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How does organizational support for creativity affect research and development (R&D) employees' innovative behavior?

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Abstract: Purpose: This study aimed to investigate the relationships among organizational support for creativity, employees' creative self-efficacy, job satisfaction, and employees' innovative behavior in the Chinese pharmaceutical manufacturing industry. **Design/methodology/approach:** A quota sample ($n = 385$) and a quantitative research methodology were employed in this study. Data from R&D staff at Chinese pharmaceutical manufacturing companies was gathered using an online survey. The study examined the validity and reliability of the measuring tools as well as the variables' correlation analysis. Using structural equation modeling (SEM), hypotheses were investigated. The specific indirect impacts were quantified through the use of bootstrapping. **Findings:** The investigation indicates that organizational support is positively related to employees' innovative behavior. Employee inventive behavior and organizational support for creativity are positively impacted by the twin mediation roles that creative self-efficacy and work satisfaction levels play. Job satisfaction was found to have a greater impact on inventive behavior among employees compared to creative self-efficacy in terms of size. **Research, practical, and social implications:** In addition to fostering the interdisciplinary application of psychology and organizational behavior, this study creates a dual-mediation model that bridges the gap in the mechanisms of individual cognitive and attitudinal roles between organizational support for creativity and employee innovative behavior. Furthermore, this research advances management strategies and fosters innovation in the pharmaceutical manufacturing sector. **Originality/value:** From the perspective of individual perceptions and attitudes, this study examined the mechanism of action between employees' innovative behaviors and the organizational support for creativity among employees. This investigation offers a fresh viewpoint on the factors influencing employees' innovative behaviors. The research enhances our comprehension of the correlation between employee job contentment, their belief in their creative abilities, and their capacity for innovative performance. The outcomes of the study can offer valuable perspectives for executives in the business realm.

Keywords: organizational support for creativity; creative self-efficacy; job satisfaction; innovative behavior

1. Introduction

The field of pharmaceutical manufacturing plays a crucial role in both the national economy and the health of individuals (Milanesi et al., 2020; W. Chen et al., 2010). The drugs developed by these companies are essential for preventing and treating diseases (Wu et al., 2020), and the growing demand for drug diversification presents new opportunities for the market (Jakovljevic et al., 2021). Some consumers seek newer or more effective treatments to maintain their health (Jiang et al., 2022). Unfortunately, there are significant barriers to curing certain diseases, such as

Alzheimer's and cancer, which continue to affect many people worldwide (Debela et al., 2021; Sharma et al., 2019). To remain competitive, the pharmaceutical manufacturing industry must innovate to meet evolving market demands (Hering et al., 2018). However, despite decades of growth, the industry faces challenges in maintaining innovation efficiency (Laermann-Nguyen and Backfisch, 2021).

China is the second-biggest pharmaceutical market globally, and its development prospects are bright (Jakovljevic et al., 2021). With the increase in government investment in biomedical research, bio-pharmaceutical (biotechnology) companies in China are focusing on developing innovative drugs and expanding their reach to global markets (Chen and Zhao, 2018). China Contract Research Organization (CRO) has integrated China's R&D capabilities to promote global drug innovation (Shi et al., 2014). However, China's pharmaceutical industry is encountering similar obstacles that the global manufacturing industry is facing, such as low productivity and inadequate innovation capacity (Crupi et al., 2022; Zhong et al., 2022).

From an economic standpoint, the effectiveness of enterprise technology can be influenced by biotechnology and R&D inputs (Grant et al., 2020). Significant improvements have been made in drug research and development efficiency due to advances in scientific, technological, and managerial aspects (Scannell et al., 2012). However, pharmaceutical manufacturing is a high-cost, high-risk, high-reward industry (Jambulingam, 2019). In particular, the development of innovative drugs requires significant and long-term expenditures (Jambulingam, 2019). In the pharmaceutical manufacturing industry, creative efficiency is significantly impacted by the process of discovering and developing drugs (Paul et al., 2010). Research and development, as well as innovation, are essential activities for high-tech enterprises, which must survive and grow (Stam and Wennberg, 2009). Key technological advancements, such as drug development, process optimization, quality control, clinical testing, and preparation development, all require the expertise of R&D professionals (Melnychuk et al., 2021; Narayanan et al., 2020; Pudipeddi et al., 2019; Schutte et al., 2017). The innovative behavior of these experts is crucial in driving these changes (Noefer et al., 2009), making it a primary focus of study in the pharmaceutical manufacturing industry.

Employees' innovative behavior contributes to improving enterprise innovation performance and innovation efficiency (Dedahanov et al., 2017; Laily and Ernawati, 2020). High-tech organizations want R&D personnel to make more innovative contributions to the company (Saether, 2019), which requires both creativity and willingness to innovate for employees to participate in innovation efforts (Parjanen, 2012).

Supporting creativity within an organization is a crucial aspect of fostering innovation and demonstrating a culture that values new ideas (Scott and Bruce, 1994). No doubt encouraging creativity among employees can lead to more innovative outcomes (Ibrahim et al., 2016). According to Taylor et al.'s (2020) recent studies, the level of support an organization provides for creativity is directly linked with the level of creative outputs produced. Additionally, this support can positively influence R&D personnel's innovation performance (Alpkan et al., 2010). To stay competitive, organizations need to create an atmosphere that values creative thinking and problem-solving and encourages creativity (Baccarella et al., 2022). Furthermore, studies have

demonstrated the potential influence of individual characteristics on creative behavior in employees, including creative self-efficacy (Sarwoko, 2020) and job satisfaction (Tang et al., 2019).

