

# The Effect of Organizational Dynamics Towards Innovative Behaviour of R&D Personnel in High-tech Enterprise

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**Abstract:** In the fiercely competitive environment of the global market, innovation has become a key factor for corporate survival and success. This study aims to explore the impact of organizational dynamic factors on the innovative behavior of R&D personnel in high-tech enterprises in Shaanxi Province. Although research on individual innovative behavior continues, there is a research gap in the specific impact of organizational dynamics on innovative behavior, especially in the specific context of technology-based enterprises. This study explores the relationship between high-tech enterprises and the innovative behavior of R&D personnel, and analyzes organizational dependence, innovation climate, employer brand, and work engagement as key organizational dynamic factors that influence the innovative behavior of R&D personnel. The study adopted the stimulus-organism-response (SOR) model, job demands-resources (JD-R) model and social cognitive theory as conceptual frameworks. Through quantitative research methods, an online questionnaire survey was conducted among 458 R&D personnel of high-tech enterprises in Shaanxi Province. Data analysis included descriptive statistics, reliability and validity tests, and structural equation modeling. The results show that although organizational dependence and innovation climate have no direct impact on the innovative behavior of R&D personnel, they indirectly affect innovation through work engagement. Employer brand not only has a direct impact, but also affects innovative behavior through work engagement. The research results suggest practical contributions such as establishing a community of employee interests, improving collaborative interactions between organizations and R&D personnel, and creating a positive employer brand image. Limitations of this study include the geographical focus on Shaanxi Province, and it is recommended that future research consider a wider sample and consider moderator variables in the future to fully understand the impact of organizational dynamics on innovative behavior.

**Keywords:** Organizational dynamics, Innovative work behaviour, R&D personnel, Work engagement, Employer brand, high-tech enterprise.

## 1. Introduction

In the current fiercely competitive environment of the global market, innovation has become a crucial element for the survival and success of enterprises. Slowing global economic growth, rapid technological changes, diversified consumer demands, and increasing environmental constraints have made innovation particularly urgent for enterprises [1][2][3]. This challenge is particularly significant in China, where companies' demand for high-level innovative talents continues to emerge. However, corporate managers have insufficient understanding of human resources and fail to build a comprehensive human resources management model that is in line with the industry and their own characteristics. As a result, employees lose confidence in the company, reduce corporate loyalty, and ultimately lead to brain drain, especially in high-tech enterprise, the phenomenon of turnover of R&D talents has brought serious challenges to enterprises. At the same time, [4] technology blockade has had an impact on China's high-tech enterprises, intensifying the demand for employees' innovative behaviors. Currently, the turnover rate of high-level innovative talents in enterprises is relatively high, which brings more challenges to stimulating the innovative behavior of the new generation of R&D personnel.

The factors that influence individual innovative behavior have always been the focus of scholars. An individual's

propensity to engage in innovative behavior may be influenced by a variety of factors at both the individual and organizational levels. However, the specific impact of organizational dynamics on innovative behavior, particularly the relationship between organizations and R&D personnel, remains an underexplored area. Although there is a large amount of literature in the field of organizational innovation and employee innovative behavior, and existing research mainly focuses on general employees and leadership, there is still a lack of specific research on the innovative behavior of R&D personnel in the special context of technology-based enterprises [5]. In addition, although many scholars pay attention to the study of work engagement on innovative behavior, there is still a lack of directly related research results using work engagement as an intermediate variable to deeply study the mechanism of organizational dynamic factors on innovation performance.

In order to fill the above research gaps, this study focuses on the relationship between high-tech enterprises and the innovative behavior of R&D personnel, and deeply analyzes the factors such as organizational dependence, innovation climate, employer brand, and work engagement at the organizational dynamic level in affecting the innovative behavior of R&D personnel.

The core focus of this study is an in-depth exploration of the organizational dynamics factors that influence the innovative behavior of R&D personnel in technology

companies. In this study, these organizational dynamic factors include organizational dependence, organizational innovation climate, employer brand, and the critical role of work engagement in influencing innovative behaviors. In the process of organizational practice management, the innovative behavior of R&D personnel not only plays an important role in improving innovation work performance, but is also crucial to maintaining the core competitiveness of the organization[6]. Understanding how these organizational dynamics influence the innovative behavior of R&D personnel plays a key role in achieving the company's long-term innovation goals and managing the success of R&D teams.

