

## Research Article

# Organizational Climate, Innovation Orientation, and Innovative Work Behavior: The Mediating Role of Psychological Safety and Intrinsic Motivation

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Nowadays, many high-tech SMEs have gradually focused on innovation-orientation and have adopted various measures to create an organizational climate, stimulate knowledge workers' enthusiasm for innovation, and promote individual innovation behavior, but met with little success. Based on the stimulus organism response (SOR) model, the objective of this study is to explore the mediating factors that affect knowledge workers' innovative work behavior, and construct a three-level model of the external environment, psychological factors, and individual behavior. This study selected 575 valid samples from 24 high-tech SMEs in Zhongguancun, which is a technology hub in Haidian District, Beijing, China. Through the convenience sampling method, This study analyze the data and perform structural equation modeling (SEM) using AMOS 23.0. The external environment (i.e., organizational climate, innovation orientation) and psychological factors (i.e., intrinsic motivation, psychological safety) have a significant positive impact on innovative work behavior. Psychological factors have the most significant impact on innovative work behavior. Besides, psychological factors also mediate the relationship between the external environment and innovative work behavior. The findings indicated that high-tech SMEs need to formulate scientific innovation-orientation when implementing strategies, and continue to shape a harmonious and equal organizational climate. Furthermore, high-tech SMEs should encourage knowledge workers to speak the truth, express different voices, and stimulate work enthusiasm to improve psychological safety and intrinsic motivation, thereby enhancing knowledge workers' innovative work behavior.

## 1. Introduction

Extensive research has focused on the concept of innovation [1], and the study on innovation is one of the most significant emerging trends in management sciences. Innovation is considered as the key to the competitive advantage of organizations [2], which has been shown to make success in today's competitive work environment. Since innovation in firms starts with new ideas generated, adopted, or modified by knowledge workers, it is imperative to understand the antecedents of individual innovative behavior.

Especially for high-tech SMEs, the living environment of enterprises has undergone significant changes. Ministry of Science and Technology will, in particular, boost the

development of innovative sci-tech SMEs featuring key technologies, research personnel, high-value intellectual property rights, and high research input, according to the notice that studies on innovation issues have received much attention in recent decades [1, 3]. However, business management is not a simple matter to promote knowledge workers to carry out sustainable and long-term innovative work behaviors [3]. Knowledge workers as the core members of enterprise, most of the knowledge workers are engaged in creative work [4]. They rely on their own professional knowledge, use their minds to think creatively, and constantly form new knowledge achievements. And compared with ordinary work behavior, innovative work behavior always depend on the knowledge works, which is expressing

new ideas to achieve innovation. Most research focuses on building an organizational climate such as infrastructure construction, improving knowledge workers' working environment, increasing work remuneration, and improving living and welfare levels, or leadership relationship. However, it ignores the knowledge worker's psychological factors and the company's innovation-orientation. In the antecedents of innovative behavior, the antecedents at different levels are not explored in depth. Therefore, to stimulate knowledge workers' innovation activities, this study is based on the stimulus-organism-response (SOR) model and constructs a three-level impact mechanism model of the external environment, psychological factors, and individual behavior. The objectives of this study are as follows. First, it is to construct an innovative work behavior model from organization, knowledge worker's psychology, and behavior. Second, it is to explore the factors that influence innovative work behavior. Third, it is to inform the organizations on the existing climate and strategy to make suggestions. This study found the influence of psychological factors (i.e., psychological safety and intrinsic motivation based on the SOR theory) further stimulated innovative work behavior and played an important mediating role between the external environment (i.e., organizational climate and innovation orientation). This study chooses high-tech SMEs as samples, which can effectively help small and medium-sized enterprises to adjust their strategy and organizational climate to achieve product, service, and management innovation.

The following sections are structured as follows: Section 2 reviews the literature related to the theory of SOR, the hypotheses and conceptual models. Section 3 introduces data collection and data analysis methods. Section 4 describes the results of the data analysis and tests the hypotheses. Section 5 discusses the theoretical and managerial implications. Section 6 summarizes the central ideas, limitations with directions for future studies.

