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Research Article

Factors Influencing Employee Engagement and Innovative Work Behavior -- A Case Study of Hi-Tech Company in China

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ABSTRACT

This study examines the factors influencing employee engagement and innovative work behavior in a case study of a Hi-Tech Company in China. Specifically, the relationships between Career Growth (CGH), Recognition (REC), Job Involvement (JIT), Job Responsibility (JRY), Employee Engagement (EET), and Innovative Work Behavior (IWB) among employees are investigated. The research objectives include identifying the relationships between these factors and exploring the mediating effect of employee engagement on the relationship between Career Growth, Recognition, Job Involvement, Job Responsibility, and Innovative Work Behavior. Data was collected through surveys conducted at the Hi-Tech Company's headquarters in Shenzhen, China. Quantitative research methods were employed to analyze the data, including structural equation modeling and mediation analysis. The findings suggest significant relationships between Career Growth, Recognition, Job Involvement, Job Responsibility, Employee Engagement, and Innovative Work Behavior. Additionally, employee engagement was found to mediate the relationships between Career Growth, Recognition, Job Involvement, Job Responsibility, and Innovative Work Behavior. These results provide valuable insights for understanding and promoting employee engagement and innovative work behavior within Hi-Tech companies in China

Keywords: Employee Engagement, Innovative Work Behavior, Career Growth, Recognition, Job Involvement, Job Responsibility

1. Introduction

1.1 Background of the study

Innovative Work Behavior (IWB) refers to the conscious generation, promotion, and implementation of novel and practical ideas, which is a crucial factor in enhancing organizational competitiveness (Scott & Bruce, 1994; Montani et al., 2017). Unlike employee creativity, IWB focuses more on the execution and application of novel and practical ideas, thus typically being associated with more direct individual, team, and organizational performance outcomes (Anderson et al., 2014). Traditionally considered as extra-role behavior, IWB has gained increasing importance in the digital economy era, where innovation has become essential and ingrained in the daily work of knowledge workers, even becoming part of job performance (Li et al., 2021). However, in their daily innovative endeavors, knowledge workers still face challenges in effectively implementing novel ideas, highlighting the challenging, risky, and complex nature of innovative behavior, which continues to influence the efforts put forth by knowledge workers in innovation (Janssen, 2000). Innovation is no longer confined to specific roles or tasks but has become a fundamental aspect of organizational culture and individual performance. The ability to innovate has transitioned from being a desirable trait to a necessary skill in the contemporary workplace. As organizations strive to stay competitive and adapt to rapidly changing environments, fostering a culture that encourages and supports innovative behavior becomes imperative. Moreover, the digital age has brought about new avenues and tools for fostering innovation, such as online collaboration platforms, data analytics, and artificial intelligence. These technological advancements have not only facilitated idea generation but have also streamlined the implementation process, reducing the barriers to innovation faced by knowledge workers. However, despite the opportunities presented by digital

technologies, knowledge workers still encounter obstacles in translating innovative ideas into tangible outcomes. These challenges stem from various factors, including organizational resistance to change, resource constraints, and risk aversion. Overcoming these barriers requires a concerted effort from both individuals and organizations, emphasizing the importance of cultivating a supportive environment that encourages experimentation, learning from failure, and continuous improvement. In summary, Innovative Work Behavior (IWB) is a critical determinant of organizational success in the digital economy era. By recognizing the significance of IWB and addressing the challenges associated with it, organizations can harness the full potential of their knowledge workers and gain a competitive edge in today's rapidly evolving business landscape.

Innovative Work Behavior (IWB) has been conceptualized by scholars through various dimensions, primarily focusing on different stages of employee innovation activities. These dimensions include one-dimensional, two-dimensional, threedimensional, and five-dimensional perspectives. The one-dimensional view posits that IWB encompasses the entire process from idea generation to the creation of new products, processes, or systems as a unified organic entity (Scott & Bruce, 1994). This perspective emphasizes the holistic nature of innovation within the organizational context. On the other hand, the two-dimensional perspective divides IWB into two distinct stages: idea generation and idea implementation. It suggests that these stages differ in terms of timing, quantity, resource requirements, structural influences, and leadership styles (Zhu & Wen, 2020). This view highlights the importance of considering both the ideation and execution phases of innovation separately. The threedimensional perspective expands upon the two-dimensional view by incorporating the promotion of ideas as an additional stage in the innovation process. According to this perspective, IWB comprises idea generation, idea promotion, and idea implementation (Janssen, 2000). By including the promotion stage, this perspective acknowledges the significance of communication and advocacy in facilitating innovation within organizations. Furthermore, the five-dimensional perspective provides a more detailed breakdown of IWB, dividing it into opportunity exploration, idea generation, idea investigation, idea promotion, and application (Kleysen & Street, 2001). This perspective offers a comprehensive framework that encompasses the various activities and phases involved in the innovation process, from identifying opportunities to implementing solutions. Overall, these dimensions offer valuable insights into the multifaceted nature of IWB and provide researchers and practitioners with frameworks for understanding and analyzing different aspects of employee innovation behavior. By considering the various stages and dimensions of IWB, organizations can better design strategies and interventions to foster a culture of innovation and capitalize on the creative potential of their workforce.

