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RESEARCH ARTICLE

Influence Mechanism of Spiritual Leadership on the Innovative Behavior of R&D Personnel in the Chinese Context*

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Abstract

Spiritual leadership is identified as an effective factor in promoting employees' innovative behavior. However, in China, this process may be influenced by both organizational and group factors. This study develops a moderated mediation model to examine the mechanisms by which spiritual leadership affects the innovative behavior of R&D personnel, drawing from a combined perspective of career calling and organizational support. Data are collected through matched-pair surveys from 513 R&D employees and their line leaders across innovative organizations in Beijing, Shenzhen, Harbin, and Xi'an. Data analysis is conducted using SPSS 22.0 and LISREL 8.5. The findings indicate that spiritual leadership positively influences the innovative behavior of R&D personnel. Furthermore, career calling serves as a mediating factor in the relationship between spiritual leadership and innovative behavior. This mediating process is positively moderated by relational energy and perceived organizational support for creativity; specifically, the effect of spiritual leadership on innovative behavior through career calling is significantly stronger when relational energy and perceived organizational support for creativity are high.

Keywords spiritual leadership; career calling; innovative behavior of R&D personnel; perceived organizational support for creativity; relational energy

1 Introduction

"Innovation lies in the power of talents."[1] Technology innovation has become the central theme of high-quality economic development in China today and into the future, as well as a focal point in global competition. The incidents concerning ZTE and Huawei underscore China's vulnerability in certain critical technologies and the shortage of high-level talent in advanced technology innovation. Aiming to position China among the leading innovative nations between 2020 and 2035, the "14th Five-Year Plan (2021–2025) for National Economic and Social Development" has emphasized the importance of enhancing enterprises' technology innovation capabilities and stimulating talent-driven

[1] Xi Jinping' s speech at the 19th Academician Conference of the Chinese Academy of Sciences and the 14th Academician Conference of the Chinese Academy of Engineering, *People's Daily*, May 29, 2018, p. 2.

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innovation.[2] At the micro-level within organizational contexts—whether in large corporations driving technology innovation or in small and medium-sized enterprises serving as vital sources of innovation—effectively activating the innovative momentum of R&D personnel requires more than strong organization and guidance from entrepreneurs and leaders. It also relies on the intrinsic, self-motivated drive of R&D professionals and the innovation support from the organization and colleagues.

As Generation Y and Generation Z[3] increasingly become the main demographic in the workforce, their broad horizons, strong opinions, and a heightened sense of self-esteem have shifted workplace dynamics. This new generation emphasizes purpose and experiential fulfillment, often rendering traditional leadership styles and motivational techniques ineffective or counterproductive (Zhao et al., 2019). R&D personnel, as a unique subgroup within this cohort, display distinct characteristics: they are highly educated, achievement-driven, and innately creative (Wei et al., 2020). Innovation is an inherently spontaneous and autonomous behavior (Petroni et al., 2011), making it essential to shift the focus of motivating R&D personnel's innovation efforts toward their personal value pursuits and a sense of purpose (Meng & Ouyang, 2019). In this context, a spiritual leadership style that emphasizes intrinsic motivation and value-based guidance has started to garner the attention of scholars and practitioners alike. Unlike other leadership styles, spiritual leadership addresses employees' pursuit of spiritual fulfillment and meaning in their work by fostering a shared vision, inspiring faith, and demonstrating altruistic love. By cultivating a sense of inner mission and organizational identity, this approach aims to foster positive attitudes and behaviors among employees, particularly in R&D roles where intrinsic drive is pivotal (Fry et al., 2005).

Scholars have explored how spiritual leadership can help employees be more creative and innovative from different theoretical points of view, including social cognition, social learning, and the model of creativity and innovation in organizations. They have also looked at possible mediating mechanisms, such as strategic identification and knowledge sharing (Deng et al., 2020; Sheng et al., 2017; Wan et al., 2019). However, existing research has primarily focused on psychological (cognitive and emotional), behavioral, and knowledge aspects, with limited attention to factors of faith and spirituality. Calling, as a spiritual factor, is a crucial mediating factor through which spiritual leadership achieves intrinsic motivation for employees. In the workplace, this concept extends as career calling, which refers to employees' ability to perceive a transcendent calling that originates from within yet extends beyond the self. It drives them to engage in tasks that provide purpose and meaning, grounded in other-oriented values as their primary motivations (Dik et al., 2012). Employees with a strong career calling tend to have higher self-expectations and stronger achievement motivation, and they seek to realize their value through excellence in work and performance. They often exhibit greater innovation motivation and a desire for self-transcendence, thus

[2] *Recommendations of the CPC Central Committee on Formulating the Outline of the 14th Five-Year Plan (2021–2025) for National Economic and Social Development and Vision 2035 of the People's Republic of China* (中共中央关于制定国民经济与社会发展第十四个五年规划和二〇三五远景目标的目标).

[3] Generation X refers to individuals born between 1965 and 1980, Generation Y to those born from the 1980s to mid-1990s, and Generation Z to those born from the mid-1990s to 2010.

becoming more inclined toward innovative behavior (Yao & Luo, 2020). Based on this, the present study hypothesizes that career calling may mediate the effect of spiritual leadership on the innovative behavior of R&D personnel. It proposes the mechanism model of "spiritual leadership → career calling → innovative behavior of R&D personnel" accordingly.

Organizational support theory posits that effective employee management should not solely emphasize employee loyalty to the organization but also consider the organization's commitment to its employees. Throughout their work, employees develop a composite perception of whether the organization values, cares for, and recognizes their contributions. Support from the organization, leaders, and colleagues is a critical source of positive psychological resources and work energy for employees (Eisenberger et al., 1986; Rhoades & Eisenberger, 2002). This theory is particularly relevant within the Chinese context, where traditional culture emphasizes harmony and emotional bonds in interpersonal relationships. Employees may base their behaviors on perceived organizational support and seek to attain ontological security, self-identity, and a sense of respect (Chin et al., 1997; Hoffman & Cowan, 2010). Nevertheless, existing studies primarily examine the effect of spiritual leadership on employee behaviors from perspectives of leadership motivation and employee self-drive, while less attention is paid to employees' perceptions of organizational support and its influence. Additionally, colleagues as a key source of support have not been adequately addressed. McDaniel (2011) and Owens et al. (2016) introduce the concept of relational energy and reveal that supportive interpersonal interactions among employees can generate psychological energy and enhance individual work efficacy. Based on organizational support theory, this study integrates perceived organizational support for creativity and relational energy into the research model to examine their roles in the process by which spiritual leadership inspires R&D personnel through calling to engage in innovative behavior.