## 2. Literature Review

*2.1. The Theory of Stimulus Organism Response (SOR).* Calvo et al. [5] reposed a one-way linear research idea of individual behavior. They believed that particular behavior was directly stimulated by external environmental factors, which resulted in a "stimulus-response" (S-O) behavior research model. The S-O model oversimplifies individual behavior, ignores consciousness and psychological state, and believes there is no mediating effect between external stimuli and behavioral responses. In later research, scholars [6] proposed the SOR model, which believed that the combination of individual differences and external stimuli formed a mediating variable between the stimulus and response, and this mediating variable directly impacted individual behavior (see Figure 1). Nolan and Garavan [6] further improved the "S-O-R" model by studying the environment and individual behavior. They believed that the physical situation could affect the individual's inner psychological state and prompt the individual to produce corresponding behavioral responses.

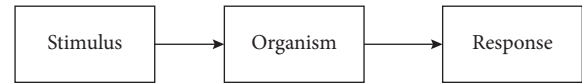


FIGURE 1: Stimulus organism response model.

The SOR model is often used to predict consumer behavior, and rarely used to predict innovative behavior, but innovation is also one of the critical results of organizational response [7]. Stimulus is an influencing factor of the internal and external situations of the organism, which can affect the mental state of the cognitive identification state of the organism. After a series of psychological or identification activities, the organism will adopt an internal and external behavioral response to the stimulus [8]. The internal response is reflected in the individual's attitude, and the external response is reflected in the individual's behavior [9].

The innovative behavior of knowledge workers is mainly affected by two factors, namely, organizational orientation and work climate. Strategic orientation determines the behavior direction of knowledge workers, and work situation climate also has a significant influence on knowledge workers' behavior choices [10]. Innovation orientation is an innovation-orientation developed by an organization to respond to permanent market challenges [11]. It is a strategic environmental factor that can provide knowledge workers with innovation orientation task guidance and has a positive impact on their innovation behavior. Organizational climate is the atmosphere of the work environment that knowledge workers can perceive. It is an environmental factor at the work team level [12]. It contains team groups' expectations and support for knowledge workers' behavior and has an important impact on knowledge workers' innovative behavior.

In terms of organism factors, knowledge workers' psychological safety and intrinsic motivation are important factors that affect individual innovative work behavior. Psychological security means to feel safe from the psychological level. Newman et al. [13] proposed an understanding of the individual's psychological safety and believed that psychological security is a feature based on the individual's psychological perception and inner state. Intrinsic motivation is a mental state in which the individual is attracted and motivated by the work itself and desires to devote themselves to work [14].

It can also be seen from the "S-O-R" model research paradigm that external environmental stimuli can affect the internal psychological state of knowledge workers and have an impact on their innovative behavior. In this study, psychological safety and intrinsic motivation mediate the relationship among innovation orientation, organizational climate, and knowledge worker's innovative work behavior. In short, the "S-O-R" research paradigm believes that the study of an individual behavior should pay attention to the stimulating effect of the external environment and the mediating development of the individual's internal consciousness. Stimuli from external environmental factors can affect the inner psychological state, which in turn encourages individuals to produce different behavioral response results.

Therefore, based on the “S–O–R” research paradigm, this study builds a model of the influence of innovation orientation and organizational climate on knowledge worker innovation behavior.

## 2.2. Hypothesis Development

*2.2.1. Organizational Climate, Innovation-Orientation, and Innovative Work Behavior.* Innovation orientation is an innovation-driven strategy launched by an organization to respond to permanent market challenges, and it is a formal control force that affects knowledge workers’ innovative behavior [15, 16]. It can reduce the knowledge workers’ perception of the dangers of innovation and promote the development of knowledge workers’ innovative behavior activities. Wei et al. [17] found through empirical research a clear positive correlation between the innovation-oriented attitude towards change and the introduction of innovation.

Regarding the earliest research on organizational climate, Litwin (1968) believes that organizational climate is something that every member of the organization can perceive and experienced organizational environment, which can be measured by members. In such a friendly climate, colleagues will trust each other, which will make the cooperation between members stronger, so that they can share their knowledge and generate new ideas [18]. According to the fairness theory, the degree of fairness that employees feel in the organization will affect the behavior of employees, so the degree of fairness that employees feel is an important antecedent to the study of employee behavior results. Johannessen and Olsen [19] found that when employees feel supported by the organization, they actively participate in the creation because it is an climate that the organization strongly promotes. Even if employees are frustrated or fail in the innovation process, the organization does not punish them, thereby stimulating employees to innovate. Thus, the following hypothesis is proposed:

*Hypothesis 1.* Organizational climate can be positively associated with knowledge workers’ innovative work behavior.