Employee Engagement (EET) is a multifaceted construct influenced by various factors from psychological, organizational, and societal perspectives. Scholars and researchers have explored these factors comprehensively to understand their impact on employee engagement. Kahn (1994) analyzed factors affecting EET from the psychological perspective of psychological meaningfulness, psychological safety, and psychological availability in the workplace. Moreover, Taorui Consulting Company (2003) summarized ten factors influencing EET, including senior management's concern for employee welfare, competitive salary and benefits, organizational culture, job experiences, and employee personal qualities. This indicates that EET is influenced by a combination of organizational and individual factors. Macdonald and Levy (2016) suggested that the perceptions of young people regarding the current economic and demographic situation influence their work status. They found a correlation between improving job recognition and social psychological factors. This highlights the importance of considering societal and generational influences on EET. Furthermore, Mahmoud et al. (2018) emphasized the significant impact of EET on organizational performance, with dimensions like vigor, dedication, and absorption contributing significantly to organizational performance and positively affecting job satisfaction, particularly with vigor making the greatest contribution.

Research by Kang et al. (2019) demonstrated a positive relationship between empowering leadership and EET. This underscores the role of leadership style in fostering employee engagement within organizations. Studies by Luo and Qian (2018), Zhou (2019), Zhang (2021), and Liu (2022) analyzed EET among younger generations and knowledge workers, highlighting the influence of leadership, career development prospects, and compensation and benefits on employee dedication levels. Hu, Liu, and Fu (2021) explored the mediating role of affective commitment and the moderating role of task complexity, finding that shared leadership has a significant positive impact on employee dedication. Moreover, Hu (2021), Zhang (2021), He (2022), and Qiu (2022) investigated the relationships between inclusive leadership, transformational leadership, paternalistic leadership styles, and EET, respectively. These studies collectively emphasize the multidimensional nature of EET and the diverse factors that influence it, including leadership style, organizational culture, job characteristics, and societal perceptions. Understanding these factors is crucial for organizations seeking to enhance employee engagement and ultimately improve innovative work behavior.

Some literature has found connections between Career Growth (CGH), Recognition (REC), Job Involvement (JIT), Job Responsibility (JOB), Employee Engagement (EET), and Innovative Work Behavior (IWB). Firstly, Career Growth (CGH) refers to employees' opportunities for career development and growth within an organization. Research indicates that organizations offering clear career paths and advancement opportunities tend to foster greater employee engagement and exhibit higher levels of job satisfaction and innovative behavior (Hou et al., 2019). Opportunities for career development can motivate employees to participate more actively in their work and provide them with a platform to unleash their innovative potential. Recognition

(REC) refers to the acknowledgment and rewards employees receive in their work. Studies show that appropriate recognition and rewards can enhance employees' job satisfaction and level of engagement (Jiang et al., 2019). When employees feel that their efforts and contributions are recognized, they are more motivated to engage in their work and may exhibit higher levels of innovative behavior. Job Involvement (JIT) refers to the degree of employees' involvement in their work tasks. Highly involved employees are more likely to be passionate about their work and tend to seek opportunities for innovation (Khan et al., 2018). They may be more focused on their work tasks and willing to experiment with new methods and ideas, thereby promoting innovative behavior. Lastly, Job Responsibility (JOB) refers to the duties and roles employees undertake in their work. Employees with clear responsibilities and a sense of duty are often more likely to be engaged in their work and willing to contribute to the organization's goals (Bakker et al., 2019). They may actively seek opportunities to solve problems and propose innovative solutions. In summary, factors such as Career Growth (CGH), Recognition (REC), Job Involvement (JIT), and Job Responsibility (JOB) influence employees' dedication and innovative behavior. When employees perceive that the organization provides good opportunities for career development, appropriate recognition and rewards, high levels of job involvement, and clear job responsibilities, they are more likely to exhibit high levels of Employee Engagement (EET) and Innovative Work Behavior (IWB). Therefore, organizations should prioritize and actively cultivate environments conducive to employee engagement and innovative behavior.