Overall, this study aims to contribute new insights to corporate innovation management practices and the literature related to employee innovative behavior, providing valuable insights to academics and corporate managers. The research results not only provide new ways to enhance the loyalty of R&D personnel, promote independent innovation, and cultivate innovative talents in enterprises, but also emphasize the importance of shaping a positive organizational culture and work environment through an in-depth understanding of different organizational dynamic factors. By cultivating a close relationship between the organization and R&D personnel and building an attractive employer brand, we can effectively stimulate employees' innovation passion and investment, thereby promoting meaningful innovative behaviors. Taken together, this study provides a deep understanding of the innovative behavior of high-tech enterprises and R&D personnel, and provides practical guidance for organizational management and future development.

## 2. Conceptual Background

### 2.1. Fundamental theories

#### 2.1.1. SOR model

The SOR model is a theoretical model widely used to study human behavior. It is based on a simple assumption that human behavior is affected by three factors: Stimulus (stimulus), Organism (individual) and Response (response)[7]. Tolman, a representative figure of new behaviorism, found through studying the learning process of mice that individual behavior is affected by a variety of factors, including cumulative experience, external environment, individual differences, and other mediating variables[8]. Based on this intermediary link of "organism's internal state", the SOR model was born. In 1974, Environmental psychologists Mehrabian and Russell further improved the "S-O-R" model in studying the environment and individual behavior, believing that the physical environment atmosphere can affect the individual's internal state, and in turn prompt the individual to produce approach or avoidance behavioral responses.

In short, the "S-O-R" research paradigm believes that studying individual behavior must not only pay attention to the stimulation of the external environment, but also pay attention to the mediating role of the individual's inner consciousness. The stimulation of external environmental factors can affect the internal psychological state of the body, thereby prompting the individual to produce different behavior response[9]. In this study, the theoretical framework is established based on the SOR model, where *s* represents different organizational dynamic factors, *o* is the individual

response, that is, work engagement at the individual level, and *r* is the innovative behavior of employees.

#### 2.1.2. JD-R model

The job requirements-resources model mainly explores the psychological processes that occur when employees face the organization's job requirements and job resources in the organization's work environment. According to the dual-path hypothesis of the JD-R model, when the organizational environment only imposes work requirements on employees but is stingy in providing work resources, it will cause resource consumption to employees through the stress process, reduce work input, have an impact on work performance, and cause job burnout problems. But if the organization can provide employees with rich work resources, it can stimulate employees' work investment through the motivation process, thereby producing a positive impact. Therefore, increasing job resources (organizational support[10], job autonomy, emotional support, incentive mechanisms has the effect of "killing two birds with one stone"[11]. "Talent" has always been a very important and indispensable core asset for high-tech enterprises. If employees can be given sufficient work resources and identify with the organization and work, employees will be more involved in the work environment physically, emotionally, and cognitively, then employees will be willing to produce various innovative behaviors in a pleasant working environment, thereby improving the innovation performance of high-tech enterprises[12]. In the past, scholars focused on the job requirements-resources model, mostly focusing on the negative impact of work stressors on employees and organizations, but ignored the positive impact of job resources in the model on organizations and employees.

Therefore, this study takes the perspective of work resources, applying the Job Demands-Resources model theory. The aim is to delve into the impact of dynamic organizational factors (including organizational dependence, organizational innovative atmosphere, and employer brand) within high-tech enterprises. Additionally, the study explores the influence of these factors on the innovative behavior of research and development personnel, considering the mediating effect of work engagement. This not only establishes a robust theoretical foundation for the relevant field but also provides strong support for further research.

#### 2.1.3. Social cognitive theory

The most famous one in social cognitive theory is triadic reciprocal determinism, that is, the environment, behavior and cognition constantly interact and influence each other to form a causal relationship<sup>[13]</sup>. In cognitive activities, cognitive situations have an impact on individual psychology and behavior. People will show different psychological and behavioral responses in different situations. In short, an individual's perception of the environment affects behavior through inner cognition and emotion, and at the same time controls behavior through cognition. Individual behavior also affects the environment, internal psychological factors, and physiological states, which interact to explain human behavior[13]. Past research has shown that individual, team, and organizational level variables all influence innovative behavior. However, most scholars usually adopt a single perspective when studying innovative behavior, ignoring the nested relationship between these influencing factors at various levels. Employees' innovative behavior is mainly affected by multiple influencing factors at different levels.