*Hypothesis 2.* Innovation orientation can be positively associated with knowledge worker’s innovative work behavior.

*2.2.2. Organizational Climate, Innovation-Orientation, and Psychological Safety.* From the perspective of psychology, external environmental stimuli can affect the individual’s mental state, and individuals will integrate their characteristics with environmental characteristics to form an internal psychological response to a given environment [20]. The high level of psychological safety of knowledge workers is mainly manifested in the following aspects: first, knowledge workers can speak freely and fully express their personal views; second, managers allow that knowledge workers engage in some meaningful or potentially valuable event without achieving the expected goals, and knowledge workers will not be punished or negatively pressured; third,

knowledge workers maintain a high degree of trust and share common visions and dreams [21].

The organization’s implementation of an innovation-orientation allows knowledge workers to recognize that their innovative behavior is consistent with the organization’s strategic goals. Edmondson and Lei [22] believe that knowledge workers’ behavior will be impacted by their cognition of interpersonal relationships in the work environment, the awareness of the innovative climate, and the perception of organizational fairness procedures. On this basis, Kahn [23] believes that people in a trust relationship can effectively improve psychological safety. This kind of support and the trust-friendly relationship has a flexible mechanism that enables knowledge workers to dare to try new affairs. Thus, the following hypothesis is proposed:

*Hypothesis 3.* Organizational climate can be positively associated with knowledge workers’ psychological safety.

*Hypothesis 4.* Innovation orientation can be positively associated with knowledge worker’s psychological safety.

*2.2.3. Organizational Climate, Innovation-Orientation, and Intrinsic Motivation.* Research by Shahin et al. [24] confirmed that a friendly organizational climate could increase knowledge workers’ satisfaction, organizational commitment, and professional engagement and reduce knowledge workers’ pressure and turnover tendency. Therefore, higher job satisfaction and lower turnover can increase knowledge workers’ intrinsic motivation.

Innovation orientation means that knowledge workers can perceive that their innovative and new ideas are encouraged and supported. Innovation orientation continuously impacts knowledge workers’ intrinsic motivation, attitudes, and behaviors. According to Farr and West [25]’s research, innovation orientation has a significant positive impact on knowledge workers’ psychological state. A higher degree of innovation orientation is more conducive to the enhancement of knowledge workers’ inner motivation. In addition, Hon [26] believes that innovation orientation can affect the inner motivation of individuals and affect the creativity of knowledge workers. Some scholars believe that factors such as fairness and knowledge workers’ sense of responsibility for work have an essential impact on improving knowledge workers’ intrinsic motivation [27, 28]. Therefore, this study proposes the following hypothesis:

*Hypothesis 5.* Organizational climate can be positively associated with knowledge workers’ intrinsic motivation.

*Hypothesis 6.* Innovation orientation can be positively associated with knowledge worker’s intrinsic motivation.

*2.2.4. Psychological Safety, Intrinsic Motivation, and Innovative Work Behavior.* Brink et al. [29] believe that when facing psychological threats and feeling psychologically insecure, people are more likely to show defensive tendencies and not to show innovative behaviors. Suppose

knowledge workers have a higher level of psychological safety, they will reduce the judgment of uncertain factors in the work environment. They tend to think that others will understand their innovative behaviors and their even risk-taking behaviors. Ford [30] proposed that safety signals are one of the essential situation variables related to innovation. The higher the knowledge worker's level of psychological safety, the higher the level of innovative behavior.

In the theory of creativity and innovation composition, Hennessey and Amabile [31] proposed that intrinsic motivation is crucial for individuals to generate creativity and innovation. Such positive emotions can enhance knowledge workers' psychological participation and energy for their continuous effort [32]. For example, they are more likely to expand the scope of searching for cognitive information actively, and it is easier to absorb and assimilate broader ideas. Self-determination theory believes that the self-confidence and sense of interest generated by intrinsic motivation can encourage knowledge workers to focus more on improving work effectiveness when facing challenging, complex, and unfamiliar work content. Therefore, this study proposes the following hypothesis:

*Hypothesis 7.* Psychological safety is positively related to innovative work behavior.

*Hypothesis 8.* Intrinsic motivation is positively related to innovative work behavior.

*2.2.5. The Mediating Role of Psychological Safety and Intrinsic Motivation.* The "S-O-R" model in psychological research believe that the external environmental stimuli that knowledge workers receive can affect their inner psychological state and affect their behavior. Knowledge workers innovation behavior also regard the individual psychological states as a vital influence mediator [33]. In this study, researchers believe that psychological safety and intrinsic motivation mediate innovation orientation, organizational climate, and knowledge worker innovation behavior.