While there has been significant research on how organizations can foster innovation among their employees, previous research has focused on the impact of the innovation environment and the support provided by organizations for creativity on their employees (Imtiaz et al., 2018; Suifan et al., 2018; Li et al., 2019). However, little research has been done on the specific psychological processes and mindsets that support creative behavior in R&D employees, especially in the pharmaceutical manufacturing sector. This research aims to investigate the linkages among innovative behavior, job satisfaction, creative self-efficacy, and the support provided by organizations for promoting creativity in R&D personnel in the pharmaceutical sector. By shedding light on these mechanisms, this study can provide valuable insights and management practices to improve R&D efficiency and innovation within the pharmaceutical manufacturing industry.

2. Literature review and hypothesis

2.1. Organizational support for creativity and employee innovative behavior

Innovative behavior among employees refers to their significant contribution to the innovation process. This includes generating new ideas, promoting them, and bringing them to life (Scott and Bruce, 1994). Research has shown that such behavior can greatly benefit organizations by introducing new products, devising effective processes, and opening new markets, all of which enhance a company's innovative performance and help it stay competitive (Dedahanov et al., 2017; Laily and Ernawati, 2020; Nasifoglu et al., 2020). However, while many studies focus on innovative ideas, few consider the challenges, risks, stresses, and uncertainties that come with implementing them. Innovation activities can be discouraging and frustrating, especially when they conflict with the goals and interests of other employees, ultimately leading to innovation failure (Eisenberger et al., 2020; Hsu and Chen, 2017). Therefore, employee innovative behavior is crucial throughout the innovation process.

Organizational support for creativity is defined as the organization's encouragement, respect, reward, and acknowledgment of employees who exhibit originality (Eisenberger et al., 2020; Hsu and Chen, 2017). Cultivating an environment that fosters and empowers creative thinking is essential for inspiring employees to be creative (Nili and Tasavori, 2022; Sembiring et al., 2022). Equipping employees with the necessary resources to overcome the challenges of creative pursuits and develop skills to tackle complex tasks is crucial for instilling a sense of value and recognition for their work (Pan et al., 2021). This recognition, in turn, motivates employees to continue to innovate and contribute creatively (Leoni et al., 2022; Suifan et al., 2018). Creativity is a valuable resource that drives innovative behavior and provides a competitive edge for organizations (Amabile et al., 1996; Baccarella et al., 2022; Esguerra et al., 2022).

According to the principle of reciprocity, employees demonstrating positive

attitudes and behaviors are often those who feel backed by their organization (Eisenberger et al., 2020). This is the basis of the notion of organizational support. Research shows that prioritizing employee welfare in organizations enhances their willingness to innovate (M. Yang et al., 2021). Furthermore, rewarding and recognizing employees for their innovative work not only increases their motivation to continue innovating but also improves their creative performance (M. Yang et al., 2021). Workers in the R&D division anticipate that their inventiveness will be appreciated by the company. Once their creativity is recognized, it leads to a stronger personal-organizational fit, which satisfies their intrinsic motivation to work and leads to the performance of innovative behaviors (Saether, 2019). Furthermore, an organizational innovation climate can improve organizational performance by encouraging creative work practices among staff members, according to a study on the relationship between organizational innovation atmosphere and performance (Shanker et al., 2017).

Empirical research has shown that corporate incentives and assistance have a favorable impact on employees' innovative activity. For instance, several research has discovered a strong correlation between employee inventive activity and perceived organizational support. Qi et al.'s (2019) study of 367 managerial and executive employees from Pakistani companies in the IT and manufacturing sectors confirmed this association. Aslan (2019) discovered that perceived organizational support has a favorable impact on employee innovative behavior with 348 participants from a carpet manufacturing company. Similarly, Saether's (2019) research demonstrated that an important element influencing employees' innovative behavior in high-tech businesses is organizational support for creativity. Yildiz et al. (2017) examined 436 workers in the white goods sector and found that employees' innovative activity was positively impacted by perceived organizational support. Moreover, Hsu and Chen (2017) demonstrated a significant positive effect of organizational innovation climate. Thus, we put up the following hypothesis in light of these findings:

H1: Organizational support for creativity can positively influence employee innovative behavior.

2.2. Organizational support for creativity, creative self-efficacy, and employee innovative behavior

2.2.1. Organizational support for creativity and creative self-efficacy

Creative self-efficacy pertains to an individual's belief in their capacity to generate creative results. It represents a distinct form of self-efficacy concentrated on the substance and attributes of creative endeavors. In simpler terms, it measures how confident someone feels about their ability to complete innovative tasks (Tierney and Farmer, 2002, 2011). Individuals with elevated levels of creative self-efficacy tackle demanding tasks with optimism and are inclined toward seeking solutions rather than surrendering to challenges (Beghetto and Karwowski, 2017; Choi et al., 2021). Therefore, just like general self-efficacy, creative self-efficacy is crucial in determining whether someone will attempt a task or avoid it. According to self-efficacy theory, Bandura (1977) suggested that a person's self-efficacy can be triggered via various ways such as mastery experience, alternative experience, social persuasion,