Organizational support for creativity includes both instrumental and emotional support for creativity and innovation, which provides material and emotional resources for employees to engage in innovative behavior (Gu et al., 2014; Mcmillan, 1997). Perceived organizational support for creativity refers to employees' subjective perception of the organizational support available for implementing innovative ideas and actions at work (Siegel & Kaemmerer, 1978). Litwin and Stringer (1968) note that employees' perceptions of the organizational environment can influence their achievement motivation, thereby leading to changes in behavior. Empirical research has shown that achievement motivation, as a crucial intrinsic driving force, can significantly affect individuals' innovative behavior (Dewett, 2007). Studies have also found that, beyond material rewards, perceived organizational support fosters employees' sense of value and purpose, stimulates a sense of responsibility and dedication, and enhances their psychological resources for tackling challenges in the workplace (Siegel & Kaemmerer, 1978). Therefore, perceived organizational support for creativity may synergize with career calling to affect the innovative behavior of R&D personnel. When perceived support for creativity is higher, the innovation drive elicited by career calling becomes more pronounced. In addition, according to organizational support theory and interaction ritual chain theory, colleagues represent a potential source of supportive resources within the organization. Relational energy, arising from interpersonal interactions among colleagues, may be another significant factor influencing the relationship between career calling and

innovative behavior of R&D personnel. Studies have shown that relational energy positively affects employees' innovative behavior (Li & Mao, 2018). When employees experience low-level energy, interactions and energy exchanges with colleagues can help them quickly regain a positive state, activate psychological motivation, enhance work capabilities, and facilitate ongoing breakthroughs and innovation at work (Ye et al., 2019).

In summary, this study, grounded in organizational support theory and incorporating a causal model of spiritual leadership, develops and tests a second-stage moderated mediation model. From a combined perspective of career calling (main effect) and organizational support (moderating effect), it examines the mechanisms and boundary conditions through which spiritual leadership influences the innovative behavior of R&D personnel in China. This study aims to deepen the understanding of the formation mechanisms behind R&D personnel's innovative behavior and provide insights and recommendations for management practices targeting R&D personnel.

2 Theory and Hypotheses

2.1 Spiritual Leadership and R&D Personnel's Innovative Behavior

Employees' innovative behavior refers to the actions an individual undertakes at work to propose creative ideas or solutions and to actively implement these innovations in practice. It is a typical form of exploratory activity that employees engage in within the workplace (Scott & Bruce, 1994). Spiritual leadership is a new leadership paradigm that places a high emphasis on employees' sense of purpose, value pursuits, and inner experiences. It views life as a goal-oriented, purposeful process (Locke & Latham, 2002). Leaders can inspire a transcendent career calling and guide employees through value alignment, autonomous empowerment, and intrinsic motivation to align their personal goals with the organization's strategic objectives and developmental vision (Fry, 2003). Fry et al. (2005) assert that through career calling and a sense of belonging, employees achieve a sense of spiritual presence, which leads to positive work attitudes and behaviors. They highlight the unique role of spiritual leadership in guiding employees to participate in innovative transformation. Spiritual leadership is also closely associated with existentialist philosophy and bears strong elements of inspiration and contemplation (Ashmos & Duchon, 2000; Hicks, 2002). Employees who are inclined toward self-determination and intrinsic motivation are more likely to engage in value-seeking activities and generate innovative ideas under the influence of spiritual leadership (Donate & de Pablo, 2015; Wang et al., 2019).

According to the model of creativity and innovation in organizations, leaders play a crucial role in influencing employees' innovation processes and behaviors (Tu et al., 2016). Spiritual leadership emphasizes strategic and goal orientation, with a tendency to develop long-term visions. A shared vision can unify employees and encourage them to pursue excellence and discover opportunities for innovation (Weng et al., 2015). Research suggests that by emphasizing transcendent motivations such as calling, faith, and altruism, spiritual leadership motivates employees to transcend self-interest, thus serving as a critical catalyst for the generation of innovative ideas and behaviors (Gu & Zhang, 2016). The care spiritual leaders show for their employees meets their emotional needs and makes them feel supported

by their leaders. This, in turn, enhances employees' psychological capital and strengthens their ability to tackle challenges within the workplace. Empirical studies have found that spiritual leaders, with their focus on character development, tend to adopt a tolerant and inclusive approach, thus creating a relaxed environment that provides knowledge-based employees with a better experience. This positive work experience, alongside the feeling of being respected, generates positive emotions that drive employees to seek novel solutions to problems (Rose et al., 2016). Pawar (2014) further proposes that when the outlook for innovation appears uncertain, spiritual leadership can encourage employees to maintain faith and adopt diverse and dialectical thinking approaches to understand and address issues. Based on this analysis, it is clear that spiritual leadership is closely connected to employees' innovative behavior. Employees inspired and motivated by spiritual leadership are inclined to pursue and implement extraordinary innovative ideas and take innovative actions to achieve breakthroughs in their work. Therefore, this study proposes the following hypothesis.

H1: Spiritual leadership has a significant positive effect on the innovative behavior of R&D personnel.

2.2 The Mediating Role of Career Calling

"An intellectual should be strong and steady, for his duty is heavy and his journey will be long. Is it not a heavy duty to be a man of men?"[4] This quote reflects the enduring spirit of commitment and calling that has characterized Chinese culture since ancient times. From the ethos of the scholars of the pre-Qin era to Gu Yanwu's moral sentiment during the Ming and Qing dynasties—embodied in his statement from *Rizhilu: Zheng Shi* (日知录・正始), "The rise and fall of the nation concern everyone."[5] Up to President Xi Jinping's contemporary emphasis on "staying true to our original aspiration and founding mission,"[6] these teachings reveal the deeply embedded cultural value of calling consciousness among the Chinese people across generations.

