaluation from six questionnaire items, such as 'The employee often produces some creative ideas'. All items were rated on a seven-point scale, from 1 (strongly disagree) to 7 (strongly agree).

Control variables

Following extant research (Hammond et al. 2011; Thurlings, Evers, and Vermeulen 2015), this study takes employees' gender, age, education, tenure and work intensity as control variables. Gender and education were assigned respective dummy variables: 0 for male and below junior college level; 1 for female and above junior college level. The age, tenure, and work intensity of employees were segmented and rated on a five-point scale; the higher the score, the higher these attributes.

Data collection

Data were collected in March, 2019 by questionnaire survey, and the entire process followed strict voluntary and confidentiality principles. As the pioneering region of reform and opening up in China, the Yangtze River Delta is one of the country's most developed regions, and the management practices and experiences of enterprises located in this area have a high representative nature and reference value for enterprises in other regions of China. Due to the nature of their jobs and the composition of their human capital, IT enterprises are likely to offer the greatest range of flexible work arrangements (Sweet et al. 2014). In view of the degree of development of flexible work and the important role played by innovative employee behaviour in the IT industry, this study adopted the method of field investigation by visiting a total of 26 IT enterprises in the Yangtze River Delta of China.

First, with the help of the human resource managers in the participating enterprises, we invited 355 employees who worked flexibly and the 86 supervisors who supervised these 355 employees to answer our initial questionnaire. Following this, 355 further questionnaires were distributed to the 86 supervisors in order for them to evaluate their employees' innovative behaviour constructs. Through prior contact, we ensured that the 355 supervisor questionnaires were all returned. The average number of subordinates rated by supervisors was four. Another 355 questionnaires were distributed to the 355 employees to measure the constructs of flexible work need, flexible work supply, flexible work demand, and flexible work ability. Overall, 91% of employees responded to our survey, totalling 323 employee respondents. Finally, after receiving the returned questionnaires, we matched employee-supervisor pairs based on the confidential codes on the questionnaires and deleted invalid questionnaires (such as items filled in with multiple blanks or the same score, etc.). This procedure resulted in 315 pairs of data. The sample effective rate was 88.7%. The final sample of employee respondents consisted of 154 men (48.89%) and 161 women (51.11%).

Empirical analysis

Reliability and validity analysis

The reliability and validity of measurement indicators of variables are listed in Table 1. The Cronbach's α values for each construct in this study are greater than 0.7, which means all scales have good reliability. The factor loading corresponding to all measurement items is generally above 0.6, except for item 6 of innovative

Table 1. Reliability and validity of measurement indicators.

Variables	Indicators	Factor loading	Cronbach's α	CR	AVE
Flexible work supply	FWS 1	0.802	0.705	0.836	0.628
	FWS 2	0.809			
	FWS 3	0.769			
Flexible work need	FWN 1	0.808	0.704	0.835	0.630
	FWN 2	0.782			
	FWN 3	0.787			
Flexible work demand	FWD1	0.778	0.719	0.821	0.605
	FWD2	0.807			
	FWD3	0.748			
Flexible work ability	FWA1	0.826	0.708	0.840	0.639
	FWA2	0.863			
	FWA3	0.699			
Innovative employee behaviour	IEB 1	0.756	0.777	0.889	0.577
	IEB 2	0.685			
	IEB 3	0.854			
	IEB 4	0.843			
	IEB 5	0.816			
	IEB 6	0.559			

employee behaviour (0.559). The AVE values are greater than 0.5, and the CR values are greater than 0.8, which indicate that all scales have good convergent validity. To ensure the scales had good content validity, they were all adopted from mature literature. Foreign language scales were translated into Chinese and English in a parallel and double-blind way, and were checked and tested by experts to ensure that the scale had good content validity.

The discriminant validity among constructs was tested by confirmatory factor analysis. The five-factor model has a better model fitting degree than other competitive factor models, and its adaptation indexes such as $\chi^2/df(2.023)$, $CFI(0.940)$, $TLI(0.927)$, $SRMR(0.043)$ and $RMSEA(0.057)$ achieve a better level, which indicates that the latent variables used in this study have a good discriminant validity.

Descriptive statistics and correlation analysis

The descriptive statistics and correlation coefficients are shown in Table 2. Employee age is negatively correlated with flexible work supply, flexible work need, and innovative employee behaviour, which indicates that young employees might have more need for flexible work and perform more innovative behaviour. Education level is positively correlated with flexible work ability and innovative employee behaviour, which indicates that employees with higher education level might perceive more self-efficacy and perform more innovative behaviour. Flexible work supply, flexible work need, flexible work demand, and flexible work ability are all positively correlated with innovative employee behaviour.