For the research on psychological safety, there is little research on innovation. But according to the current study, we can find that an excellent organizational climate can meet the psychological needs of knowledge workers, such as interpersonal relationships, emotional friendship, and organizational affiliation. Providing innovation support to knowledge workers at work can effectively promote consistency and fit between them and the organization group. This climate can enhance knowledge workers' sense of belonging, thereby enhancing knowledge workers' psychological safety of innovative behaviors, conducive to knowledge workers discovering innovation opportunities and participating in innovation activities. Due to the uncertainty of innovative behaviors, knowledge workers will consider the risks brought by their behaviors before carrying out innovative behaviors, thereby reducing innovative behaviors. The implementation of the innovation-orientation can meet an agreement between the goals of the enterprise and the knowledge workers so that protect the knowledge

workers' original intention, promote the knowledge workers' innovative behavior, and stimulate their enthusiasm for innovation.

In many scholars' research, intrinsic motivation is often used as a mediating variable between the external environment and the innovative behavior of knowledge workers. This intrinsic motivation will be affected by the organization's innovation orientation and working atmosphere, affecting the knowledge workers' innovative behavior [34]. The implementation of an innovation-oriented strategy can provide knowledge workers with more strategic resource support for the implementation of innovation activities, giving them greater work autonomy and self-decision-making space, which will increase knowledge workers' inner work motivation and increase the degree of intrinsic motivation [35]. Under this kind of intrinsically enhanced motivation, knowledge workers will break through the limitations of traditional technical rules, reflect more individual flexibility and creativity, and encourage knowledge workers to show more innovative behavior. Therefore, this study proposes the following hypothesis:

*Hypothesis 9.* Psychological safety mediates the relationship between organizational climate and innovative work behavior.

*Hypothesis 10.* Psychological safety mediates the relationship between innovation orientation and innovative work behavior.

*Hypothesis 11.* Intrinsic motivation mediates the relationship between organizational climate and innovative work behavior.

*Hypothesis 12.* Intrinsic motivation mediates the relationship between innovation orientation and innovative work behavior.

*2.3. Conceptual Model.* Based on the above-mentioned derivation and discussion of the hypothetical relationship, this study is based on the SOR model to analyze the relationship between organizational climate and innovation orientation on innovative work behavior. At the same time, to test whether there is a significant mediating effect, this study tried to introduce two variables, psychological safety and intrinsic motivation, as the mediating variables of organizational climate, innovation orientation, and innovative work behavior. Therefore, this study constructs the following (see Figure 2) conceptual model. Meanwhile, according to existing researches, there are some control variables affecting on the innovative work behavior such as age, gender, education level, income, and job tenure.

### 3. Methodology

*3.1. Data Collection and Samples.* Participants for this study are knowledge workers working for high-tech SMEs in Zhongguancun, a technology hub in Haidian District,

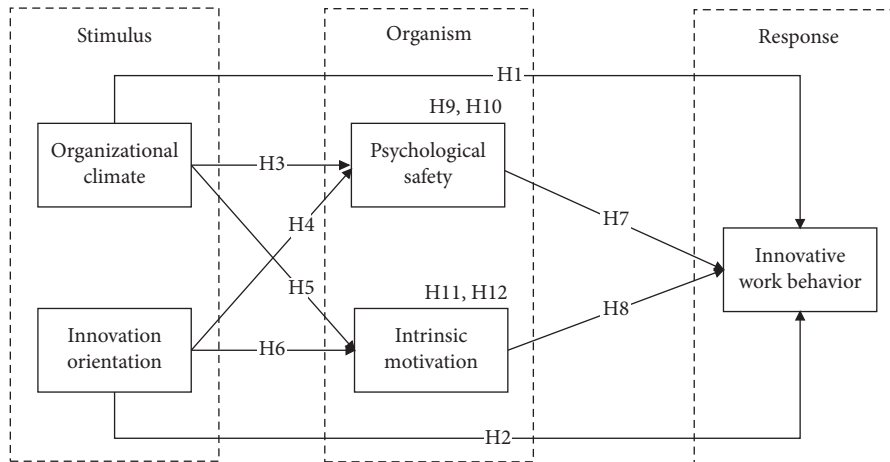


FIGURE 2: Conceptual model.