The term "calling," also translated as "summoning," "calling forth," or "vocation," originally appeared primarily in religious and moral philosophy. However, as the 21st century has seen a growing emphasis on the meaning of work and the value of life, the concept of calling has gradually entered the fields of management psychology and organizational behavior, evolving into "career calling" and attracting widespread attention from both academia and industry (Xie et al., 2016). A representative view defines calling as "a calling is a transcendent summons, experienced as originating beyond the self, to approach a particular life role in a manner oriented toward demonstrating or deriving a sense of purpose or meaningfulness and that holds other-oriented values and goals as primary sources of motivation" (Dik & Duffy, 2009, p. 4). Ponton et al. (2014) highlight that career calling emphasizes employees' intrinsic perception and attitude toward their work and focuses on

[4] Source: Xu, Y. (2011). *Thus Spoke the Master.* China Intercontinental Press/Zhonghua Book Company. The original phrase is 士不可以不弘毅,任重而道远。仁以为己任,不亦重乎?

[5] The original phrase, "To preserve the nation is a responsibility that even the humblest individual bears 保天下者,匹夫之贱与有责焉矣 ," has since been widely paraphrased as "The rise and fall of the nation concerns everyone 天下兴亡,匹夫有责 ."

[6] Source: Xi, J. (2020). *The Governance of China (III).* Foreign Languages Press. The original phrase is 不忘初心,牢记使命 .

the passion and significance they derive from it. Career calling thus encompasses both an internal and external focus—emphasizing work's role in achieving personal value and life meaning while also valuing the alignment of social and personal value. Individuals with a strong career calling tend to have higher levels of achievement motivation and seek to realize personal value through excellence in work and performance. They are more inclined to implement creative ideas and take innovative actions to gain positive personal experiences while contributing to others and society. Empirical research also indicates that career calling positively affects employees' innovation efficacy and willingness and significantly promotes their innovative behavior (Gu et al., 2018).

There is a high degree of conceptual and structural overlap between calling and spirituality, with some scholars suggesting that "career calling" is essentially "spiritual calling" (Neubert & Halbesleben, 2015). Zhang et al. (2015) propose that, in Chinese culture, career calling manifests in four aspects: guiding force, meaning and purpose, altruism, and positive orientation. Spiritual leadership comprises three dimensions: vision, hope/faith, and altruistic love. The leader's articulation of vision and demonstration of hope/faith serve as guiding examples based on a transcendent understanding and convey the leader's view of purpose and meaning in work within the organizational context. Altruistic love represents the leader's positive, caring behavior toward employees, which is rooted in altruism. These aspects indicate a close association between spiritual leadership and employees' career calling. The causal model of spiritual leadership also identifies calling as a key mediating factor through which spiritual leadership affects employees' positive behaviors (Fry & Slocum, 2008). Spiritual leadership awakens employees' career calling by resonating with their sense of faith and purpose (Caldeira & Hall, 2012; Sadeghifar et al., 2014). Then, this study posits that spiritual leadership can stimulate employees' career calling through calling, which subsequently promotes their innovative behavior. The following hypothesis is proposed.

H2: Career calling mediates the relationship between spiritual leadership and the innovative behavior of R&D personnel.

2.3 The Moderating Role of Relational Energy

Research on energy in the workplace emerged with the positive organizational behavior movement in the 21st century. Unlike traditional organizational behavior studies, which focus on dysfunction, conflict, and work stress, positive organizational behavior shifts its focus to developing employees' potential and cultivating positive, optimistic, and energetic attitudes and behaviors in the workplace (Cole et al., 2012; Luthans, 2002). Existing studies indicate that energy, as a work resource, is often gained through interpersonal interactions within the organization (Fritz et al., 2011). Based on the interaction ritual chain theory, McDaniel (2011) and Owens et al. (2016) further develop the concept of "relational energy" and define it as "a heightened level of psychological resourcefulness generated from interpersonal interactions that enhance one's capacity to do work" (p. 37). High levels of relational energy imply that employees possess greater relational resources or have the capacity and opportunity to acquire them, which can boost their work motivation and engagement and aid them in achieving set goals. Relational energy emphasizes the bidirectional interaction between the energy receiver

and giver; "high-energy individuals" who possess more resources transmit and share energy through interactions with employees who need to maintain or replenish their energy.

Recent research has begun to empirically validate the positive effects of relational energy (Xiao et al., 2020; Zhu et al., 2017). Yang et al. (2019) find that relational energy boosts individuals' work motivation and enables employees to reciprocate the energy and resource support they receive through improved work performance. Further studies indicate that relational energy, as a form of psychological support, helps employees alleviate stress and negative emotions and enhance their resilience. Restored and elevated psychological energy allows employees to escape states of energy depletion and maintain high performance levels over extended periods (Li & Mao, 2018; Xiao et al., 2020). This energy supports them in fully accessing and utilizing organizational resources, ultimately fostering innovative ideas and behaviors (Sonnentag et al., 2010). In R&D teams, interpersonal interactions among employees not only facilitate the transfer and replenishment of psychological energy but also aid in the exchange and sharing of knowledge and ideas. This, in turn, invigorates employees and stimulates their motivation to innovate. Conservation of resources theory also suggests that employees maintain, replenish, or enhance energy resources through interactions with those around them; colleagues, as insiders within the organization or team, play a vital role in providing psychological energy (Farh et al., 1998; Yang et al., 2019). When colleagues provide a high level of relational energy, employees experience heightened emotional arousal and mental stimulation in their daily work. Driven by calling, they exhibit increased focus and purpose, while the energy support from colleagues helps them maintain enthusiasm, foster resilience in the face of difficulties and challenges, and enhance their willingness and ability to innovate. Based on the analysis above, this study proposes the following hypotheses.