Some literature suggests that there is a close relationship among Career Growth (CGH), Recognition (REC), Job Involvement (JIT), Job Responsibility (JOB), Employee Engagement (EET), and Innovative Work Behavior (IWB) in Hi-tech companies in China. Research by Deal and Kennedy indicates that Job Involvement and Job Responsibility are important factors influencing employee engagement. They point out that when employees are involved in their tasks and have clear responsibilities, they are more likely to demonstrate high levels of dedication and ultimately enhance innovation. Galinsky's study found that Career Growth and Recognition also have a significant impact on employee engagement within organizations. This implies that when employees perceive that the organization provides good career development opportunities and appropriate recognition, they are more motivated to engage in their work, demonstrating higher levels of dedication, and thereby enhancing innovation. These research findings underscore the importance of factors such as Career Growth,

Recognition, Job Involvement, and Job Responsibility in promoting employee engagement and innovation, providing guidance and insights for organizations.

1.2 Research Questions

1) *What is the relationship between Career Growth (CGH), Recognition (REC), Job Involvement (JIT), Job responsibility (JRY) and Employee Engagement (EET) among the employees of Hi-tech company in China?*
2) *What is the relationship between Career Growth (CGH), Recognition (REC), Job Involvement (JIT), Job responsibility (JRY) and Innovative Work Behavior (IWB) among the employees of Hi-tech company in China?*
3) *What is the relationship between Employee Engagement (EET) (PCF) and Innovative Work Behavior (IWB) among the employees of Hi-tech company in China?*
4) *Whether the Employee Engagement (EET) mediates Career Growth (CGH), Recognition (REC), Job Involvement (JIT), Job responsibility (JRY) and Innovative Work Behavior (IWB) among the employees of Hi-tech company in China?*

1.3 Research Objectives

1) *To identify the relationship between Career Growth (CGH), Recognition (REC), Job Involvement (JIT), Job responsibility (JRY) and Employee Engagement (EET) among the employees of Hi-tech company in China.*
2) *To identify the relationship between Career Growth (CGH), Recognition (REC), Job Involvement (JIT), Job responsibility (JRY) and Innovative Work Behavior (IWB) among the employees of Hi-tech company in China.*
3) *To identify the relationship between Employee Engagement (EET) (PCF) and Innovative Work Behavior (IWB) among the employees of Hi-tech company in China.*
4) *To investigate the mediating effect of Employee Engagement (EET) between Career Growth (CGH), Recognition (REC), Job Involvement (JIT), Job responsibility (JRY) and Innovative Work Behavior (IWB) among the employees of Hi-tech company in China.*

2. Literature Review

2.1 Research Theory

The factors examined in this study, including Career Growth (CGH), Recognition

(REC), Job Involvement (JIT), Job Responsibility (JOB), Employee Engagement (EET), and Innovative Work Behavior (IWB), are supported by two theories: First, the Expectancy Theory: "Vroom's Expectancy Theory and the Public Library Customer Service Environment" (Vroom, 1964) proposed the expectancy theory. The expectancy theory suggests that individuals are motivated to engage in behaviors that they believe will lead to desired outcomes. Career Growth (CGH), Recognition (REC), Job Involvement (JIT), and Job Responsibility (JOB) are all factors that can influence employees' perceptions of the outcomes of their efforts, such as career advancement opportunities, acknowledgment for their contributions, engagement in meaningful work tasks, and clarity in their role expectations. Secondly, the Self-Determination Theory: "Intrinsic Motivation and Self-Determination in Human Behavior" (Deci & Ryan, 1985) presented the self-determination theory. The self-determination theory proposes that individuals are motivated by the innate psychological needs for autonomy, competence, and relatedness. Career Growth (CGH), Recognition (REC), Job Involvement (JIT), and Job Responsibility (JOB) can all contribute to fulfilling these psychological needs, thereby enhancing employees' intrinsic motivation, engagement, and willingness to engage in innovative work behavior. These literatures provide theoretical support, aiding researchers in understanding how these factors influence employees' motivation, engagement, and behavior, and guiding organizations in creating work environments conducive to employee engagement and innovative behavior. These theories support the relationships among these factors by providing frameworks for understanding how they influence employees' motivation, engagement, and behavior in the workplace. They emphasize the importance of providing employees with meaningful work, opportunities for growth and development, recognition for their contributions, and clarity in their roles and responsibilities to foster higher levels of engagement and innovative behavior.