Beijing, China. Convenience sampling was used in the sample collection of this study because it is considered that this method can help researchers collect a large amount of data in a short period. The researchers contacted supervisors from 30 high-techSMEs and asked them to allow their knowledge workers to participate in the study. As a result, 24 companies participated in data collection from February to March 2021. Respondents were informed that participating in the survey was voluntary and anonymous, and they could get 10 CNY (1.5 USD) as a reward after the survey was completed. A total of 600 questionnaires were distributed to 24 high-techSMEs. Among them, 575 valid questionnaires were filled out, with a response rate of 95.8%. The demographic and job characteristics of the participants were reported in Table 1.

3.2. *Measure.* This study used existing scales, which were reliable and verified by different researchers. All items were scored on a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The organizational climate was measured using the 10-item scale designed by Zaacute et al. [36]. The measurement of innovation orientation is a three-item scale verified by Hurley and Hult [37]. They pointed out the need to pay more attention to the innovation and openness of the enterprise’s overall strategy and management field. Most researchers used the three-item scale developed by Detert and Burris [38] to measure psychological safety. The scale was adapted from Edmondson and Lei [22]’s research on the perception of team psychological safety and had good reliability. The measurement of intrinsic motivation was developed by Grant and Adam [39]. The scale has 4 items and has good reliability. The measure of innovative work behavior adopted the 8-item scale designed by Janssen [40]. Control variables include age, gender, education level, income, and job tenure.

**4. Results**

4.1. *Measurement Model.* This study tests the hypothetical model. It constructs reliability of the concepts that are measured using a multiple-item scale were evaluated by

TABLE 1: Descriptive statistics of the samples.

Demographic factor	Descriptive statistics
Age	Mean = 31.06 (s.d. = 5.861)
Gender	Male: 299 (52%) Female: 276 (48%)
Education level	Below bachelor’s degree: 39 (6.8%) Bachelor’s degree: 305 (53%) Master’s degree: 205 (35.7%) Doctoral degree: 26 (4.6%)
Income (monthly)	≤4,000 CNY: 38 (8.8%) 4,001–6,000 CNY: 225 (39.1%) 6,001–8,000 CNY: 216 (37.6%) 8,001–10,000 CNY: 63 (11%) ≥10,000 CNY: 33 (5.7%)
Job tenure	Mean = 4.13 (s.d. = 1.756)

using Cronbach alpha coefficient, composite reliability (CR), and average variance extracted (AVE). The AVE value of each construct in this study was, respectively, 0.562, 0.658, 0.638, and 0.568, which were all above 0.5, and all Cronbach alpha coefficients exceed the widely suggested value of 0.7. Thus, the convergent validity of this questionnaire conforms to the standard and has discriminant validity. At the same time, this paper analyzes the discriminant validity based on AVE value. It can be see that the AVE square root values 0.750, 0.811, 0.750, 0.799, 0.754 (represented in bold in Table 2) were greater than the maximum value of absolute correlation coefficient between factors, respectively, indicating that it has good discriminant validity. As shown in the above results, the reliability and validity of the scale used for this study conform to the relevant standards and requirements.

This conducted a correlation analysis to investigate the relationship between the measured variables. The means, standard deviations, reliability, and correlations among the key variables are shown in Table 2.

4.2. *Structural Path Model.* The modeling results of the structural equation model show that the model can be identified and converged, and there is no negative error variance in the nonstandardized estimation model, so the model identification

TABLE 2: Means, standard deviations, reliabilities, and correlations.

Variable	Mean	Sd	OC	IO	PS	Im	IWB
OC	3.883	0.635	<b>(0.750)</b>				
IO	3.908	0.828	0.392**	<b>(0.811)</b>			
PS	3.838	0.796	0.447**	0.446**	<b>(0.750)</b>		
IM	3.738	0.807	0.451**	0.501**	0.445**	<b>(0.799)</b>	
IWB	3.945	0.765	0.506**	0.492**	0.527**	0.594**	<b>(0.754)</b>

Notes: (1) diagonal elements are the square roots of AVE; (2) \*\*:  $p < 0.01$ .