H3: Relational energy moderates the positive relationship between career calling and the innovative behavior of R&D personnel. The higher the level of relational energy among colleagues, the stronger the positive relationship between career calling and the innovative behavior of R&D personnel.

H4: Relational energy moderates the mediating role of career calling in the relationship between spiritual leadership and the innovative behavior of R&D personnel. The stronger the relational energy among colleagues, the stronger the mediating effect of career calling on the relationship between spiritual leadership and the innovative behavior of R&D personnel.

2.4 The Moderating Role of Perceived Organizational Support for Creativity

Scholars have introduced the concept of perceived organizational support for creativity from the perspective of employees' perception of an organization's innovation climate. This concept refers to the degree to which employees feel recognized, respected, supported, and rewarded by the organization for engaging in individual or group innovation activities. The core of this concept lies in employees' psychological perception of the organization's support for innovative behavior (de Stobbeleir et al., 2011). Perceived organizational support for creativity differs from relational energy. While both foster positive experiences and stimulate employees' psychological energy, relational energy emphasizes energy transfer between specific individuals, primarily achieved through high-quality interpersonal

interactions. The key actors in relational energy are colleagues, and its supportive effect depends on individual interactions within the organization. In contrast, perceived organizational support for creativity focuses on the individual's experience within the broader organizational environment and highlights the overall climate of the organization. Thus, the principles underlying their supportive roles differ. According to organizational support theory, individuals' perception of organizational support helps activate positive emotions and a sense of energy. When employees perceive strong organizational support for creativity, they experience heightened excitement, security, confidence, and motivation for creative action.

Existing research indicates that perceived organizational support for creativity affects employees' innovative behavior by enhancing achievement motivation, identity, organizational self-esteem, and commitment (de Stobbeleir et al., 2011; Kurtessis et al., 2017). However, as an essential external contextual factor for employee innovation, it remains unclear whether perceived organizational support for creativity interacts with career calling, which emphasizes autonomous drive, to influence innovative behavior. The underlying mechanisms of this potential interaction have yet to be empirically tested. Some studies suggest that employees who perceive high organizational support for creativity do not need to expend energy and psychological resources to handle potential interference and negative impacts from the internal environment (Zhou & Li, 2018). Consequently, the psychological and behavioral engagement inspired by career calling is better sustained and supported. Moreover, a positive perception of organizational support for creativity enhances employees' positive emotional experiences. According to the broaden-and-build theory, positive emotions allow individuals to expand their range of cognition and action, facilitate the generation of innovative ideas, and encourage innovative problem-solving approaches. In this context, employees are more likely to respond to the career calling within spiritual leadership, activate their internal sense of purpose, and pursue excellence through innovative actions (Gupta & Devalina, 2015). Based on this, this study posits that the process by which employees engage in innovative behavior, driven by career calling, may be significantly influenced by perceived organizational support for creativity.

Based on the discussion above, this study proposes the following hypotheses.

H5: Perceived organizational support for creativity moderates the positive relationship between career calling and the innovative behavior of R&D personnel. The higher the perceived organizational support for creativity, the stronger the positive relationship between career calling and the innovative behavior of R&D personnel.

H6: Perceived organizational support for creativity moderates the mediating role of career calling in the relationship between spiritual leadership and the innovative behavior of R&D personnel. The higher the perceived organizational support for creativity, the stronger the mediating effect of career calling on the relationship between spiritual leadership and the innovative behavior of R&D personnel.

In summary, this study combines career calling as the main effect and organizational support as the moderating effect. This includes innovation support at the organizational level and relational energy support at the colleague level. Figure 1 shows the theoretical model of this study.

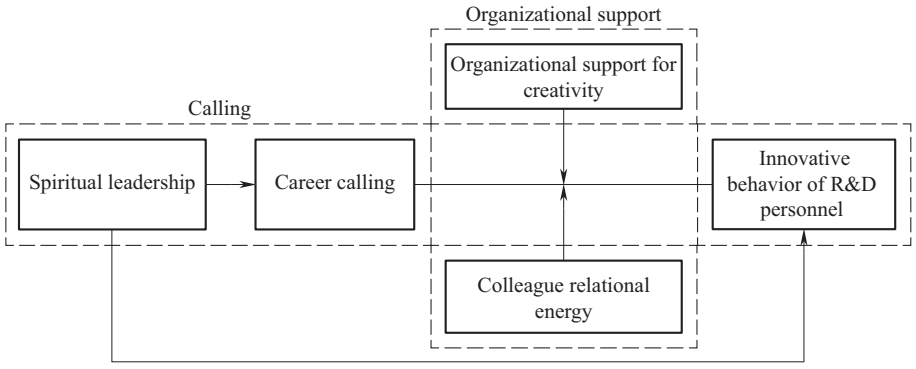

Figure 1 Theoretical Model

3 Procedures and Methods

3.1 Research Sample and Data Collection Process

This study employs a survey-based approach to collect data from various organizations. Targeting technical or product R&D personnel in multiple technology-innovation organizations across different geographic areas, including Beijing, Shenzhen, Harbin, and Xi'an, two sets of questionnaires (A and B) were distributed and collected. The participants, drawn from industries such as telecommunications, information technology and big data, optoelectronics, integrated circuits, power, agricultural machinery and chemicals, medical devices, and pharmaceutical R&D, varied in company size, job level, and position, thus ensuring diversity in the sample. Researchers conducted a matched-pair processing of questionnaires and ensured that participants (leaders, employees, and colleagues) were unaware of each other's responses. Questionnaire A, administered to employees through paper forms, online survey platforms, and emails, included scales measuring perceived spiritual leadership, individual career calling, perceived organizational support for creativity, and colleague relational energy. Questionnaire B was completed by employees' line leaders or team colleagues and included measures of employees' innovative behavior. A total of 720 questionnaires were returned, and after excluding incomplete or invalid responses based on entry checks and data screening, 513 valid paired samples were retained, yielding an effective response rate of 71.25%.