This study will take organizational-level factors, including organizational dependence, organizational innovation climate and employer brand, as well as individual-level work engagement as the starting point to explore their relationship with employee innovative behavior. Comprehensive analysis of the interrelationships between these factors at different levels will help to provide a more comprehensive understanding of the determinants of employee innovative

behavior.

## 2.2. The key concepts

This study introduces a conceptual model comprising five key factors: organizational dependence, organizational innovation climate, employer brand, work engagement, and innovative work behavior.

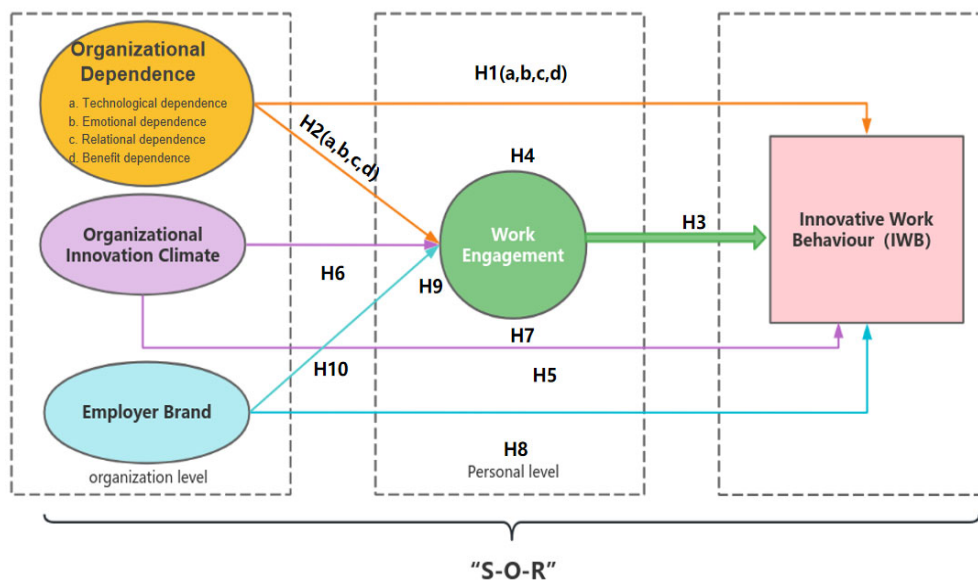
**Table 1.** Definition of key terms

Variables		Definitions
Independent variables	Organizational dependence	Organizational dependence emphasizes the interdependence and mutual exchange between employees and the organization, which is a kind of interdependence between employees and the organization based on the same values and in the process of effective integration of resources, technologies and capabilities[14].
	Organizational innovation climate	The innovation climate is the context in which the interaction between people and the environment in the organization leads to the creation and diffusion[15].
	Employer brand	the employer's brand is considered as the employer's commitment to employees and serves as an emotional connection between the employer and employees.
Mediating variable	Work engagement	Engagement refers to a fully engaged employee who wants to perform his or her duties. Employees' physical, cognitive, and emotional commitment reflects their engagement[16].
Dependent variables	Innovative work behavior	This is the employees' action in creating, applying, and executing original ideas, processes, procedures, and products[17].

## 2.3. Research conceptual framework

The theoretical framework of this study is built on the SOR model and is supported by social exchange theory, job-

resource demand model and social cognitive theory to deeply analyze the impact of organizational dependence, organizational innovation climate, employer brand and work engagement on R&D personnel innovation behaviour.



**Figure 1.** Conceptual model

## 3. Methodology

### 3.1. Research method

This study employed quantitative research approach to investigate the organizational dynamic factors impact on

innovative behavior of R&D personnel in high-tech enterprise.

### 3.2. Sampling design

The participants was selected from the target population using both probability and non-probability techniques, and

the total sample size was 384. This study first started with purposive sampling, selecting individuals or groups with knowledge, experience, or expertise related to the research focus [18]. This study intentionally selects specific companies that are representative and influential in the high-tech industry in Shaanxi Province, the target region. Random sampling is a sampling method that ensures that each individual in the population has an equal and independent chance of being selected into the sample, thereby eliminating selection bias and ensuring the randomness and representativeness of the sample [19]. Once the selection of high-tech companies was identified through purposive sampling, the study continued using random sampling to select individual R&D personnel as study respondents to ensure that every R&D employee in the selected company had an equal chance of being included in the sample.