2.2 Research Hypotheses

Hou et al. (2019) found that opportunities for career development and growth within an organization positively influence employee engagement. Employees who perceive clear career paths and advancement opportunities are more likely to be engaged in their work. This literature supports the hypothesis that Career Growth (CGH) has a positive correlation with Employee Engagement (EET) among the employees of Hi-tech company Technologies. Hou et al. (2019) also suggested that organizations offering opportunities for career development tend to foster innovative behavior among employees. When employees have clear career paths and growth opportunities, they are more motivated to unleash their innovative potential. Thus, Career Growth (CGH) is likely to have a positive correlation with Innovative Work Behavior (IWB) among the employees of Hi-tech company Technologies.

Jiang et al. (2019) indicated that appropriate recognition and rewards positively impact employee job satisfaction and engagement. When employees feel acknowledged for their efforts, they are more likely to be engaged in their work. Therefore, Recognition (REC) is expected to have a positive correlation with Employee Engagement (EET) among the employees of Hi-tech company Technologies. Jiang et al. (2019) also suggested that recognition and rewards can enhance employees' level of engagement, which may lead to higher levels of innovative behavior. Employees who feel recognized for their contributions are likely to exhibit innovative work behavior. Hence, Recognition (REC) is anticipated to have a positive correlation with Innovative Work Behavior (IWB) among the employees of Hi-tech company Technologies. Khan et al. (2018) found that highly involved employees are more passionate about their work and tend to seek opportunities for innovation. This indicates that employees with high job involvement are likely to be more engaged in their work. Thus, Job Involvement (JIT) is expected to have a positive correlation with Employee Engagement (EET) among the employees of Hi-tech company Technologies. Khan et al. (2018) also suggested that highly involved employees are more inclined to seek opportunities for innovation. Employees who are deeply involved in their work tasks are more likely to experiment with new methods and ideas, thereby promoting innovative behavior. Therefore, Job Involvement (JIT) is likely to have a positive correlation with Innovative Work Behavior (IWB) among the employees of Hi-tech company Technologies.

Bakker et al. (2019) indicated that employees with clear responsibilities and a sense of duty are often more engaged in their work. When employees understand their job responsibilities clearly, they are more likely to be dedicated to achieving organizational goals. Hence, Job Responsibility (JOB) is expected to have a positive correlation with Employee Engagement (EET) among the employees of Hi-tech company Technologies. Bakker et al. (2019) also suggested that employees with clear job responsibilities may actively seek opportunities to solve problems and propose innovative solutions. Clear job responsibilities provide employees with a sense of direction and purpose, which may encourage innovative behavior. Thus, Job Responsibility (JOB) is anticipated to have a positive correlation with Innovative Work Behavior (IWB) among the employees of Hi-tech company Technologies.

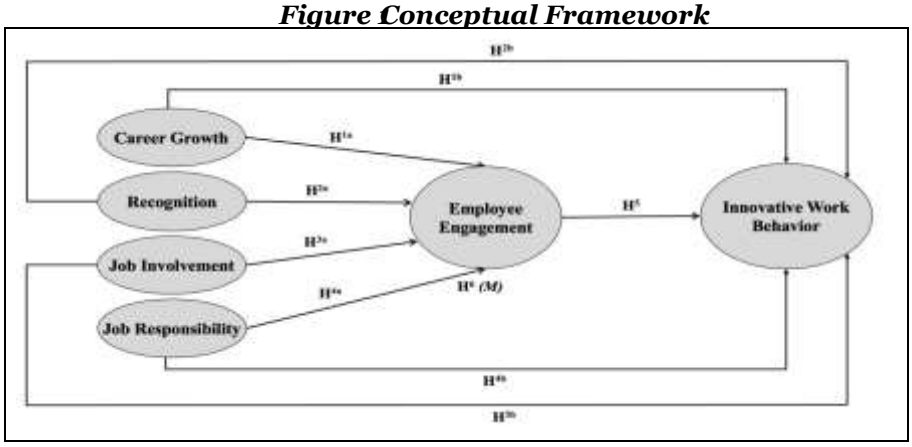
Hou et al. (2019) indicated that engaged employees are more likely to exhibit innovative behavior. When employees are engaged in their work, they are more motivated to contribute ideas and solutions to improve organizational processes. Therefore, Employee Engagement (EET) is expected to have a positive correlation with Innovative Work Behavior (IWB) among the employees of Hi-tech company Technologies. Employee Engagement (EET) mediates the relationships between Career Growth (CGH), Recognition (REC), Job Involvement (JIT), Job Responsibility (JOB), and Innovative Work Behavior (IWB). This is supported by the literature reviewed, indicating that factors such as career growth, recognition, job involvement, and job responsibility are positively associated with both employee engagement and innovative work behavior. Thus,

it is plausible to assume that employee engagement mediates the relationship between these factors and innovative work behavior among the employees of Hi-tech company Technologies.