The final sample characteristics are as follows: Male participants comprise 61.4%, higher than females at 38.6%. In terms of age, 54.4% are aged 20–30, 40.7% are 31–40, 3.3% are 41–50, 1.2% are 51–60, and 0.4% are 61 or older, with 95.1% under 40, representing the new generation of young science and technology professionals. For education level, 17.3% hold a vocational degree, 57.5% hold a bachelor's degree, 23.8% hold a master's degree, and 1.4% hold a doctoral degree, with 82.7% having at least a bachelor's degree. Regarding years of work experience, 13.6% have less than 3 years, 44.4% have 3–8 years, 31% have 8–15 years, and 10.9% have over 15 years of experience. In terms of organization type, 28.5% of employees are from Chinese central state-owned enterprises and other state-owned enterprises and organizations, 20.7% from large private enterprises, 43.3% from small and

medium-sized private enterprises, and 7.6% from foreign and other types of enterprises. The descriptive statistics confirm that the sample characteristics align with the research criteria and demonstrate strong representativeness.

3.2 Instruments

This study uses established measurement tools from mainstream international research. English scales are translated and back-translated by professionals in organizational behavior (including professors and postdoctoral researchers) using a double-blind method to ensure consistency in item wording. To reduce the potential effect of social desirability on the results, some scales employ frequency-based questions. All questionnaires use a 5-point Likert scale, with responses ranging from "1" to "5," indicating frequency or degree of agreement from low to high.

(1) *Spiritual leadership*. This measure is based on the Chinese version of the spiritual leadership questionnaire revised by Tang et al. (2014). Sample items include: "The leader's actions or messages help me understand and commit to the organization's vision." "I do my best at work because I have confidence in my leader." and "My leader periodically communicates with employees to understand their thoughts." Cronbach's α for this scale is 0.95.

(2) *Career calling*. The Brief Calling Scale (BCS) developed by Dik et al. (2012) is used. The BCS is advantageous because it does not specify the source of calling but allows participants to respond based on their understanding of calling. It consists of four items, with sample items including: "I am trying to identify what I feel called to do in my career." and "I understand my calling as it applies to my career." Cronbach's α for this scale is 0.91.

(3) *Colleague relational energy*. This measure, based on the scale developed by Owens et al. (2016), includes items such as "I feel energized when interacting with colleagues." "After interacting with colleagues, I feel more energy for my work." and "When I need a boost, I go to a colleague." Cronbach's α for this scale is 0.94.

(4) *Perceived organizational support for creativity*. This scale, based on the measure developed by Zhou and George (2001), includes items such as "Innovative ideas or behaviors from employees are encouraged by the organization." "The organization's reward system promotes innovation." and "The organization publicly recognizes those who are innovative." Cronbach's α for this scale is 0.84.

(5) *Employees' innovative behavior*. The innovative behavior scale developed by Scott and Bruce (1994) is used, with sample items such as "This employee consistently seeks to apply new processes, technologies, and methods." "This employee frequently communicates and sells their new ideas to others." and "Overall, this employee is an innovative person." Cronbach's α for this scale is 0.93.

(6) *Control variables*. Following prior research, age, gender, education level, and years of work experience are included as control variables.

3.3 Statistical Analysis

This study primarily utilizes LISREL 8.5, SPSS 22.0, and the PROCESS macro plugin for data analysis. First, LISREL is used to conduct confirmatory factor analysis (CFA) on the variables within the model and compare the research model with competing models to assess discriminant validity among the variables. SPSS is then used for descriptive statistical analysis of each variable, providing an initial exploration of the correlations between variables. Next, hierarchical regression analysis is employed to test *H1*, *H3*, and *H5* and verify the direct and moderating effects within the model. The mediating effect for *H2* is tested using cross-validation methods. Finally, Model 14 in the PROCESS macro is applied to test *H4* and *H6*, thereby validating the moderated mediating effects proposed in this study.

4 Results

4.1 Test for Common Method Bias

The results show that there are five factors. To check for common method bias, this study uses both Harman's single-factor test (Podsakoff et al., 2003) and principal component analysis with maximum variance rotation. The first factor accounts for 23.32% of the variance, while the total variance explained by all factors is 73.09%. Since the variance explained by the first factor does not exceed half of the total variance, this study's common method bias is within an acceptable range and does not significantly affect the results. In addition, to further eliminate common method bias, we control for an unmeasured latent method factor to test for its presence, as shown in Table 1. The results indicate that after adding the method factor, the model fit indices of RMSEA, NFI, and IFI do not improve significantly, indicating that there is no serious common method bias in this study.

Table 1 Results of Confirmatory Factor Analysis

Model	χ^2/df	RMSEA	NFI	IFI	SRMR
Single-factor model: *JSLD* + *SMG* + *GXNL* + *CXZC* + *CXXW*	13.60	0.16	0.80	0.84	0.08
Two-factor model: *JSLD*, *SMG* + *GXNL* + *CXZC* + *CXXW*	8.30	0.12	0.83	0.86	0.07
Three-factor model: *JSLD*, *GXNL*, *CXZC* + *SMG* + *CXXW*	6.31	0.10	0.87	0.89	0.06
Four-factor model: *JSLD*, *SMG*, *GXNL*,*CXZC* + *CXXW*	5.25	0.10	0.95	0.92	0.05
Five-factor model: *JSLD*, *SMG*, *GXNL*, *CXZC*, *CXXW*	2.63	0.06	0.99	0.99	0.03
Five-factor model + method factor	2.53	0.06	0.99	0.99	0.02

Note. *JSLD* = spiritual leadership; *SMG* = career calling; *GXNL* = relational energy; *CXZC* = perceived organizational support for creativity; *CXXW* = innovative behavior of R&D personnel; "+" indicates that two factors are combined into one factor.

4.2 Test for Discriminant Validity

To assess the discriminant validity among the variables in the research model, a CFA is conducted on spiritual leadership, career calling, perceived organizational support for creativity, and innovative behavior of R&D personnel. As shown in Table 1, the five-factor model exhibits the best fit compared to the other five competing models, with all parameters meeting the fit criteria ($\chi^2/df = 2.63$, NFI = 0.99, IFI = 0.99, RMSEA = 0.06, SRMR = 0.03). These results indicate that the five variables in this study demonstrate good discriminant validity.