### 3.3. Questionnaire development

The questionnaire was adapted from an existing mature scale and covers five aspects: organizational dependence, organizational innovation climate, employer brand, work engagement and innovative behavior. The entire questionnaire was professionally evaluated by two professor and three doctoral candidates, and the measurement content of each question was evaluated for its pertinence, structural integrity, and accuracy of expression. By deleting duplicate or lack of pertinence questions, 43 questions were finally used, forming an initial questionnaire on the impact of organizational dynamic factors on the innovative behavior of R&D personnel. Subsequently, pilot test and exploratory factor analysis were conducted on the initial questionnaire, and finally a formal questionnaire containing 41 questions was constructed. Specifically, the organizational dependence scale contains 17 measurement questions, covering four dimensions; the organizational innovation climate scale contains 5 measurement questions; the employer brand scale contains 5 measurement questions; the work engagement scale contains 7 measurement questions; the innovative behavior scale contains 7 measurement items.

### 3.4. Data collection

This study adopted an online questionnaire survey, and a total of 458 questionnaires were distributed through the Questionnaire Star platform, targeting personnel engaged in R&D work in high-tech enterprises in Shaanxi Province. Eligible participants were invited to fill in the questionnaire, which was expected to take approximately 5 minutes. Informed consent will be obtained from participants at the beginning of the survey and their confidentiality and anonymity will be guaranteed. This study strictly adhered to research ethics guidelines, including the principles of informed consent, data privacy, and voluntary participation. Participant identities and responses will be treated confidentially and all data will be stored securely [20].

### 3.5. Data analysis

After the data collection was completed, this study used SPSS and AMOS software to conduct in-depth analysis of the quantitative data. Descriptive statistics were used to comprehensively explain the basic characteristics of the variables [21]. In order to evaluate the internal consistency

and reliability of the measurement scale, this study applied Cronbach's alpha [22]. Confirmatory factor analysis (CFA) was used to assess the convergent and discriminant validity of the measurement items, helping to validate the underlying structure of the construct and ensure that the items accurately measured the intended latent variables. Correlation analysis further reveals the relationship between variables [23]. Subsequently, this study employed structural equation modeling (SEM) to delve into the complex relationships among multiple variables and provide insights into direct and indirect effects. Through SEM, this study evaluates the hypothesized relationships and mediating effects among organizational dependence, organizational innovation climate, employer brand, work engagement and innovative behaviors. This comprehensive analysis helps to reveal the complexity of the research model and provide a deeper understanding of the direct and indirect effects of these organizational dynamic factors on the innovative behavior of R&D personnel.

## 4. Results and Findings

### 4.1. Demographic information

This study recovered 385 valid questionnaires, with an effective rate of 84%. As shown in table 2, the research subjects are mainly engaged in high-tech industries, of which the electronic technology industry accounts for 26.5% and the aerospace manufacturing field accounts for 24.2%. Other industries include energy technology, biomedicine, Internet technology, transportation, etc., accounting for 10.4%, 3.9%, 7%, 5.7% and 13.5% respectively. Among these enterprises, 44.7% of the respondents work in private enterprises, 30.9% in state-owned enterprises, and the rest are foreign enterprises (7.8%) and other enterprises (16.6%). Male account for 57.4% of the total number, and female account for 42.6%. In terms of age, 38.4% are between 26 and 35 years old, 25.2% are between 36 and 45 years old, and 17.7% are between 46 and 55 years old. There were fewer respondents aged 25 and below and 55 and above, 9.1% and 9.6% respectively. In terms of education level, undergraduates accounted for the most, accounting for 44.7%. Bachelor's degree or below and master's degree accounted for 24.4% and 24.7% respectively. R&D personnel with doctoral degrees accounted for 6.2%. Grassroots R&D personnel account for 48.1%, grassroots managers account for 19%, and middle-level and top-level managers are basically the same, accounting for 16.6% and 16.4% respectively. R&D personnel with less than 1 year of working experience accounted for 11.2%, those with 1-2 years accounted for 13.5%, 3-5 years accounted for 23.4%, 6-10 years and more than 10 years accounted for 25.2% and 26.8% respectively.

Demographic analysis plays a key role in research [24]. This study was able to gain a more comprehensive understanding of the characteristics and composition of the sample through an in-depth study of demographic information such as gender, age, education, and work experience of the respondents. This helps to draw an overall picture of the research object, identify possible relationships between organizational dependence, organizational innovation climate, employer brand, work engagement and innovative behavior variables, and provide a more in-depth basis for subsequent analysis.