Hypothesis testing

After centralizing the variables, Spss20.0 was used to carry out multiple hierarchical regression analysis. The regression results are shown in Table 3 and visualized through a three-dimensional response surface graph (Figures 3 and 4). The solid

Table 2. Descriptive and correlation statistics analysis.

Variables	Mean	SD	1	2	3	4	5	6	7	8	9
1. Gender	0.511	0.501									
2. Age	1.743	0.570	-0.152**								
3. Education level	0.978	0.148	0.083								
4. Tenure	2.070	0.688	-0.086	-0.160*	-0.134*						
5. Work intensity	3.454	1.065	-0.024	0.056	0.089	0.017					
6. Flexible work supply	5.543	0.904	0.032	-0.129*	0.099	-0.102	-0.020				
7. Flexible work need	5.564	0.892	0.037	-0.136*	0.065	-0.080	-0.035	0.582**			
8. Flexible work demand	5.400	0.968	-0.011	-0.096	0.015	-0.103	-0.069	0.616**	0.673**		
9. Flexible work ability	5.557	0.947	-0.011	-0.066	0.127*	0.023	-0.024	0.569**	0.564**	0.581**	
10. Innovative employee behaviour	5.503	0.808	0.089	-0.119*	0.117*	-0.042	-0.023	0.693**	0.722**	0.686**	0.756**

**Significant at the 0.01 level; *Significant at the 0.05 level.

Table 3. Results of polynomial regression and match effect analysis.

Variables	Innovative employee behaviour				
	Model 1	Model 2	Model 3	Model 4	Model 5
Constant term	-0.570	-0.620*	-0.499	-0.257	-0.127
Gender	0.131	0.110	0.128*	0.132*	0.155*
Age	-0.236	-0.051	-0.033	-0.094	-0.077
Education	0.806*	0.455*	0.423*	0.213	0.204
Tenure	0.096	0.100	0.082	0.042	0.035
Work intensity	-0.021	0.001	-0.005	0.017	0.016
Flexible work supply		0.532**	0.379**		
Flexible work need		0.456**	0.497**		
Flexible work supply ²			-0.068*		
Flexible work supply *Flexible work need			0.063		
Flexible work need ²			-0.062*		
Flexible work demand				0.392**	0.305**
Flexible working ability				0.554**	0.483**
Flexible work demand ²					-0.129**
Flexible work demand *Flexible working ability					0.097*
Flexible working ability ²					-0.084**
R ²	0.036	0.634	0.652	0.672	0.695
F	2.278*	79.308**	57.032**	89.800**	69.389**
X = -Y slope test ($a_1 - a_2$)			0.118		-0.178*
X = -Y curvature test ($a_3 - a_4 + a_5$)			-0.193*		-0.310**
X = Y slope test ($a_1 + a_2$)			0.876**		0.788**
X = Y curvature test ($a_3 + a_4 + a_5$)			-0.067		-0.116**

In model 3, X represents flexible work supply, Y represents flexible work need; a_1 to a_5 successively represents the polynomial regression coefficient of flexible work supply, flexible work need, the square term of flexible work supply, the product term of flexible work supply and flexible work need, and the square term of flexible work need. In model 5, X represents flexible work demand, Y represents flexible work ability; a_1 to a_5 successively represents the polynomial regression coefficient of flexible work demand, flexible work ability, the square term of flexible work demand, the product term of flexible work demand and flexible work ability, and the square term of flexible work ability.

**Significant at the 0.01 level; *Significant at the 0.05 level.

line on the bottom of these figures ($X = Y$ line) runs between two points that represent low-low fit and high-high fit of supply-need and demand-ability respectively; the dotted line on the bottom (the $X = -Y$ line) runs between two points that represent low-high misfit or high-low misfit of supply-need and demand-ability respectively.

According to the correlation slope and the curvature test of model 3 in Table 3, the curvature (-0.193 , $p < 0.05$) is significantly less than 0 under the mismatch state ($X = -Y$), which indicates that the misfit between flexible work supply and flexible work need takes the form of an inverted U-shaped relationship with innovative employee behaviour. It can be seen in Figure 3 that the three-dimensional response surface is a concave surface, curving downwards along the misfit line (the dotted line on the bottom). Innovative employee behaviour approaches its highest (e.g. point C, which is higher than point A and point B) when flexible work need and flexible work supply are close to their fit states. Thus, hypothesis 1 is supported.