H1a. Career Growth (CGH) has a positive correlation with Employee Engagement (EET) among the employees of Hi-tech company Technologies.
H1b. Career Growth (CGH) has a positive correlation with Innovative Work Behavior (IWB) among the employees of Hi-tech company Technologies.
H2a. Recognition (REC) has a positive correlation with Employee Engagement (EET) among the employees of Hi-tech company Technologies.
H2b. Recognition (REC) has a positive correlation with Innovative Work Behavior (IWB) among the employees of Hi-tech company Technologies.
H3a. Job Involvement (JIT) has a positive correlation with Employee Engagement (EET) among the employees of Hi-tech company Technologies.
H3b. Job Involvement (JIT) has a positive correlation with Innovative Work Behavior (IWB) among the employees of Hi-tech company Technologies.
H4a. Job Responsibility (JOB) has a positive correlation with Employee Engagement (EET) among the employees of Hi-tech company Technologies.
H4b. Job Responsibility (JOB) has a positive correlation with Innovative Work Behavior (IWB) among the employees of Hi-tech company Technologies.
H5. Employee Engagement (EET) has a positive correlation with Innovative Work Behavior (IWB) among the employees of Hi-tech company Technologies.
H6. Employee Engagement (EET) mediates the relationship between Career Growth (CGH), Recognition (REC), Job Involvement (JIT), Job Responsibility (JOB), and Innovative Work Behavior (IWB) among the employees of Hi-tech company Technologies.

2.3 Conceptual Framework

Figure 1 Conceptual Framework



Source: Design by the researcher (2024)

3. Research Methodology

3.1 Research Methods

Quantitative research methods are employed in this study to systematically gather numerical data and analyze statistical relationships among variables. This approach involves the collection of structured data through surveys, questionnaires, or other standardized instruments, allowing for objective measurement and analysis. By quantifying phenomena and utilizing statistical techniques, such as correlation analysis, researchers identify patterns, trends, and associations in the data. Quantitative research is well-suited for exploring relationships between variables and testing hypotheses, providing valuable insights into the research questions.

3.2 Research Design

The research design serves as the blueprint for conducting the study, outlining the overall plan and procedures to achieve the research objectives. It encompasses various elements, including the selection of research methods, sampling techniques, data collection procedures, and data analysis methods. The research design ensures the study's validity, reliability, and generalizability of findings. In this study, a descriptive research design is employed to systematically describe the characteristics of the variables under investigation. Additionally, a cross-sectional design is utilized to collect data at a single point in time from a diverse sample of participants. This design allows for the examination of relationships between variables at a specific moment

in time. Overall, the research design provides a structured framework for conducting the study and generating meaningful insights into the research questions.

3.3 Research Sampling

In this study, sampling followed Yamane's formula. It targeted Hi-tech company, ranked as the top innovative firm on the "2022 China's Top 500 Innovation Brands" list. With its headquarters in Shenzhen, boasting an innovation index of 897.42, the company employs 41,372 staff members as of April 2023. After excluding nonoperational personnel, 33,487 frontline employees remained. Yamane's formula determined a minimum sample size of 395 individuals. Surveys were distributed onsite over 16 days, ensuring equal participation chances. Using simple random sampling, surveys were given across departments, including Technology Support Systems, Research and Development, Intermediate Testing, and Production Systems. This approach aimed for a diverse and representative sample, reflecting the organization's workforce. The chosen method sought to yield robust data, exploring the intricate relationships among Career Growth, Recognition, Job Involvement, Job Responsibility, Employee Engagement, and Innovative Work Behavior at Hi-tech company Technologies.