and physiological state. Similarly, these four aspects are also sources of triggering creative self-efficacy (Puente-Díaz, 2016). Past successes can inspire employees to believe in their abilities to accomplish tasks or achieve goals, and thus work harder to achieve a certain level (Webb-Williams, 2018). Individuals can increase their confidence in accomplishing similar tasks by observing others in creative endeavors and learning from the successes of team members (Wilson and Narayan, 2016). To inspire confidence and belief in their success in the innovation field, organizations can show individuals successful role models and offer rewards or publicly praise those who perform creatively (Malik et al., 2015). Additionally, a positive mindset and good physical condition can also increase an individual's creative self-efficacy (M. K. Lee and Oh, 2020). This study argues that companies that reward employees for creative outcomes indicate that the praised employees have acquired the skills and successes needed to accomplish a certain task. This can help prepare them for more challenging tasks in the future (Kong et al., 2019). Additionally, this is a role-modeling behavior aimed at motivating other members and enhancing their confidence in their ability to innovate (Newman et al., 2018). By providing material rewards, such as awards, and non-material support, such as praise, recognition, and encouragement, organizations create an environment that supports innovation (Mbebeb, 2019). This environment meets the requirements for employees to implement innovative behaviors and work in a supportive environment. By doing so, employees will be more confident in their ability to handle innovative work, and they will feel more confident and empowered in their attempts to innovate (Saeed et al., 2019; Teng et al., 2020).

2.2.2. Creative self-efficacy and employees' innovative behavior

Bandura's (1986) social cognitive theory focuses on the influence of various factors on human behavior, such as interactions between behavior, environmental factors, intra-individual cognition, and personal factors. Personal cognition, which mainly consists of personal self-efficacy, plays a significant role in human functioning (Bandura, 1986; Schunk and DiBenedetto, 2020). Although social cognitive theory highlights the relationship between individual behavior, environment, and cognition, human cognition has a considerable impact on one's behavior in social settings.

The innovation climate within an organization is a social resource that employees can utilize while dealing with innovation tasks. Personal positive psychological capital is another resource that comes into play during the innovation process. According to Hsu and Chen (2017), employee behavior and performance are more directly influenced by personal characteristics than organizational innovation climate.

Studies have revealed that creative self-efficacy is a strong predictor of creative performance (Mathisen, 2011). According to Teng et al. (2020), employee innovative behavior in the hospitality sector is positively impacted by creative self-efficacy, particularly in work situations where knowledge sharing is common. Similarly, Akbari et al. (2021) discovered that creative self-efficacy in high-tech SMEs positively influences employees' inventive behavior. This is because individuals with high levels of creative self-efficacy have confidence in their abilities and expertise, which motivates them to act creatively—that is, to generate and implement original ideas at work (Jiang and Gu, 2017).

According to studies, creative self-efficacy is essential for fostering relationships

between people and their surroundings. For instance, research by Hu and Zhao (2016) demonstrated that creative self-efficacy functions as a mediator between an employee's innovative behavior and information sharing. In a similar vein, Sarwoko's (2020) study highlighted the role that creative self-efficacy plays in mediating the relationship between innovative work behavior and entrepreneurial leadership among employees. Additionally, Yang and Zhou (2022) found that creative self-efficacy functions as a mediator in the relationship between organizational support and the creativity of high-tech professionals. People with strong creative self-efficacy are more likely to exhibit positive imaginative behaviors in an organizational setting that fosters creativity (Jaiswal and Dhar, 2015). Our research points out that praising and rewarding the creative work of employees can improve their creative self-efficacy and affect their innovative behavior. Therefore, the following is our hypothesis:

H2: Creative self-efficacy mediates the relationship between organizational support for creativity and employee innovative behavior.

H2a: Organizational support for creativity can positively influence creative self-efficacy.

H2b: Creative Self-Efficacy can positively influence employee innovative behavior.

2.3. Organizational support for creativity, job satisfaction, and employee innovative behavior

2.3.1. Organizational support for creativity and job satisfaction

The overall feeling and evaluation of one's work environment and job attributes, such as coworkers, supervisors, pay incentives, and comfort in promotion jobs, is known as job satisfaction. This variable is one of the most important in improving work performance and influencing the results of various organizations. It has been well-examined in organizational behavior (Bernal et al., 1998; Idris et al., 2020; Murray and Atkinson, 1981; Usmanova et al., 2021). According to Herzberg's "Motivation-Hygiene Dual Factor Theory" (2015), there are two distinct categories of factors that impact an employee's attitude and behavior at work. These factors are motivators and hygiene factors. Motivators include social and psychological elements such as self-worth, personal growth, responsibility, recognition, and opportunities for advancement. When these factors are present, employees feel motivated and satisfied, which improves output job performance, and engagement. Conversely, hygiene factors are objective elements like work environment, management style, company policies, relationships with colleagues, working conditions, compensation, and job security. If these factors are absent or unsatisfactory, employees may feel dissatisfied, but fulfilling these factors alone does not guarantee true job satisfaction. Herzberg emphasized that motivational and hygiene factors are independent of each other. Therefore, to improve job satisfaction, it is crucial to not only enhance the work environment and conditions (hygiene factors) but also provide challenging and meaningful job tasks (motivational factors).

According to Vroom's (1964) expectancy theory, there are two key factors that businesses must meet to inspire employees to work more diligently. First, make sure staff members are aware of the goal of their work and the reason behind their

motivation. This involves communicating the rewards that come with working hard, such as increased compensation, elevated job titles, or personal fulfillment. The second is to foster a belief among employees that they can attain higher goals through their hard work.