4.3 Descriptive Statistical Analysis of Variables

Table 2 presents the mean, standard deviation, and correlation coefficients for each variable. Spiritual leadership shows a significant positive correlation with career calling ($r = 0.61$, $p < 0.01$), relational energy ($r = 0.56$, $p < 0.01$), perceived organizational support for creativity ($r = 0.48$, $p < 0.01$), and employees' innovative behavior ($r = 0.47$, $p < 0.01$). Career calling is also significantly positively correlated with relational energy ($r = 0.60$, $p < 0.01$), perceived organizational support for creativity ($r = 0.54$, $p < 0.01$), and employees' innovative behavior ($r = 0.58$, $p < 0.01$). In addition, relational energy is significantly positively correlated with employees' innovative behavior ($r = 0.50$, $p < 0.01$), and perceived organizational support for creativity is positively correlated with employees' innovative behavior ($r = 0.38$, $p < 0.01$). These correlations align with theoretical expectations and provide preliminary support for subsequent hypothesis testing.

Table 2 Means, Standard Deviations, and Correlation Coefficients of Variables

Variable	*Mean*	*SD*	*age*	*sex*	*edu*	*year*	*JSLD*	*SMG*	*CXXW*	*GXNL*
age	1.53	0.66								
sex	1.39	0.50	−0.03							
edu	2.90	0.68	−0.16**	0.10*						
year	2.38	0.90	0.63**	−0.11*	−0.05					
JSLD	2.80	1.32	0.01	−0.05	−0.09*	0.03				
SMG	2.47	0.90	0.07	0.01	−0.12**	0.08	0.61**			
CXXW	3.17	0.96	−0.02	0.01	−0.06	−0.02	0.47**	0.58**		
GXNL	3.24	1.10	−0.01	−0.03	−0.08	0.02	0.56**	0.60**	0.50**	
CXZC	2.78	0.84	0.06	−0.08	−0.06	0.13**	0.48**	0.54**	0.38**	0.48**

Note. * $p < 0.05$ and ** $p < 0.01$.

4.4 Hypothesis Testing

4.4.1 Main Effects and Mediating Effects

This study uses hierarchical regression modeling to find out what the main effect of spiritual leadership is on R&D employees' willingness to come up with new ideas and

whether career calling mediates the relationship between spiritual leadership and the innovative behavior of R&D personnel. Models 1 and 2 use career calling as the dependent variable, while Models 3 through 8 use the innovative behavior of R&D personnel as the dependent variable. Models 1 and 3 serve as baseline models and incorporate only control variables. The regression analysis results indicate a significant positive effect of spiritual leadership on the innovative behavior of R&D personnel (Model 4: $b = 0.56$, $p < 0.001$), providing support for *H1*. Model 2 shows a significant positive correlation between spiritual leadership and career calling (Model 2: $b = 0.59$, $p < 0.001$). In Model 5, where both the independent variable (spiritual leadership) and the mediator (career calling) are included in the regression equation, the direct effect of spiritual leadership is reduced, and career calling shows a significant positive relationship with the innovative behavior of R&D personnel (Model 5: $b = 0.42$, $p < 0.001$). This indicates that career calling partially mediates the relationship between spiritual leadership and the innovative behavior of R&D personnel, thus supporting *H2*.

Moreover, to further test the mediating effect of career calling, this study applies the PROCESS macro using the Bootstrap method with 5,000 resamples and a 95% confidence interval. The statistical analysis results in Table 3 indicate a significant indirect effect of spiritual leadership on the innovative behavior of R&D personnel through career calling, thus providing further support for *H2*. These findings suggest that spiritual leadership significantly enhances the innovative behavior of R&D personnel, with career calling serving as a mediating factor in this relationship.

Table 3 Results of Hierarchical Regression Analysis

Variable	Career calling		Innovative behavior of R&D personnel					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
age	0.03	0.07	−0.03	0.02	0.01	−0.05	0.01	−0.03
sex	0.05	0.10*	0.02	0.07	0.06	−0.02	0.04	0.05
edu	−0.17	−0.07	−0.10	0.02	0.02	0.01	0.01	0.01
years	0.08	0.03	−0.00	−0.05	−0.06	−0.05	−0.06	−0.09
JSLD		0.59***		0.56***	0.19***			
SMG					0.42***	0.59***	0.39***	0.41***
GXNL							0.20***	
CXZC								0.34***
SMG × *GXNL*							0.13*	
SMG × *CXZC*								0.17*
R^2	0.02*	0.51***	0.00*	0.59***	0.61***	0.37***	0.66***	0.44***

Note. * $p < 0.05$ and *** $p < 0.001$.

4.4.2 Test of Bivariate Moderating Effects

Using a stepwise regression method, the moderating effects of relational energy and perceived organizational support for creativity are tested, with interaction terms formed from the product of mean-centered variables. Model 6 shows a significant positive effect of career calling on the innovative behavior of R&D personnel *(*$b = 0.59$, $p < 0.001$). Model 7 indicates a significant positive effect of relational energy on the innovative behavior of R&D personnel ($b = 0.20$, $p < 0.001$), while Model 8 reveals a significant positive effect of perceived organizational support for creativity on the innovative behavior of R&D personnel ($b = 0.34$, $p < 0.001$). Furthermore, Model 7 shows a significant positive effect of the interaction between career calling and relational energy on the innovative behavior of R&D personnel ($b = 0.13$, $p < 0.05$), and Model 8 demonstrates a significant positive effect of the interaction between career calling and perceived organizational support for creativity on the innovative behavior of R&D personnel ($b = 0.17$, $p < 0.05$). These results provide support for *H3* and *H5* and confirm that both relational energy and perceived organizational support for creativity positively moderate the relationship between career calling and the innovative behavior of R&D personnel.

Following the simple slope method, the moderating effects of relational energy and perceived organizational support for creativity are further illustrated in Figures 2 and 3, respectively.