4. Data Analysis

4.1 Formal Survey

4.1.1 Descriptive Analysis

4.1.1.1 Sample Basic Information

In this research, a comprehensive distribution and collection of questionnaires were carried out at Hi-tech company Technologies Co., Ltd. headquarters in Shenzhen over a period of 16 working days. The survey employed a simple random sampling method, covering various departments such as Technical Support Systems, Research and Development, Intermediate Trial Production, and Production Systems. A total of 700 questionnaires were distributed during the formal testing phase, with 627 collected and 598 questionnaires considered valid. In summary, the gender distribution in the sample was relatively balanced. Participants were mainly concentrated in the age group of 24 to 34. The educational background of participants was predominantly college diploma, and the majority reported an annual income between 210,001 and 532,000 yuan. These demographic characteristics provide reference points for subsequent analysis and research.

Table 1 Sample Basic Characteristics

		n	%
Gender	Male	286	47.8
	Female	296	49.5
	Prefer not to say	16	2.7
Age	18-24	221	37.0
	25-34	260	43.5
	35-44	76	12.6
	Over 45	41	6.9
Educational background	Diploma	300	50.2
	Bachelor's degree	137	22.9
	Master's degree	153	25.6
	Doctoral degree or higher	8	1.3
Annual salary	Below 210,000 yuan	97	16.2
	210,001- 53,2000 yuan	191	31.9
	532,001 - 838,000 yuan	183	30.6
	Over 838,001yuan	127	21.2
	Total	598	100.0

4.1.1.2 Descriptive Statistics

Hi-tech company employees expressed overall satisfaction with career development, recognition, job involvement, and employee engagement. Their satisfaction with job responsibilities was moderate, while their perception of innovative work behavior was also moderate. These characteristics provide management with essential insights into employee satisfaction, the working environment, and motivation mechanisms, facilitating further optimization and enhancement of the work environment and corporate culture. Additionally, the skewness and kurtosis values for all variables met the requirements for a normal distribution. The absolute values of skewness did not exceed 3, and the absolute values of kurtosis did not exceed 10, indicating that the sample largely conforms to a normal distribution, ensuring data quality

Table 2 Descriptive analysis result

Variable	Mean	SD	S	K
Career Growth	3.755	0.625	-0.035	-0.319
Recognition	3.865	0.606	-0.454	0.154
Job Involvement	3.872	0.582	-0.314	0.022
Job responsibility	3.620	0.735	-0.277	-0.383
Employee Engagement	3.773	0.625	-0.384	0.007
Innovative Work Behavior	3.642	0.640	-0.134	-0.428

4.1.2. Reliability Analysis

Reliability analysis is conducted to assess the consistency and stability of individual items within a scale. The reliability analysis results for the six research variables, namely Career Growth,Recognition,JobInvolvement, Job Responsibilities, Employee Engagement, and Innovative Work Behavior, are presented in Table 4.5. The Cronbach's α values for these variables range from 0.835 to 0.890, indicating that the scales for these sixvariables exhibit good internal consistency and stability. This implies that these scales are effective in measuring the respective variables and provide reliable data for the research.

Table 3 Reliability Analysis Results

Variables	Items	Cronbach's α
Career Growth	5	0.890
Recognition	5	0.835
Job Involvement	5	0.836
Job responsibility	5	0.878
Employee Engagement	6	0.862
Innovative Work Behavior	5	0.842

4.1.3. Validity Analysis (CFA) + Correlation Analysis

In this research, a confirmatory factor analysis (CFA) was employed to assess the structural validity of the scales. First, the fit indices of the measurement model were examined, and the results indicated a good model fit ($\chi 2/df=2.809$, GFI=0.880, NFI=0.887, IFI=0.924, TLI=0.915, CFI=0.924, SRMR=0.027, RMSEA=0.055). These indices suggest a good fit between the model and the actual data. Subsequently, tests for convergent validity and discriminant validity of the variables were conducted. The specific procedures and results are presented below:

4.1.3.1. Convergent Validity

Based on the data provided and the results of the confirmatory factor analysis and convergent validity assessment, it can be concluded that the variables within the scales for Career Growth, Recognition, Job Involvement, Job Responsibilities, Employee Engagement, and Innovative Work Behavior demonstrate good convergent validity.