Recent research shows that employee motivation, whether intrinsic or extrinsic, can lead to better job performance. Job satisfaction is affected by these motivators in different contexts (Ihensekien and Joel, 2023). For instance, a study of healthcare workers during a crisis found that extrinsic factors like pay, job security, and organizational policies had a more significant effect on job satisfaction than intrinsic factors (Karaferis et al., 2022). According to Bola Avoseh and Marie Giese (2018), a study on non-academic university faculty indicated that overall job satisfaction was determined by achievement, responsibility, acknowledgment, growth and development, and a sense of success. According to another study, success harmed job satisfaction, although acknowledgment and the work nature had a favorable impact (Ann and Blum, 2020). The same study also discovered that employee discontent was caused by elements including work security, personal life, status, and technical supervision. Furthermore, personality factors moderated the association between job satisfaction and an encouraging and rewarding organizational atmosphere (Ahmad et al., 2018). Ozsoy (2022) indicated a significant relationship between job satisfaction and innovation in the corporate environment. Therefore, organizations should target motivation to employees based on the different needs and motivational factors of individuals (Holston-Okae and Mushi, 2018; Ihensekien and Joel, 2023).

2.3.2. Job satisfaction and employee innovative behavior

Knowledge workers' creativity is a vital resource that businesses require to remain inventive and competitive. Fischer, Malycha, and Schafmann (2019) assert that companies depend on their workforce's innovation to introduce novel concepts into the work environment. Prior studies have demonstrated that employee creativity and innovation are significantly impacted by intrinsic motivation (Amabile, 1995). However, as they can strengthen the internal motivation that propels innovation and creativity, extrinsic elements like rewards and recognition are equally crucial for fostering creativity and performance (Amabile and Pratt, 2016; Fischer et al., 2019).

Job satisfaction is pivotal in motivating employees to engage in behaviors that benefit their company (Ali and Anwar, 2021). For instance, Al-event (2018) found that in the telecommunication industry, job satisfaction can boost product and service innovation, and can even serve as a mediator between employee innovative behavior and transformational leadership. Similarly, Tang et al. (2019) investigated the relationship between employee innovative behavior and job satisfaction through the lens of psychological capital. Their findings revealed that increased job satisfaction correlates with a heightened propensity for participating in innovative behavior.

According to Loan (2020), job satisfaction is a crucial link between an organization and its employees' performance. In the IT industry, research by Lee et al. (2011) has shown that unfavorable work environments or insufficient incentives for technological excellence can negatively impact entrepreneurial intentions by reducing job satisfaction. Xerri (2014) has also demonstrated that fair procedures in organizations can enhance nurses' job satisfaction and promote innovative behavior.

Finally, Ganesan and Xu (2019) found that organizations' talent policies can positively influence career satisfaction and foster employee innovative behavior among scientific workers.

According to Ali and Anwar (2021) providing good working conditions and remuneration to support employees' innovative activities can satisfy their extrinsic motivation and maintain job satisfaction. Wen et al. (2019) suggest that employees who feel supported by their organization are more likely to feel satisfied with their work. For knowledge workers, recognition and respect from their organization or team is a key factor in realizing their self-worth. Tang et al. (2019) emphasize that encouraging and recognizing employees who show creativity is crucial in satisfying their intrinsic motivation and promoting innovation. Thus, the present study has put forth the subsequent hypothesis:

H3: Job satisfaction mediates the relationship between organizational support for creativity and employee innovative behavior.

H3a: Organizational support for creativity can positively influence job satisfaction.

H3b: Job Satisfaction can positively influence employee innovative behavior.

The research model is as shown in **Figure 1**.

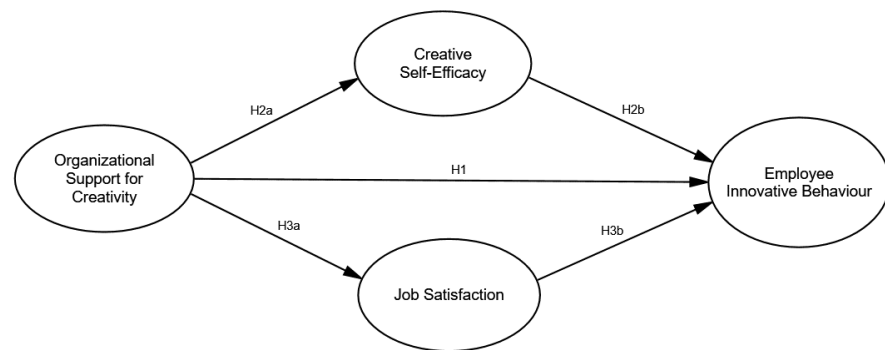


Figure 1. Hypothetical model.

3. Research methodology

3.1. Data and samples

This study used a quantitative methodology, collecting data via an online survey. The web-based survey method proved to be cost-effective with minimal missing data (Ebert et al., 2018). Quota sampling was utilized, initially proportioned according to the number of individuals in various strata of large, medium, and small businesses, followed by a random selection of the desired number of participants in each stratum until the quota was met (Robaee et al., 2018; Sennott and Kane, 2022). Participants were contacted through acquaintances, industry networking groups, and by contacting the human resource management department of the target organization. To reduce common methodological biases, the survey emphasized the anonymity of the study. There were no right or wrong answers to the questions (Podsakoff and Organ, 1986).

With the help of internal staff from the target firms, the survey was completed online. It was distributed to R&D personnel from pharmaceutical manufacturers located in Sichuan province, who possess publicly available R&D teams to advance

their drug development efforts. The survey included 11 large, 27 medium, and 8 small-sized companies, and following the removal of any invalid data, we received 385 valid responses. Among these, 66% were from large enterprises, 31% from medium-sized enterprises, and 3% from small enterprises.