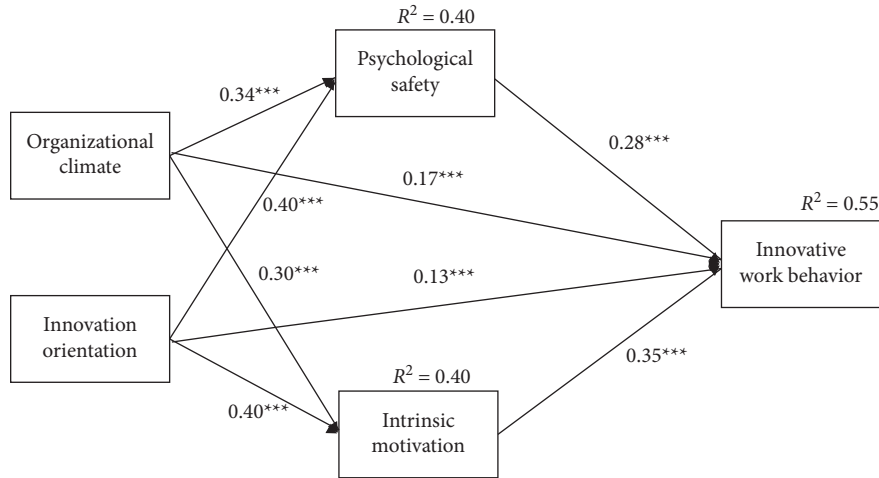


FIGURE 3: Structural Model. Notes: \*\*  $p < 0.01$  and \*\*\*  $p < 0.001$ ; standardized coefficients are reported.

TABLE 3: Standardized direct, indirect, and total effects.

	Point estimate	Product of coefficients		Percentile 95% CI		Bootstrapping Bias-corrected 95% CI		Two-tailed significance
		SE	Z	Lower	Upper	Lower	Upper	
<i>Direct effects</i>								
OC → IWB	0.171	0.048	3.563	0.078	0.268	0.076	0.267	0.000 (***)
IO → IWB	0.131	0.054	2.426	0.027	0.234	0.028	0.235	0.013 (*)
<i>Indirect effects</i>								
OC → IWB	0.199	0.034	5.853	0.137	0.270	0.137	0.271	0.000 (***)
IO → IWB	0.268	0.037	7.243	0.201	0.344	0.204	0.348	0.000 (***)
<i>Total effects</i>								
OC → IWB	0.370	0.045	8.222	0.283	0.456	0.282	0.455	0.000 (***)
IO → IWB	0.400	0.043	9.302	0.312	0.480	0.313	0.480	0.000 (***)

Notes: standardized estimation of 5,000 bootstrap samples; \*  $p < 0.05$  and \*\*\*  $p < 0.001$ . Abbreviations: OC, organizational climate; IO, innovation orientation; IWB, innovative work behavior.

rules are not violated. Besides, the fit between the model and the data is also good ( $\chi^2 = 534.749$ ,  $df = 341$ ,  $\chi^2/df = 1.568$ , CFI = 0.979, GFI = 0.939, AGFI = 0.927, RMSEA = 0.031). The structural equation modeling is shown in Figure 3.

Hypothesis 1 predicted that organizational climate positively associates with innovative work behavior. The result significantly confirms their positive link ( $\beta = 0.171$ ;  $p < 0.001$ ). Thus, hypothesis 1 is supported. Hypothesis 2 predicted that innovation orientation positively associates with innovative work behavior. The result also significantly confirms their positive link ( $\beta = 0.131$ ;  $pp < 0.01$ ). Thus, hypothesis 2 is supported.

Hypotheses 3 and 4 predicted that the organizational climate and innovation orientation positively associate with psychological safety, respectively. Results that the organizational climate positively associates with psychological safety ( $\beta = 0.340$ ;  $p < 0.001$ ). And innovation orientation positively associates with psychological safety ( $\beta = 0.402$ ;  $p < 0.001$ ). Hypotheses 5 and 6 predicted that the organizational climate and innovation orientation negatively associate with intrinsic motivation, respectively. Results that the organizational climate positively associates with intrinsic motivation ( $\beta = 0.297$ ;  $p < 0.001$ ). And innovation orientation positively associates with

intrinsic motivation ( $\beta = 0.446$ ;  $p < 0.001$ ). Therefore, hypotheses 3, 4, 5, and 6 are supported.

Hypotheses 7 and 8 predicted that psychological safety and intrinsic motivation positively associate with innovative work behavior. The relationship between psychological safety and innovative work behavior is positive and statistically significant ( $\beta = 0.281$ ;  $p < 0.001$ ). The relationship between intrinsic motivation and innovative work behavior is positive and statistically significant ( $\beta = 0.348$ ;  $p < 0.001$ ). Therefore, hypotheses 7 and 8 are supported.