**Table 2.** Demographic information

	<b>Variables</b>	<b>Frequency</b>	<b>Percent</b>
<b>Gender</b>	Male	221	57.40%
	Female	164	42.60%
<b>Age</b>	25 and under 25	35	9.10%
	26-35	148	38.40%
	36-45	97	25.20%
	46-55	68	17.70%
	Over 55	37	9.60%
<b>Education Level</b>	College diploma and below	94	24.40%
	Undergraduate	172	44.70%
	Post graduate	95	24.70%
	PHD and above	24	6.20%
<b>Job position</b>	General Employee	185	48.10%
	Grassroots Manager	73	19.00%
	Middle Manager	64	16.60%
	Senior Manager	63	16.40%
<b>Years of work</b>	Under 1 year	43	11.20%
	1-2 year	52	13.50%
	3-5 year	90	23.40%
	6-10 year	97	25.20%
	Over 10 year	103	26.80%
<b>Nature of business</b>	State-Owned Enterprise (SOE)	119	30.90%
	Private Enterprise	172	44.70%
	Foreign-Invested Enterprise (FIE)	30	7.80%
	Other	64	16.60%
<b>Field</b>	Electronic Information Technology	102	26.5%
	Software Development	34	8.8%
	Energy Technology	40	10.4%
	Biopharmaceuticals	15	3.9%
	Internet Technology	27	7%
	Transportation/Shipping/Logistics	22	5.7%
	Aerospace manufacturing	93	24.2%
Others	52	13.5%	
<b>Total</b>		<b>385</b>	<b>100%</b>

#### 4.2. Reliability and Validity Analysis

This study used SPSS 27.0 software to conduct a Cronbach coefficient reliability test on the internal consistency of each dimension of the scale. Ensuring the quality of measurement data is a key prerequisite for meaningful subsequent analysis.

As shown in Table 3, the overall reliability coefficient of the scale in this study is 0.948. The  $\alpha$  of each measured variable and its dimension are all above 0.8. This result shows that the overall reliability of the scale is satisfactory and the scale has good structural validity.

**Table 3.** Cronbach's Alpha

<b>Variable</b>	<b>Cronbach's Alpha</b>	<b>Total</b>
<b>Organizational dependence</b>	0.951	0.948
<b>Organizational Innovative Climate</b>	0.881	
<b>Employer Brand</b>	0.865	
<b>Work Engagement</b>	0.900	
<b>Innovative Work Behaviour</b>	0.897	

The validity of questionnaires mainly includes three types: content validity, criterion validity and structure validity. In the empirical analysis of the structural equation model, this study conducted a detailed analysis of the structural validity of the

questionnaire through the model path coefficient and the model fitting index. The results showed that all values met the standards and the overall model fit was good, as shown in Table 4.

**Table 4.** Model fit indices

Index	Suggested Value	Test Result	Fitness
<b>Absolute fit indices</b>			
$\chi^2/df$	<3.00	2.003	Fitted
RMSEA	<0.05(Excellent) <0.08(Good)	0.051	Fitted
GFI	>.90 or close to 0.9	0.888	Fitted
<b>Relative fit indices</b>			
NFI	>.90	0.906	Fitted
IFI	>.90	0.950	Fitted
TLI(NNFI)	>.90	0.945	Fitted
CFI	>.90	0.950	Fitted
<b>Parsimony fit indices</b>			
PGFI	>.50	0.744	Fitted
PNFI	>.50	0.815	Fitted
PCFI	>.50	0.855	Fitted

Structural validity can be subdivided into convergent validity and discriminant validity. In the confirmatory factor analysis, by calculating the average variation extraction value (AVE) and combined reliability (CR) of each latent variable, it was found that the AVE value of the latent variable was generally above 0.50, and the CR was above 0.6, indicating

that each latent variable has good convergent validity<sup>[25]</sup>. It can be seen from Table 5 that the factor loadings of all items in this study are above 0.6, the AVE of each variable is above 0.5, and most CR values are above 0.8, showing that the convergent validity of the study is high.