3.2. Measures

3.2.1. Organizational support for creativity

Zhou and George (2001) developed a scale to measure the level of support an organization provides for creativity based on Scott and Bruce' (1994) research. The scale consists of four items (1 = strongly disagree to 5 = strongly agree). Previous studies have demonstrated the scale's reliability with a Cronbach alpha coefficient of 0.95 (Joiner,2007). An example item was "Creativity is encouraged at [company]"

3.2.2. Creative self-efficacy

A scale consisting of eight items, ranging from 1 (strongly disagree) to 6 (strongly agree), was developed and released by Carmeliy and Schaubroeck (2007) and Chen, Gully, and Eden (2001). The scale's Cronbach alpha coefficient was 0.92. One example of an answer was, "I will be able to achieve most of the goals that I have creatively set for myself".

3.2.3. Job satisfaction

A six-item scale (1 =strongly disagree to 5=strongly agree) formulated by Schriesheim and Tsui (1980) was used to measure job satisfaction, yielding an alpha coefficient of 0.73. Previous research by Tsui et al. (1992) has shown a good reliability of the scale, with a Cronbach's alpha coefficient of 0.83. An example item was "I am delighted with my work".

3.2.4. Employment innovative behavior

Employee innovative behavior in the workplace was assessed using a six-item scale devised by Scott and Bruce (1994). The reliability of the scale was confirmed by Hsu and Chen's (2017) earlier research, which yielded a Cronbach's alpha coefficient of 0.907. An illustrative item from the scale was "I search out new technologies, processes, techniques, and/or product ideas."

3.3. Data analysis methods

For this study, we utilized SPSS26.0 software to analyze the demographics of our sample, examine each variable's descriptive statistics, test reliability and validity, and perform correlation analysis. To test our hypotheses, we employed an SEM model through AMOS 24.0 software. SEM models are ideal for analyzing complex relationships between variables, allowing for causal inference, model comparison, and path analysis (Hair Jr et al., 2017; Kline, 2023). This method is often used for testing multiple mediation effects (MacKinnon and Valente, 2014), as was the case in this dual mediator model. We assessed the fit of our data to the model using fit metrics provided by Hu and Bentler (1999) and Byrne (2001). These included the chi-square to degrees of freedom ratio (χ^2/df), root mean squared error of approximation (RMSEA), Tucker-Lewis Index (TLI), Goodness-of-Fit Index (GFI), and Comparative Fit Index (CFI). When RMSEA values were less than or equal to 0.08

and CFI, GFI, and TLI values were greater than 0.90, we considered our model fit to be acceptable.

To effectively assess the importance of each specific indirect effect, this research employed Bootstrapping techniques to confirm the statistical significance of the total, direct, and indirect effects (MacKinnon et al., 2004). To measure multiple mediation models, percentile bootstrapping and bias-corrected bootstrapping are preferred (Hayes, 2009; A. B. Taylor et al., 2008). Following expert recommendations, this study employed a sample of 5000 bootstrap iterations, incorporating 95% confidence intervals for percentile bootstrap and bias-corrected bootstrap methodologies (Ajoudani et al., 2019; Hayes, 2009; MacKinnon et al., 2004; Taylor et al., 2008), calculating confidence intervals for the lower and upper bounds to test for a significant mediating effect (Preacher and Hayes, 2008). Furthermore, to account for any potential common methodological biases, this study conducted a Harman one-way test for all variables (Podsakoff and Organ, 1986).

4. Results

4.1. Demographic characteristics of participants

Table 1. Demographic characteristics of participants.

Attribute	Category	Frequency	Percentage (%)	Attribute	Category	Frequency	Percentage (%)
Gender	Male	174	45.2	Location of the Enterprise	Chengdu	323	83.9
	Female	211	54.8		Deyang	5	1.3
Age (in years)	30 years and under	98	25.5	Enterprise Size	Mianyang	12	3.1
	31–40 years	146	37.9		Neijiang	30	7.8
	41–50 years	80	20.8		Luzhou	10	2.6
	51–60 years	61	15.8		Guang'an	5	1.3
Education	Associate	24	6.2	Enterprise Size	Large	254	66
	Bachelor	136	35.3		Medium	120	31.2
	Master	172	44.7		Small	11	2.9
	Doctor	53	13.8				
Tenure	1–5 years	126	32.7				
	6–10 years	85	22.1				
	11–15 years	82	21.3				
	16–20 years	72	18.7				
	20 years above	20	5.2				

As shown in **Table 1**, participants in this study comprised 45.2% male and 54.8% female respondents. Regarding age distribution, the majority falls within the age groups of 30 years and under, 31–40 years, and 41–50 years, representing 25.5%, 37.9%, and 20.8% respectively. Regarding age distribution, the majority falls within the age groups of 30 years and under, 31–40 years, and 41–50 years, representing 25.5%, 37.9%, and 20.8% respectively. Combining the proportions of those aged 30 and under and 31–40 years, we find that they constitute 63.4% of the population.

Combining the proportions of those aged 30 and under and 31–40 years, we find that they constitute 63.4% of the total. 80% of the participants had either a bachelor’s or master’s degree in hand. Additionally, 13.77% possess doctoral degrees, while 6.23% hold Associate degrees. This suggests that individuals with Bachelor’s and Master’s degrees predominate in the pharmaceutical R&D workforce, with a notable presence of doctoral degree holders, indicating a need for specialized expertise. In terms of work experience, most respondents have 1–5 years (32.7%), 6–10 years (22.1%), or 11–15 years (21.3%) of experience. Geographically, Chengdu City is home to 83.90% of the assessed businesses, suggesting that Sichuan Province’s pharmaceutical industry is primarily centered there. The pharmaceutical industry is primarily centered there.