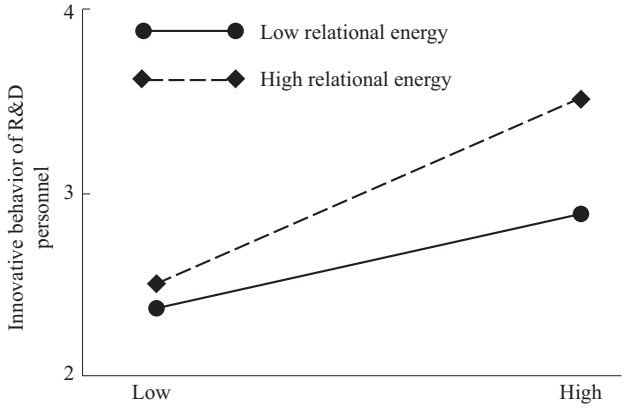

Figure 2 The Moderating Effect of Relational Energy on the Relationship between Career Calling and the Innovative Behavior of R&D Personnel

4.4.3 Test of Moderated Mediating Effects

The moderated mediating effects are tested with the PROCESS macro in SPSS and the Bootstrap method, with results shown in Table 4. As indicated in Table 4, the indirect effect of spiritual leadership on the innovative behavior of R&D personnel through career calling is not significant when relational energy is low ($\beta = 0.05$, not significant) but becomes significant when relational energy is high ($\beta = 0.21$, $p < 0.05$), with a significant difference between the two conditions ($\Delta\beta = 0.16$, $p < 0.05$). This provides support for *H4*. Similarly, the indirect effect of spiritual leadership on the innovative behavior of R&D personnel

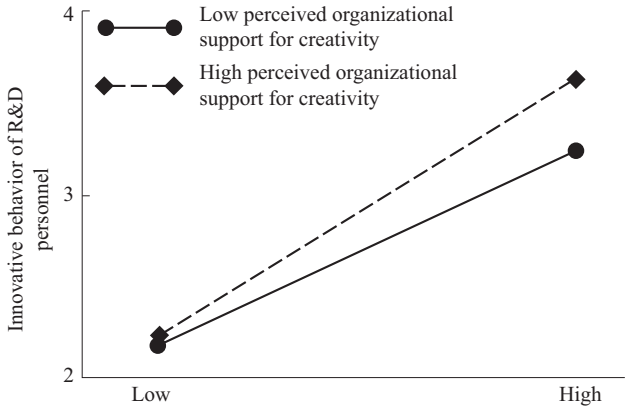

Figure 3 The Moderating Effect of Perceived Organizational Support for Creativity on the Relationship between Career Calling and the Innovative Behavior of R&D Personnel

through career calling is not significant when perceived organizational support for creativity is low ($\beta = 0.05$, not significant) but becomes significant when perceived organizational support for creativity is high ($\beta = 0.15$, $p < 0.01$), with a significant difference between these two conditions ($\Delta\beta = 0.10$, $p < 0.01$), thereby supporting *H6*. These results indicate that both relational energy and perceived organizational support for creativity positively moderate the mediation process in which spiritual leadership influences the innovative behavior of R&D personnel through career calling.

Table 4 Bootstrap Test Results for Moderated Mediating Effect

Moderating variable	First stage	Second stage	Direct effect	Indirect effect	Total effect
	P_{MX}	P_{YM}	P_{YX}	$P_{MX}P_{YM}$	$P_{YX} + P_{MX}P_{YM}$
Low *GXNL*	0.15*	0.34**	0.11*	0.05	0.16**
High *GXNL*	0.35**	0.60**	0.20*	0.21*	0.41***
Difference	0.20*	0.26*	0.09*	0.16*	0.25***
Low *CXZC*	0.18*	0.27**	0.11*	0.05	0.16**
High *CXZC*	0.33**	0.46**	0.23*	0.15**	0.38**
Difference	0.15*	0.19*	0.12*	0.10**	0.22***

Note. * $p < 0.05$, ** $p < 0.01$, and *** $p < 0.001$.

5 Conclusions and Discussions

5.1 Conclusions

This study, grounded in the real management context of Chinese organizations and based on the causal model of spiritual leadership and organizational support theory, develops a second-stage moderated mediation model to explore the mechanisms through which spiritual leadership influences the innovative behavior of R&D personnel. By combining the perspectives of career calling and organizational support, this study empirically tests

the mediating role of career calling in the relationship between spiritual leadership and the innovative behavior of R&D personnel and examines how perceived organizational support for creativity and relational energy moderates this effect. The findings reveal that (1) spiritual leadership significantly promotes the innovative behavior of R&D personnel; (2) work calling serves as a mediator in this relationship, indicating that spiritual leadership can enhance innovative behavior by invoking the career calling of R&D personnel; and (3) relational energy and perceived organizational support for creativity both positively moderate this mediation process. Stronger relational energy and organizational support increase the likelihood that R&D personnel, motivated by spiritual leadership, will engage in innovative behavior.

This study results reveal the process by which spiritual leadership stimulates innovative behavior of R&D personnel by awakening their intrinsic sense of purpose, meaning, and value. It also shows that the level of perceived organizational support for creativity and relational energy affects the degree of this influence, indicating that the innovative behavior of R&D personnel is a composite outcome of both career calling and organizational support. The positive effect of spiritual leadership on the innovative behavior of R&D personnel aligns with previous research, with this study further identifying the mediating role of career calling between the two. In China, which emphasizes interpersonal relationships and organizational norms, this study explores and confirms the moderating effects of perceived organizational support for creativity and colleague relational energy, thereby deepening the understanding of the mechanisms underlying the innovative behavior of R&D personnel from the perspective of spiritual motivation.