Table 4 Aggregated Validity Test Results

Variables	n	Standardized Loadings	Non-Standardized Loadings	T	P	CR	AVE
CGH	A1	1.000	0.800		0.891	0.621	
	A2	1.070	0.875	24.532	***		
	A3	0.994	0.790	20.719	***		
	A4	0.767	0.732	18.724	***		
	A5	0.810	0.733	18.890	***		
REC	B1	1.000	0.739		0.836	0.506	
	B2	1.079	0.775	18.166	***		
	B3	0.979	0.733	16.781	***		

	B4	1.043	0.686	15.313	***		
	B5	0.873	0.614	13.831	***		
JIT	C1	1.000	0.561			0.838	0.512
	C2	1.823	0.716	12.985	***		
	C3	1.928	0.789	13.523	***		
	C4	1.874	0.768	12.984	***		
	C5	1.851	0.722	12.412	***		
JRY	D1	1.000	0.780			0.879	0.593
	D2	1.046	0.813	21.248	***		
	D3	1.034	0.795	20.003	***		
	D4	0.927	0.723	17.725	***		
	D5	0.835	0.735	18.236	***		

Table 4.6 (cont.)

EET	E1	1.000	0.696			0.862	0.511
	E2	1.139	0.723	16.126	***		
	E3	1.090	0.716	15.817	***		
	E4	1.083	0.712	15.626	***		
	E5	1.063	0.701	15.428	***		
	E6	1.152	0.740	16.065	***		
IWB	F1	1.000	0.683			0.844	0.522
	F2	0.928	0.630	14.009	***		
	F3	0.963	0.669	14.615	***		
	F4	1.410	0.807	16.479	***		
	F5	1.526	0.804	16.473	***		

4.1.3.2 Correlation Analysis and Discriminant Validity

Based on the Fornell and Larcker criterion and the results of correlation analysis, it can be concluded that there are significant correlations between the variables, and these variables exhibit good discriminant validity within the scales.

Table 5 Results of Discriminant Validity Test

	CGH	REC	JIT	JRY	EET	IWB
CGH	0.788					
REC	0.642***	0.711				
JIT	0.565***	0.653***	0.715			
JRY	0.525***	0.600***	0.664***	0.77		
EET	0.569***	0.624***	0.668***	0.689***	0.715	
IWB	0.588***	0.641***	0.659***	0.679***	0.665***	0.722

Note: The bold values on the diagonal represent the square root of the Average Variance Extracted (AVE) for each variable.

4.1.4 Differentiation Analysis

4.1.4.1 Analysis of Differences Among Employees of Different Genders

The results of the analysis of variance further support the specific differences among employees of different genders in terms of Career Growth, Recognition, Job Involvement, Job Responsibility, Employee Engagement, and Innovative Work Behavior.

Table 6 Analysis of Different Genders

		n	Mean	SD	F	Sig.
Career Growth	Male	286	3.855	0.611	7.341	0.001
	Female	296	3.668	0.626		
	Prefer not to say	16	3.575	0.593		

	Total	598	3.755	0.625			
	Male	286	3.942	0.597	3.809	0.593	6.165	0.002
	Female	296	3.525	0.796			
Recognition	Prefer not to say	16					
	Total	598	3.865	0.606			
	Male	286	3.934	0.567	3.834	0.578	6.536	0.002
Job	Female	296	3.450	0.728			
Involvement	Prefer not to say	16					
	Total	598	3.872	0.582			
	Male	286	3.743	0.757	3.526	0.694	9.852	0.000
Job	Female	296	3.163	0.678			
responsibility	Prefer not to say	16					
	Total	598	3.620	0.735			
	Male	286	3.857	0.652			7.671	0.001
Employee	Female	296	3.714	0.578			
Engagement	Prefer not to say	16	3.354	0.717			
	Total	598	3.773	0.625			
	Male	286	3.777	0.657	13.788	0.000	
Innovative		296	3.532	0.599			3.288	0.566
Work	Female	16	3.642	0.640			
Behavior	Prefer not to say Total	598					

4.1.4.2 Analysis of Differences Among Employees of Different Ages

Table 7 presents the results of the differentiation analysis for employees of different ages concerning Career Growth, Recognition, Job Involvement, Job Responsibility, Employee Engagement, and Innovative Work Behavior. In terms of Career Growth, the results show significant differences among different age groups (F=14.156, p=0.000).