4.2. Reliability and validity testing

The reliability of the research instruments underwent a thorough evaluation using Cronbach’s Alpha and Composite Reliability (CR), which are conventional metrics used to evaluate the internal consistency of a proposed measurement scale. The results, detailed in **Table 2**, indicate that each construct under investigation surpassed the threshold commonly recommended in scholarly research. The values obtained for Cronbach’s Alpha and CR for each construct demonstrate robust internal consistency, bolstering the validity of the instruments employed in this investigation. To guarantee that the constructions are measured precisely and consistently, strong reliability indicators are essential. This, in turn, lends credibility to the research findings and allows for greater confidence in the subsequent conclusions drawn from the data (Furnell and Larcker, 1981; Taber, 2018). This study’s assessment of convergent validity was conducted meticulously by examining factor loadings, and average variance extracted (AVE) metric, composite reliability (CR). The empirical results, as shown in **Table 2**, consistently reveal that all constructs under investigation surpass the acceptable verge of 0.7 for factor loadings, indicating good convergent validity. Additionally, the CR values exceed the standard criteria of 0.7, indicating the reliability of the constructs. Each construct’s AVE also satisfies the suggested threshold of 0.5, meaning that the constructs adequately reflect variance concerning measurement error. These metrics provide solid evidence of convergent validity, affirming that the constructs are well-defined and that the indicators employed are effectively measuring the same underlying construct. This rigorous validation process ensures the constructs are conceptually sound and contributes to the overall robustness of the study’s theoretical framework. The statistical indicators collectively corroborate the convergent validity of the instruments used in the research (Fornell and Larcker, 1981; Hair et al., 2019; Hair Jr et al., 2017).

Table 2. Reliability and convergent validity.

Variables	Std. Loading	AVE	CR	Cronbach’s Alpha	KMO
OSC	0.757–0.784	0.593	0.854	0.853	0.826
CSE	0.742–0.799	0.592	0.921	0.920	0.943
JS	0.754–0.841	0.620	0.907	0.907	0.913
EIB	0.773–0.794	0.607	0.903	0.903	0.916

Note: OSC, Organizational Support for Creativity; CSE, Creative Self Efficacy; JS, Job Satisfaction; EIB, Employee Innovative Behavior.

The correlation between each latent variable and the square root of the average variance that was extracted from the other latent variables was compared in this study using the methodology suggested by Fornell and Larcker (1981). It is suggested that the measuring structures exhibit discriminant validity by **Table 3**, which shows that all correlations between the pairs of constructs are fewer than the square roots of the average variances recovered for the respective constructs (Fornell and Larcker, 1981).

Table 3. Means, standard deviations, correlations, and discriminant validity.

Variables	M	SD	1	2	3	4
1. OSC	3.309	0.973	0.770			
2. CSE	3.329	0.938	0.378**	0.769		
3.JS	3.298	1.008	0.445**	0.454**	0.787	
4. EIB	3.344	0.990	0.410**	0.421**	0.458**	0.779

Note: OSC, Organizational Support for Creativity; CSE, Creative Self Efficacy; JS, Job Satisfaction; EIB, Employee Innovative Behavior. Diagonal bolding is the square root of the discriminant validity AVE. * $p < 0.05$; ** $p < 0.01$ (two-tailed); N = 385.

4.3. Common method bias

In the present study, the evaluation of common method bias was rigorously addressed through the application of Harman’s one-factor test. This test was conducted by incorporating all pertinent variables and assessing the total variance explained by the first extracted factor. The analytical outcomes of this procedure indicated that the first factor accounted for 38.87% of the total variance. Given that this value is notably below the critical threshold of 50%, the findings suggest that common method bias does not pose a significant threat to the validity of the dataset under investigation. This result lends further credence to the integrity of the study’s findings and supports the conclusion that the observed relationships among variables are not unduly influenced by the potential biases inherent to the method of data collection. The findings lend further credibility to the integrity of the variables and the overall methodological rigor of the study (Podsakoff and Organ, 1986).

4.4. Structural equation modeling

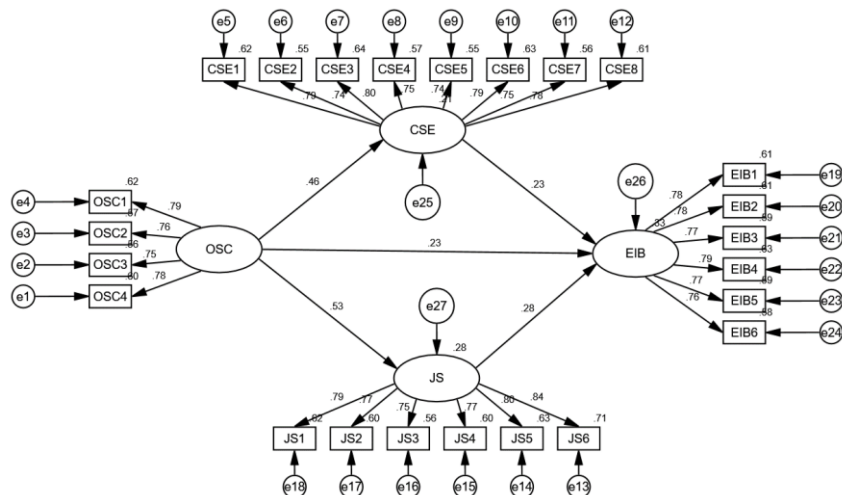


Figure 2. Structural equation model.