5.2 Contributions

This study, grounded in the Chinese management context and based on spiritual leadership and organizational support theory, develops a theoretical model from the multidimensional perspectives of leadership motivation, organizational climate, and colleague interactions. Within a framework of diverse organizational behavior actors, it explores and tests multiple factors influencing the innovative behavior of R&D personnel and the mechanisms underlying these influences, thereby deepening the understanding of how innovative behavior forms of R&D personnel. The primary research contributions are as follows:

(1) *Enriching antecedent research on innovative behavior from the theoretical perspective of spiritual leadership*. Previous leadership research on the innovative behavior of R&D personnel has primarily focused on leadership styles at behavioral and psychological levels, such as transformational leadership (Song, 2019) and empowering leadership (Wei et al., 2020). This study incorporates a leadership style at the spiritual level and expands the scope of employees' positive behaviors inspired by spiritual leadership. It empirically verifies the significant positive effect of spiritual leadership on innovation of R&D personnel and further demonstrates the effectiveness of spiritual leadership theory in activating employees' motivation for innovation.

(2) *Advancing understanding of the mediating mechanisms and boundary conditions of the influence of spiritual leadership on employees' innovative behavior*. First, based on the causal

model of spiritual leadership, this study identifies the mediating role of career calling between spiritual leadership and employees' innovative behavior. By examining career calling, it analyzes how spiritual factors are transmitted between leaders and employees, emphasizes "career calling" as a pathway through which spiritual leadership affects subordinates, and highlights the underlying mechanisms of organizational influence. Second, this study examines two critical boundary conditions: perceived organizational support for creativity and colleague relational energy. These factors play a boundary role in the process by which spiritual leadership, through career calling, drives employees' innovative behavior. Perceived organizational support for creativity and relational energy provides employees with positive experiences, emotional resources, and psychological energy. This internal organizational support combines with career calling and produces an additive and reinforcing effect (Neubert et al., 2015) that further motivates employees to engage in innovative behavior.

(3) *Deepening and expanding organizational support theory from the perspective of relational energy*. Traditional research on organizational support theory has focused mainly on organization-wide and leadership factors, such as organizational climate, working conditions, organizational justice, perceived support, and professional assistance (Liu et al., 2019; Zhou, 2009), with limited attention to colleagues. Although scholars generally recognize colleagues and their interactions as important internal organizational factors, and some have even incorporated community support into the structure of organizational support (Liu, 2005), few studies have explored the supportive role of colleagues through the lens of energy dynamics (Cui et al., 2021). Energy, as an internally generated resource within interactions, offers a dynamic and interactive perspective that enriches organizational support theory and provides a novel approach to understanding how colleague support influences R&D personnel.

5.3 Managerial Implications

This study offers the following insights for leaders and managers responsible for R&D personnel and team management:

(1) Managers should integrate spiritual factors into R&D management practices. Young R&D personnel today, as digital natives immersed in the internet and emerging technology environments, exhibit distinctive characteristics that differ significantly from previous generations, such as Generation X. Their emphasis on self-worth and the meaningfulness of work extends beyond the motivational scope that traditional leadership approaches can effectively provide. Value recognition and participation/co-creation have become the organizational experiences most desired by this new generation of employees (Zhu, 2020). Current and future management of R&D personnel must attentively address their spiritual needs and sense of inner calling and emphasize the role of organizational vision, mission, and values to harness employees' intrinsic motivation for innovation. Meaningful and profound innovation relies on employees' pursuit of personal values and positive experiences; externally controlled and restrictive innovation management approaches not only fail to yield genuine innovation but may also hamper employees' efficiency and waste organizational resources. Organizational policies and resources supporting innovation should be designed

to meet employees' actual needs and focus on employee experience management and the cultivation of a supportive organizational culture.

(2) Managers should prioritize both self-motivation and organizational support for R&D personnel while optimizing team composition to foster mutual inspiration and collective growth. While calling-driven passion is essential for R&D personnel engaging in innovative work, support from the group is equally crucial. In the Chinese context, managing employees' means recognizing the significant influence of interpersonal relationships and organizational norms. Cultural traditions, such as the Confucian doctrine of the mean and collectivism, tend to encourage employees to adhere to relational norms and exhibit a "conformity" orientation (Ma & Cai, 2020). When faced with conflicts in innovation, employees may adopt strategies like compromise or withdrawal. Only when employees interact well with structural elements such as leadership, colleagues, and organizational norms—and receive support—are they likely to engage in proactive and breakthrough behaviors (Greenhalgh & Stones, 2010). As technology innovation competition intensifies, although R&D is a highly autonomous activity, solo efforts can hinder breakthrough achievements and potentially lead to psychological resource depletion, workplace isolation, and burnout (Xiao et al., 2020). Organizations and leaders should explicitly advocate for the values that encourage innovation and cultivate a supportive internal culture and reward system for innovation. This involves providing R&D personnel with a more flexible and open working environment, enhancing relationship management, and optimizing team composition to create a complementary member structure. Establishing team-based innovation units can promote collaboration and synergistic problem-solving. Furthermore, it is essential to set up platforms for high-quality interactions and encourage knowledge and energy-sharing networks within the organization to enhance collaboration and drive collective innovation efforts.

5.4 Limitations and Future Directions

First, this study employs a cross-sectional design, which limits the ability to infer causal relationships and fails to capture the comprehensive and dynamic process by which spiritual leadership influences the innovative behavior of R&D personnel. Future studies could use natural experiments or longitudinal research to improve precision. Second, the measurement tools rely on self-reported scales. Although core variables were assessed through leader-employee paired evaluations, subjective and objective factors inevitably influenced the results. Future studies could incorporate objective data and alternative indicators, such as patent data, which could benefit future research. In addition, future studies might explore the mechanisms through which spiritual leadership affects the innovation behavior of R&D personnel from a multi-theoretical perspective and examine its incremental effects and differences compared to transformational and servant leadership. Finally, while this study investigates the mechanisms of spiritual leadership's influence from a combined perspective of mission-driven motivation and organizational support, it focuses primarily on organizational factors. It does not delve into the potential impacts of organizational structure, collective energy, team spirituality, or individual differences within R&D teams. Future research could explore the nonlinear, complex system relationships and mixed effects between leaders, colleagues,

and the organization from perspectives such as adaptive structuration theory, conservation of resources theory, social facilitation theory, and social contagion theory (Cui et al., 2021).

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