The bootstrapping approach has been adopted in this study to test the mediating effect. According to Preacher and Hayes (2004) suggested, 5,000 bootstrap samples were generated with bias-corrected and percentile bootstrapping at a 95% confidence interval (see Table 3). There is no zero value within the 95% confidence interval, and the  $Z$  values were all greater than 1.96, so the effect can be considered significant. Hypothesis 9 to 12 predicted that psychological safety and intrinsic motivation play mediating role between organizational climate and innovative work behavior, respectively. As shown in Table 3, psychological safety positively and significantly mediates the relationship between organizational climate and innovative work behavior, and the relationship between intrinsic motivation and innovative work behavior (standardized indirect effect = 0.199,  $p < 0.001$ ). Therefore, hypotheses 9 and 10 are supported. Intrinsic motivation positively and significantly mediates the relationship between organizational climate and innovative work behavior, and the relationship between intrinsic motivation and innovative work behavior (standardized indirect effect = 0.268,  $p < 0.001$ ). Therefore, hypotheses 11 and 12 are supported.

## 5. Conclusion

**5.1. Theoretical Implication.** This study has made the following contributions to research on innovative behavior. First, the authors developed a new model to discuss the influences of external, psychological factors on innovative work behavior based on the “S-O-R” model. The results indicated that organizational climate and innovation orientation as the external stimulus factors have a significant and positive impact on psychological safety, intrinsic motivation, and innovative work behavior. The results are consistent with previous studies [41–43]. Innovation orientation has the strongest influence on psychological safety. Implementing innovation-oriented strategies can inspire knowledge workers’ enthusiasm for innovation to take risks and dare to try constantly, significantly reduce knowledge workers’ perception of the dangers of innovation, eliminate various internal obstacles to engaging in transformation activities, and effectively promote knowledge workers’ innovative behavior. Although the innovation orientation at the strategic organizational level can provide knowledge workers with strategic guidance and activity arrangements, the environment in which they work should have a closer influence on selecting knowledge workers’ work behaviors and activities. Supervisor’s task arrangement, colleagues’ mutual assistance and cooperation, fair performance system,

etc., all have a more significant impact on knowledge workers.

Second, The SOR theory points out that the combination of individual differences and external environmental stimuli forms a mediating variable between stimulus and response. Based on this, this study takes psychological safety and intrinsic motivation as the mediating variables that influence innovation orientation and organizational climate on knowledge workers’ innovative behavior [43]. There are four hypotheses. The results of sample data analysis support the viewpoints of this study. This study found that the relationship between organizational climate and innovative work behavior is positive and significantly mediated by psychological safety and intrinsic motivation. The relationship between innovation orientation and innovative work behavior is positive and significantly mediated by psychological safety and intrinsic motivation. It can be found that comparing the mediating variables, the mediating role of intrinsic motivation is higher than the role of psychological safety. The intrinsic motivation perceived by knowledge workers is an important mediating variable of innovation orientation and organizational climate for knowledge workers’ innovative behavior. This conclusion is consistent with previous research.

**5.2. Practical Implication.** This study has made the following contributions to managerial implications on innovative behavior. Firstly, psychological factors (i.e., intrinsic motivation, psychological safety) have the most significant impact on knowledge workers’ innovative work behaviors and mediate the relationship between the external environment (i.e., organizational atmosphere, innovation orientation) and innovative work behavior. Because of the particularity of innovative work behavior, it is a process that requires knowledge workers to fully mobilize their intrinsic motivation to create new value. Therefore, if the goal is only to complete the task mechanically, then it is impossible to achieve true innovation. Regarding how to improve knowledge workers’ intrinsic motivation, the company should build the following two aspects to make knowledge workers like their work because interest is always the best teacher. On the one hand, company should create a harmonious and equal atmosphere, respect the needs of knowledge workers, understand the difficulties and problems encountered by knowledge workers at work, and attach importance to cooperation and sharing between knowledge workers. In Eastern culture, companies mainly use top-down management method, lacking down-top expression. Using the down-top expression approach can effectively improve the company’s atmosphere. On the other hand, companies should establish an innovation orientation of corporate strategy, emphasizing corporate culture, goals, and vision so that knowledge workers feel that their innovative behavior is consistent with its objectives.