The relationship between organizational support for creativity, job satisfaction, creative self-efficacy, and employee innovative behavior can be visualized through the use of structural equation modeling plots. As shown in **Figure 2**, with a chi-square to degrees of freedom ratio of 1.228, a Root Mean Square Error of Approximation of 0.024, and a consistently high Goodness of Fit Index of 0.938, the fit indices of the mediation model show that it correlates well with empirical data. Furthermore, the incremental fit indices with strong values of 0.990, 0.988, and 0.989, respectively, were the Comparative Fit Index (CFI), Incremental Fit Index (IFI), and Tucker-Lewis Index (TLI). This implies that the model has a high degree of explanatory power.

4.4.1. Path coefficient test

The causal stages technique was used to find mediating effects by going through the processes that Baron and Kenny (1986) specified. The independent variable’s direct effect on the dependent variable was measured without any intermediary factors. Findings revealed statistically significant standardized path coefficients ($\beta = 0.47, p < 0.001$) indicating a substantial correlation between employee innovative behavior and organizational support for creativity, with no intervening factors.

The investigation delved into the specific paths of the proposed partial mediation model. This model suggested that creative self-efficacy and job satisfaction acted as intermediate factors between organizational support for creativity and employee innovative behavior. The results presented in **Table 4** showed a decrease in the overall impact of organizational support for creativity on employee innovative behavior when the mediators were taken into account ($\beta = 0.23, p < 0.001$). Nevertheless, the direct path coefficients from organizational support for creativity to employee innovative behavior still held significant statistical value. Therefore, *H1* was validated.

Similarly, the pathways from organizational support for creativity to both job satisfaction and creative self-efficacy were significant ($\beta = 0.46, p < 0.001; \beta = 0.53, p < 0.001$). Therefore, *H2a* and *H3a* were supported. The pathways from these mediators to employee innovative behavior were significant ($\beta = 0.23, p < 0.001; \beta = 0.28, p < 0.001$). Hence, *H2b* and *H3b* were supported. The significance of these paths underscores the contributory roles of both creative self-efficacy and job satisfaction in fostering innovative behaviors among employees.

Table 4. Path coefficient test with mediation.

Paths			Std. (β)	Unstd.	S.E.	C.R.	P
CSE	←	OSC	0.458	0.457	0.059	7.708	***
JS	←	OSC	0.530	0.604	0.068	8.951	***
EIB	←	CSE	0.229	0.242	0.062	3.917	***
EIB	←	OSC	0.234	0.247	0.069	3.59	***
EIB	←	JS	0.278	0.256	0.058	4.42	***

Note: Note: OSC, Organizational Support for Creativity; CSE, Creative Self Efficacy; JS, Job Satisfaction; EIB, Employee Innovative Behavior.

4.4.2. Mediation effect test

Using the bootstrapping method, we analyzed the direct, specific indirect, and total effects of organizational support for creativity on employee innovative behavior

through the channels of creative self-efficacy and job satisfaction. The results in **Table 5** demonstrate the statistical significance of the direct influence of organizational support for creativity on employee innovative behavior. (unstandardized direct effect = 0.25, $p < 0.001$). Additionally, the indirect effect of organizational support for creativity via creative self-efficacy on employee innovative behavior is positive and significant (unstandardized direct effect = 0.11, 95% CI = [0.054, 0.184], $p < 0.001$), supporting H2. The indirect effect of job satisfaction on organizational support for creativity and employee innovative behavior is equally significant (unstandardized direct effect = 0.16, 95% CI = [0.089, 0.242], $p < 0.001$), supporting H3.

Table 5. Mediation effects bootstrapping test (unstandardized coefficients).

Effects	Paths	Point Estimate	Bias-coated 95% CI		Percentile 95% CI		Two-Tailed Significance <i>P</i>
			Lower	Upper	Lower	Upper	
DE	OSC→EIB	0.247	0.122	0.377	0.124	0.381	0.000 (***)
SIE 1	OSC→CSE→EIB	0.110	0.054	0.184	0.052	0.180	0.000 (***)
SIE 2	OSC→JS→EIB	0.155	0.089	0.242	0.083	0.233	0.000 (***)
Total SIE	SIE1 + SIE2	0.265	0.186	0.368	0.181	0.362	0.000 (***)
Total	SIE1 + SIE2 + DE	0.512	0.403	0.630	0.402	0.629	0.000 (***)
SIE Difference Comparison	SIE1–SIE2	–0.044	–0.153	0.057	–0.147	0.063	0.371 (***)

Note: DE, Direct Effects; SIE, Specific Indirect Effects; IE, Indirect Effects. Note: OSC, Organization Support for Creativity; CSE, Creative Self-Efficacy; JS, Job Satisfaction; EIB, Employee Innovative Behavior. Note: OSC, Organization Support for Creativity; CSE, Creative Self Efficacy; JS, Job Satisfaction; EIB, Employee Innovative Behavior.

5. Conclusion and discussion

According to this study, supporting creativity within an organization has a positive effect on employees’ innovative behavior. This result is in line with other studies that have been done (Hsu and Chen, 2017; Saether, 2019; Shanker et al, 2017). Hsu and Chen (2017) explored the link between the organizational innovation environment and employees’ innovative behavior from a psychological capital perspective and found that the organizational innovation environment had a significant and positive influence on employees’ innovative behavior. Shanker et al. (2017) discovered that an organizational innovation climate not only promotes managers’ innovative work behaviors but also enhances employees’ work performance. In contrast, Saether (2019) found an indirect effect of organizational support for creativity on R&D personnel’s innovative behavior from the perspective of individual-organizational fit. These previous studies provide the theoretical basis for this study’s hypotheses. This study emphasizes the direct impact of organizational support for creativity on employees’ innovative behaviors and further confirms the positive impact of an organizational climate of support for innovation on employees’ innovative behaviors. In terms of the development of China’s pharmaceutical manufacturing industry, companies should encourage their employees to exercise creativity by formulating relevant incentive policies and providing material and spiritual rewards for employees who make creative contributions, which will help improve the R&D efficiency of innovative drugs. According to this study, creative self-efficacy acts as a beneficial intermediary between organizational support for