**Table 5.** CR & AVE

	Construct			Factor loading	AVE	CR
<b>Organizational dependence</b>	TD	<---	OD	0.916	0.837	0.954
	RD	<---	OD	0.918		
	ED	<---	OD	0.902		
	BD	<---	OD	0.924		
<b>Organizational Innovative Climate</b>	OIC1	<---	OIC	0.755	0.598	0.881
	OIC2	<---	OIC	0.83		
	OIC3	<---	OIC	0.747		
	OIC4	<---	OIC	0.766		
	OIC5	<---	OIC	0.766		
<b>Employer Brand</b>	EB1	<---	EB	0.712	0.564	0.866
	EB2	<---	EB	0.826		
	EB3	<---	EB	0.737		
	EB4	<---	EB	0.767		
	EB5	<---	EB	0.708		
<b>Work Engagement</b>	WE1	<---	WE	0.774	0.563	0.9
	WE2	<---	WE	0.758		
	WE3	<---	WE	0.778		
	WE4	<---	WE	0.732		
	WE5	<---	WE	0.691		
	WE6	<---	WE	0.721		
	WE7	<---	WE	0.793		
<b>Innovative Work Behaviour</b>	IWB1	<---	IWB	0.735	0.558	0.898
	IWB2	<---	IWB	0.757		
	IWB3	<---	IWB	0.712		
	IWB4	<---	IWB	0.846		
	IWB5	<---	IWB	0.758		
	IWB6	<---	IWB	0.658		
	IWB7	<---	IWB	0.75		

In terms of discriminant validity, that is, when the square root value of AVE of each variable is greater than its correlation coefficient with other variables, it indicates that the scale has good discriminant validity [26]. As shown in Table 6, the AVE square root value of each variable in this

study is greater than its correlation coefficient with other variables, thus indicating that each dimension has good discriminant validity, thus supporting the construction of a structural equation model for the formal scale questionnaire.

**Table 6.** Discriminant validity

	AVE	IWB	WE	EB	OIC	OD
IWB	0.558	0.747				
WE	0.563	0.550	0.750			
EB	0.564	0.413	0.489	0.751		
OIC	0.598	0.317	0.616	0.305	0.773	
OD	0.837	0.366	0.574	0.240	0.313	0.915

### 4.3. Hypothesis Testing

This study used AMOS software to conduct SEM path tests respectively. As shown in Tables 7, no significant effects were observed on the effects of OD on IWB and OIC on IWB ( $P > 0.05$ ), that is, hypothesis (H1, H1a-H1d and H2a-H2b, H5) are not supported, and there is no direct correlation between variables; except for this, all other hypothesis are supported.

**Table 7.** Hypothesis results

Hypothesis		S.E.	C.R.	P	Results
WE	<-- OD	0.048	8.447	***	Supported
WE	<-- OIC	0.052	8.217	***	Supported
WE	<-- EB	0.054	5.785	***	Supported
IWB	<-- OD	0.061	1.412	0.158	Not Supported
IWB	<-- OIC	0.064	-0.462	0.644	Not Supported
IWB	<-- EB	0.066	3.264	0.001	Supported
IWB	<-- WE	0.085	4.774	***	Supported

### 4.4. Mediating effect analysis

According to Table 8, although OD has no direct impact on IWB, it indirectly affects the innovative behavior of R&D personnel through work engagement; among the effects of organizational innovation climate (OIC) on innovative work behavior (IWB), work engagement (WE) also plays a key intermediary role; and employer brand, in addition to work engagement (WE) as an intermediary, employer brand (EB) also has a direct and significant impact on innovative work behavior (IWB).

Effect Type	Effect value	SE	Z	Lower	Upper
EB-WE-IWB Indirect effect	0.128	0.042	3.048	0.061	0.226
EB-WE-IWB Direct effect	0.215	0.080	2.688	0.066	0.382
EB-WE-IWB Total effect	0.342	0.080	4.275	0.198	0.512
OIC-WE-IWB Indirect effect	0.172	0.048	3.583	0.093	0.282
OIC-WE-IWB Direct effect	-0.300	0.067	-4.478	-0.163	0.400
OIC-WE-IWB Total effect	0.143	0.061	2.344	0.026	0.264
OD-WE-IWB Indirect effect	0.164	0.047	3.489	0.085	0.272
OD-WE-IWB Direct effect	0.086	0.066	1.303	-0.040	0.218
OD-WE-IWB Total effect	0.250	0.062	4.032	0.132	0.375

## 5. Conclusion, Recommendation and Limitations

### 5.1. Conclusion

The above test results show that among the organizational dynamic factors, organizational dependence, organizational innovation climate and employer brand, organizational dependence and organizational innovation climate have no significant impact on the innovative behavior of R&D personnel, but they all indirectly affect the innovation of R&D personnel through work engagement. And work engagement has a mediating role in the positive relationship between all organizational dynamics factors and innovative behavior.