Secondly, based on the feedback from the returned questionnaires, the researchers found that under the influence of East Asian culture (e.g., high power distance),

knowledge workers dare not express their true thoughts to their leaders when their ideas are inconsistent. This is because most knowledge workers are worried that they might get the negation of their leaders when expressing different views, and the different views might even have a bad influence on their work. To improve knowledge workers' psychological safety in East Asian countries, leaders should first let knowledge workers know that it is safe to express true thought in the company and that they will not be punished if they raise the company's problems and even get rewards if the ideas are adopted. The two methods can effectively improve knowledge workers' psychological safety in the work of innovative behavior.

Thirdly, organizational climate and innovation orientation also have a significant impact on the innovation behavior of knowledge workers. This shows that implementing innovation orientation and building an excellent corporate climate in high-tech SMEs can effectively promote knowledge workers' innovative behaviour. Therefore, for the management practice of high-tech SMEs, it is necessary to persist in formulating scientific innovation-oriented strategies and create an excellent organizational climate. On the one hand, in terms of strategy formulation, it is essential to "slogan" and "reimplement." When implementing an innovation orientation strategy, it is necessary to formulate a specific business development strategy and decompose it layer by layer through target management methods so that knowledge workers at all levels in the organization can receive innovation-oriented strategic support, to fully mobilize the enthusiasm of knowledge workers for innovation. Only then can they more positively influence their innovation activities. On the other hand, companies need to be persistent, and long-term focused on creating an organizational climate. Creating an excellent organizational climate is a long-term investment. It should not only look at the immediate situation but requires persistent implementation.

Fourthly, In the daily management of an enterprise, the following methods can be used to create an appropriate organizational climate and innovation orientation. On the one hand, create a innovation-oriented corporate culture or strategy. Because when employees feel relaxed and happy in the organizational innovative activity, they are more willing to communicate and trust with their colleagues and share their experience, skills and other knowledge, therefore it can affect on innovative behavior. The other hand, establish a good and fair climate. Because when employees feel that there is a fair climate in the organization, their efforts will be rewarded fairly, which will stimulate the inner potential of employees, enhance communication between employees, and enable employees to produce innovative behaviors.

*5.3. Limitation and Future Research.* Based on the proposed objectives, this study investigated knowledge workers' innovative work behavior based on SOR theory. This study extracts that psychological safety and intrinsic motivation are the mediating factors that affect knowledge workers' innovative behavior. It analyzes the mechanism of innovation orientation and organizational climate on knowledge

workers' innovative behavior. It constructs a corresponding relationship hypothesis model. The survey of technology-based SMEs for quantitative analysis uncovered the "black box" of the internal psychological factors of innovation-orientation, organizational climate as external environmental variables affecting innovative behavior. Research results show that intrinsic motivation and psychological safety have the greatest impact on innovative work behavior, followed by organizational climate and innovation orientation. Besides, intrinsic motivation and psychological safety mediate the relationship between organizational climate and innovative work behavior and innovation orientation and innovative work behavior.

This study has certain limitations. Firstly, the innovation behavior of knowledge workers is the result of multiple factors. Due to the limitation of the research theme, personal energy and time, this study only explores the relationship between innovation orientation, organizational climate, psychological safety, internal motivation, and knowledge workers' innovation behavior. It does not involve more antecedent and mediating variables, with certain limitations. In the follow-up research, it may be necessary to introduce more mediating variables and moderating variables, and further explore the mechanism of the influence of innovation orientation and organizational climate on the innovation behavior of knowledge workers. Secondly, when discussing the effect of innovation orientation and organizational climate on knowledge worker innovation behavior, this study did not give too much analysis and explanation to the control variables involved, mainly considering that these variables are not the main research variables of this study. In this study, the control variables do not significantly influence the relationship with knowledge workers' innovative behavior. Future research can analyze the relationship between knowledge workers' experience years, income, etc., and their innovative behaviors. Thirdly, this study did not consider the influence of moderating variables, especially the influence of innovation orientation, the organizational climate on psychological safety, and the formation of different moderating variables among internal dynamics. In future research, it is necessary to extract the possible moderating variables in different relationship paths and then conduct an in-depth analysis and inspection of the detailed interaction relationship between these elements.

## Data Availability

The data used to support the findings of this study are included within the article.

## Conflicts of Interest

The authors declare that they have no conflicts of interest regarding the publication of this paper.

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