creativity and employee innovative behavior. This implies that when organizations offer backing for creativity, it positively influences an employee's creative self-efficacy, subsequently fostering their innovative behavior. These results align with prior research conducted by previous studies (Kong et al., 2019; Teng et al., 2020; Yang and Zhou, 2022). Kong et al. (2019) found that creativity, learning goal orientation, and team learning behaviors enhance employees' innovative self-efficacy. Teng et al. (2020) demonstrated that creative personality predicts creative self-efficacy, while Yang and Zhou (2022) established that creative self-efficacy mediates the correlation between organizational support and employee creativity. These investigations lay the theoretical groundwork for positing that creative self-efficacy serves as a mediator between organizational support for creativity and employee innovative behavior. The research further highlights that R&D staff in Chinese pharmaceutical manufacturing firms exhibit a comparatively modest level of creative self-efficacy, averaging only 3.329. Hence, enterprises must prioritize enhancing their staff members' creative self-efficacy, given its substantial role as a predictor of their innovative conduct (Mathisen, 2011).

According to this study, organizational support for creativity positively influences employee innovative behavior through the mediating factor of job satisfaction. The research suggests that when organizational support for creativity increases, job satisfaction also increases, which in turn promotes employee innovative behavior. These findings reinforce previous research conducted by previous research (Bola Avoseh and Marie Giese, 2018; Karaferis et al., 2022; Ozsoy, 2022). For example, Karaferis et al. (2022) discovered that the compensation, policies, and job security provided by an organization can enhance job satisfaction, while Bola Avoseh and Marie Giese (2018) found that recognition, growth development, and fulfillment are predictors of overall job satisfaction. These studies highlight the various aspects of job satisfaction and the essential factors that influence it. Furthermore, Ozsoy's (2022) research demonstrated a strong positive correlation between organizational innovation climate and job satisfaction, underscoring the significance of the work environment on employee satisfaction. Xerri (2014) also revealed that fair procedures in an organization can promote employees' innovative behavior by fostering job satisfaction, while Ganesan and Xu's (2019) study showed that organizational talent policies impact employee innovative behavior through career satisfaction. These investigations offer fresh perspectives and enhance our comprehension of the correlation between job satisfaction and employee innovative behavior. Moreover, they establish a critical theoretical framework for the present research regarding the mediating function of job satisfaction between organizational support for creativity and employee innovative behavior.

5.1. Theoretical significance

This research combines various concepts from motivational theory, self-efficacy frameworks, and organizational support constructs to create a comprehensive model that explores the association between organizational support for creativity and employee innovation within research and development (R&D) settings. By analyzing the roles of creative self-efficacy and job satisfaction, this study sheds light on how

organizational support for creativity can encourage innovative thinking among R&D personnel. The methodology used in this study brings together behavioral science and organizational psychology to provide a more holistic understanding of the factors that drive innovation in corporate environments. This interdisciplinary approach not only enriches the theoretical landscape but also offers practical insights for organizations looking to foster a more innovative workforce.

5.2. Practical significance

This study offers valuable insights into enhancing organizational innovation within the pharmaceutical industry. Findings indicate that fostering creativity among employees can lead to increased innovative behavior. Business managers should prioritize measures that support and motivate employees' creativity, cultivate an innovation-friendly environment, stimulate employees' innovation potential, and enhance the organization's innovation capability.

Moreover, this study presents a framework for human resource strategies and innovation incentives in pharmaceutical manufacturing enterprises. By incentivizing and promoting employee innovation, enterprises can boost employee creative self-efficacy and job satisfaction. Recognition and rewards for innovative ideas and performance can serve as powerful motivators for employees to innovate.

Lastly, this study underscores the importance of innovative behavior among R&D employees in driving innovation within the pharmaceutical manufacturing industry. By improving employees' innovative behaviors, enterprises can spur technological, product, and management innovation, ultimately leading to the sustainable development of the industry as a whole.

5.3. Limitation and future research

In this study, frontline R&D personnel in pharmaceutical companies were surveyed using a self-report approach to gather their opinions. However, it's important to note that this method may introduce bias and lead to respondents either overestimating or underestimating their creative self-efficacy and innovative behavior. To address potential threats of Common Method Variance (CMV), future research should consider employing multiple measures. For example, researchers could collect data from both supervisors and R&D personnel and conduct data collection in two waves to reduce the influence of CMV on the relationships between variables.

Given that the study sample solely encompasses pharmaceutical companies in China, it is important to note that the results may not be generalizable to other geographic regions or companies. This is due, in part, to the significant influence of Chinese Confucianism, which values collectivism and hierarchical power structures. Additionally, Confucianism's Doctrine of the Mean may impact employees' levels of creativity and innovative behavior (Ma et al., 2023; Wei et al., 2020).

As innovation involves individual, team, and organizational efforts, organizations usually rely on a team-based structure to develop new projects and implement innovative solutions. Hence, research at the team level is becoming more valuable. Therefore, future organizational innovation research should not overlook the concept of teamwork (Berraies and Chouiref, 2023; Hsu and Chen, 2017).

Exploring the same research model in different settings can provide a better comprehension of how creative self-efficacy and job satisfaction mediate employees' innovative behavior and how it relates to organizational support for creativity. It's an interesting idea worth considering.

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