The lack of a direct positive relationship between organizational dependence and organizational innovation climate and the innovative behavior of R&D personnel may stem from their mediating role on the influence path. Organizational dependence may indirectly affect the innovative behavior of R&D personnel by affecting work engagement. At the same time, organizational innovation climate may, after providing a work environment that stimulates innovative thinking and behavior, affect employees' innovation input, thereby affecting innovative behavior. This indirect influence path better explains why the relationship between organizational dependence and organizational innovation climate and innovative behavior presents a complex and indirect pattern.

Whether R&D personnel can devote themselves to their work well is not only related to their own abilities and efforts, but also affected by many external factors at the organizational level. The three organizational dynamic factors of organizational innovation climate, organizational dependence and employer brand all have a positive effect on work engagement. Among organizational dependencies, interest dependence and emotional dependence mainly play a positive role in the work engagement of R&D personnel. The reason why benefit dependence and emotional dependence have a positive impact on the work engagement of R&D personnel is that they build a close organization-individual relationship. Interest dependence stimulates R&D personnel to actively invest in their work by providing salary, promotion and other forms of benefits, because they expect to obtain corresponding returns by fully utilizing their abilities. Emotional dependence makes employees more engaged in their work by cultivating their emotional identity because they feel that the organization cares and supports their personal and career development. This dual dependence relationship not only meets individual economic needs, but also strengthens employees' identification with the organization, thereby promoting a higher level of work engagement.

### 5.2. Contribution

#### 5.2.1. Establish a community of employee interests

In order to encourage R&D personnel of high-tech enterprises to actively invest and contribute more to corporate innovation performance, the most direct and effective way is to organically combine R&D personnel with corporate benefits. In addition to meeting R&D personnel's expectations for wages and benefits, high-tech companies can also formulate technology stock ownership plans. By participating in technology stock ownership, they can obtain long-term returns on technological innovation and knowledge contributions, thereby increasing organizational dependence and continuously stimulating the enthusiasm of R&D

personnel. . Faced with the differences in needs of R&D personnel due to age, high-tech companies can formulate differentiated incentive measures to strengthen their sense of accomplishment and presence in the organization, thereby increasing the level of dependence of R&D personnel on the organization and making them more proactive. Put in the work.

### 5.2.2. Improve the collaborative interaction between R&D personnel and organizations

First of all, establishing a transparent and effective communication mechanism is the key to improving the innovative behavior of R&D personnel. Regular team meetings, feedback mechanisms and interactive platforms can be used to strengthen the flow of information between the organization and R&D personnel and establish a communication bridge of mutual trust. Second, strengthen the relationship between leaders and employees and cultivate good interpersonal relationships through a supportive management style, personalized career development planning, and care for employees' personal needs. In addition, provide attractive employee development opportunities, including training, professional development programs, and skill enhancement, to increase employees' sense of relationship dependence on the organization. Through these initiatives, the relationship between the organization and R&D personnel can be consolidated, stimulate their deeper work investment, and promote innovative behaviors.

### 5.2.3. Create a positive employer brand image

Technology companies can convey a positive corporate image to the outside world by displaying the company's real R&D team work scenarios, successful cases and employee experience. Secondly, implementing a consistent internal and external communication strategy can maintain employees' recognition of the externally communicated employer brand image through internal training, communication activities and other means. Through these measures, technology companies can comprehensively and targetedly enhance their employer brand, pay attention to the incentive mechanism for employee work engagement, and promote innovative behaviors.

## 5.3. Limitation and suggestion for future research

Although this study used a relatively large sample (458 questionnaires, 385 valid questionnaires), and considered the coverage of gender, age, position, education, and working hours in sample selection, because the survey subjects were from Shaanxi Province, there is a certain lack of representation of special groups. The breadth of research objects also needs to be strengthened, especially for companies in the northwest region. Due to differences in economic policies and humanistic environments, data quality may be affected. The generalizability of the conclusion needs to be further tested, especially since the influence of moderating variables, such as the nature of the enterprise, has not been taken into account. Follow-up research should conduct in-depth analysis of the impact of organizational dependence, organizational innovation climate and employer brand on innovative behavior and consider the role of moderating variables to obtain a more comprehensive understanding.

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