Under the match state ($X = Y$), the slope (0.876 , $p < 0.01$) is significantly positive, but the curvature (-0.067 , $p = 0.38$) is not significant, which indicates that the supply-need fit for flexible work and innovative employee behaviour takes the form

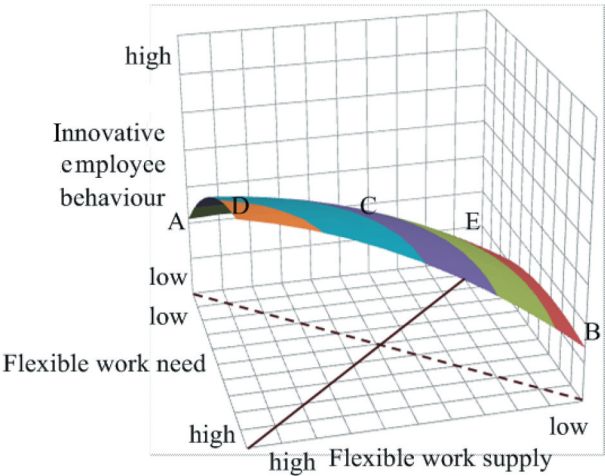


Figure 3. Flexible job supply-need fit and innovative employee behaviour.

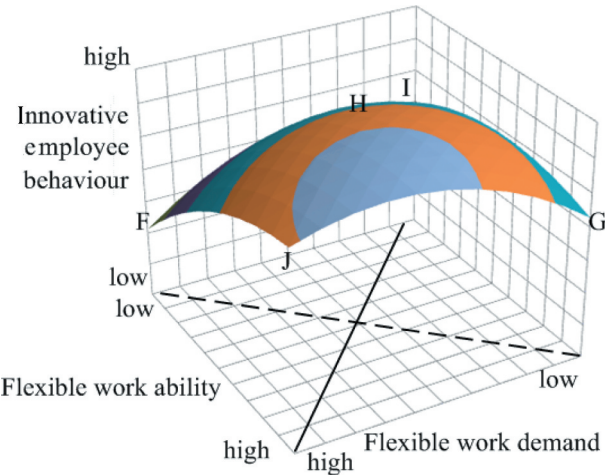


Figure 4. Flexible job demand-ability fit and innovative employee behaviour.

of a linear relationship. It can be seen in [Figure 3](#) that the three-dimensional response surface slopes downwards along the fit line (the solid line on the bottom). This means that compared with the low level of supply-need fit, a high level of supply-need fit raises employees' level of innovative behaviour (point D is higher than point E), so hypothesis 2 is supported.

According to the correlation slope and the curvature test of Model 5 in [Table 3](#), the curvature (-0.310 , $p < 0.01$) is significantly less than 0 under the mismatch state ($X = -Y$), which indicates that the misfit between flexible work demand and flexible work ability takes the form of an inverted U-shaped relationship with innovative

employee behaviour. It can be seen in [Figure 4](#) that the three-dimensional response surface is a concave surface, and curves downwards along the misfit line (the dotted line on the bottom). This means that innovative employee behaviour approaches its highest (e.g. point H, which is higher than point F and point G) when flexible work demand and flexible work ability are close to their fit states. Thus, hypothesis 3 is supported.

Under the match state ($X = Y$), the slope (0.788, $p < 0.01$) is significantly positive, but the curvature (-0.116 , $p < 0.01$) is significantly less than 0, which indicates that the fit between flexible work demand and flexible work ability takes the form of an inverted U-shaped relationship with innovative employee behaviour. It can be seen in [Figure 4](#) that the three-dimensional response surface is a concave surface, and curves downward along the fit line (the solid line on the bottom). This means that with an increase in the degree of demand-ability fit, innovative employee behaviour first exhibits an upward trend (e.g. from point I to point H), but then declines (e.g. from point H to point J) as the degree of demand-ability fit goes beyond a certain point (e.g. point H). Therefore, we conclude that in a state of moderate demand-ability fit (such as point H), the level of innovative employee behaviour is at its highest, so hypothesis 4 is verified.

Discussion

This paper has identified the interaction mechanism of individual characteristics and work characteristics on innovative employee behaviour and analysed the heterogeneous effect of flexible work arrangements on this behaviour under different states of supply-need fit and demand-ability fit. The findings are as follows: first, when the organizational supply for flexible work matches the needs of employees, the level of innovative employee behaviour is higher than when there is a mismatch. Second, when the ability of employees fits the organizational demand for flexible work, the level of innovative employee behaviour is higher than when there is a misfit. Third, there are differences in the effects of supply-need fit and demand-ability fit at different fit levels on innovative employee behaviour. Specifically, as with the supply-need fit for flexible work, a higher level leads to a higher level of innovative employee behaviour. As for demand-ability fit, neither a high nor low level is the optimal choice for innovative employee behaviour; the level of this behaviour approaches its highest when there is a moderate level of demand-ability fit.

Implications

Theoretical implications

This study provides a meaningful expansion of the existing related research in three aspects. First, the study has developed a research framework for the relationship between flexible work arrangements and innovative employee behaviour. By introducing supply-need fit and demand-ability fit for flexible work into the research framework, the contingency effect of individual characteristics on the relationship between job characteristics and individual innovative behaviour is verified (Shockley and Allen 2010; Van den Broeck et al. 2013).

Second, this study explores the influence of supply-need fit and demand-ability fit for flexible work on innovative employee behaviour, which corresponds with the perspective of interactionists in terms of individual innovation (Shalley, Zhou, and Oldham 2004; Woodman and Schoenfeldt 1990). Additionally, the findings of a nonlinear mechanism behind the relationship between flexible work arrangements and innovative employee behaviour provide a reasonable explanation for the inconsistency of results in extant research regarding the relationship.

Third, this study has tested whether supply-need fit and demand-ability fit, or misfit, and their level of fit for flexible work have different influences on innovative employee behaviour. The research conclusion breaks through the simple proposition of 'outcomes are most optimal when personal attributes and environmental attributes are compatible regardless of the level of these attributes' (Van Vianen 2018) and provides further insight into the impact mechanism of person-job fit on individual innovative behaviour.

Management implications

The results of this research indicate that organizations can stimulate innovative employee behaviour by increasing the level of supply-need fit and creating a moderate level of demand-ability fit for flexible work. In order to increase the level of supply-need fit, organizations should take initiative to improve the flexible work supply and cultivate the flexible work need. In order to do this, organizations could first optimize the supply conditions of flexible work, reduce process control and intervention, give employees more right to self-determination, and avoid them falling into the 'autonomy control paradox' (Putnam, Myers, and Gailliard 2014). Second, organizations could establish a regular communication system and create an inclusive organizational culture in order to abate the social isolation and career threat perception of flexible employees and improve their need for flexible work in a more continuous way.

In order to create a moderate level of demand-ability fit and thus achieve the best level of innovative employee behaviour, flexible work arrangements should vary from person to person. For employees with high ability, organizations should provide them with more challenges by increasing their flexible work demand. For employees with low ability, organizations could take a series of support measures to cut down their work requirements and increase their ability. It is worth noting that under the moderate level of demand-ability fit, the level of innovative employee behaviour is at its highest, which shows that no matter how high the ability of employees, excessive flexible work requirements may not be the best choice for organizations.

Limitations and future directions

There are several limitations that should be addressed and overcome in future research. First, due to the availability of data, the sample size of this study is limited, with the responding enterprises all originating from the Yangtze River Delta region of China including the Jiangsu and Anhui provinces; this affects the representativeness of the research conclusions. Second, the study only controlled for demographic variables such as gender, age, education, tenure, and work intensity. Some relevant organizational

factors were ignored, such as organizational climate, organizational culture, and leadership style, all of which may affect innovative employee behaviour; this may have affected the accuracy of the research conclusions to a certain extent. Third, this study has only explored the impact of flexible work on innovative employee behaviour at the individual level. Future research, in addition to expanding the sample area and capacity and strengthening the comparison and subdivision of different types of flexible work, should include cross-level research and explore the role of relevant team and organizational factors in the relationship. Finally, innovative employee behaviour has dual characteristics of exploration and exploitation, and the influence of flexible work arrangements on these different characteristics call for further research.

Conclusion

At present, in order to improve organizational innovation capability and adaptability in line with the ever-changing environment, more and more enterprises are beginning to change their employees' working practices from traditional methods to something more flexible. However, the relationship between flexible work arrangements and innovative employee behaviour is controversial in existing research. Using the perspective of person-job fit, this paper has identified the heterogeneous effects of different combinations of flexible work supply-need fit and demand-ability fit on innovative employee behaviour and clarified the complex relationship between flexible work arrangements and innovative employee behaviour. The findings of the study have made a literature contribution and the methodology used has reference value for similar research on the interaction between individual characteristics and environmental characteristics.

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