Table 7 Analysis of Different Ages

		n	Mean	SD	F	Sig.
Career Growth	18-24	221	3.880	0.660	14.156	0.000
	25-34	260	3.572 3.924	0.558		
	35-44	76	3.927	0.591		
	Over 45	41		0.611		
	Total	598	3.755	0.625		
Recognition	18-24	221	3.911 3.740	0.678	8.485	0.000
	25-34	260	4.026	0.556		
	35-44	76		0.565		
	Over 45	41	4.112	0.372		
	Total	598	3.865	0.606		
Job Involvement	18-24	221	3.915 3.710	0.601	17.221	0.000
	25-34	260	4.153	0.558		
	35-44	76		0.478		
	Over 45	41	4.141	0.472		
	Total	598	3.872	0.582		

	18-24	221	3.646	0.761	28.173	0.000
	25-34	260	3.388	0.688		
Job		76	4.042	0.556		
	35-44	41	4.171	0.479		
responsibility						
	Over 45					
	Total	598	3.620	0.735		
	18-24	221	3.783	0.671	18.038	0.000
Employee	25-34	260	3.618	0.567		
Engagement	35-44	76	4.041	0.581		
	Over 45	41	4.207	0.392		
	Total	598	3.773	0.625		
	18-24	221	3.620	0.674	24.356	0.000
Innovative	25-34	260	3.478 4.061	0.591		
Work	35-44	76	4.034	0.509		
Behavior	Over 45	41		0.436		
	Total	598	3.642	0.640		

4.1.4.3 Analysis of Different Educational Backgrounds

Table 8 presents the results of the differentiation analysis for employees with different educational backgrounds concerning Career Growth, Recognition, Job Involvement, Job Responsibility, Employee Engagement, and Innovative Work Behavior. In terms of Career Growth, a differentiation analysis was conducted among employees with different educational backgrounds. The results show significant differences in Career Growth among different educational backgrounds (F=12.804, p=0.000).

Table 8 Analysis of Different Educational Backgrounds

		n	Mean	SD	F	Sig.
	Diploma	300	3.904	0.648	12.804	0.000
	Bachelor's degree	137	3.564	0.530	3.629	0.590
	Master's degree	153	3.825	0.570		
Career Growth	Doctoral degree or higher	8				
	Total	598	3.755	0.625		
	Diploma	300	3.945	0.640	5.931	0.001
	Bachelor's degree Master's	137	3.686	0.517		
	degree	153	3.864	0.570		
Recognition	Doctoral degree or higher	8	3.975	0.838		
	Total	598	3.865	0.606		
	Diploma	300	3.961	0.585	5.251	0.001
	Bachelor's degree Master's	137	3.743	0.557	3.820	0.569
	degree	153	3.725	0.676		
Job Involvement		8				
	Doctoral degree or higher					
	Total	598	3.872	0.582		
	Diploma	300	3.763	0.742	7.921	0.000
Job	Bachelor's degree	137	3.485	0.666		
responsibility	Master's degree	153	3.463	0.741		
	Doctoral degree or higher	8	3.600	0.478		
	Total	598	3.620	0.735		
	Diploma	300	3.878	0.652	5.959	0.001
Employee	Bachelor's degree	137	3.639	0.542	0.597	
Engagement	Master's degree	153	3.690	0.862		
	Doctoral degree or higher	8	3.729			
	Total	598	3.773	0.625		

	Diploma	300	3.735	0.664	5.093	0.002
Innovative	Bachelor's degree	137	3.509	0.535	0.648	
Work	Master's degree	153	3.570	0.715		
Behavior	Doctoral degree or higher	8	3.850			
	Total	598	3.642	0.640		

4.2.4.4 Analysis of Different Salary Levels

Table 9 presents the results of the differentiation analysis for employees with different salary levels concerning Career Growth, Recognition, Job Involvement, Job Responsibility, Employee Engagement, and Innovative Work Behavior. In terms of Career Growth, a differentiation analysis was conducted among employees with different salary levels. The results show significant differences in Career Growth among different salary levels (F=4.408, p=0.004). Based on the differentiation analysis results for employees with different salary levels in Career Growth, Recognition, Job Involvement, Job Responsibility, Employee Engagement, and Innovative Work Behavior, the researcher observed specific differences in these aspects among employees with different salary levels. Overall, employees with higher salaries have a more positive and satisfying perception of Career Growth, Recognition, Job Involvement, Job Responsibility, Employee Engagement, and Innovative Work Behavior.

Table 9 Analysis of Different Salary Levels

		n	Mean	SD	F	
	Below 230,000 yuan	97	3.553	0.602	4.408	0.004
	210,001 - 532,000 yuan	191	3.771	0.635	3.787	0.594
	Career	183	3.838	0.646		
	532,001 - 838,000 yuan	127				
	Growth					
	Over 838,001 yuan					
	Total	598	3.755	0.625		
	Below 230,000 yuan	97	3.740	0.714	3.545	0.014
	210,001 - 532,000 yuan	191	3.822	0.626		
	Recognition 532,001 - 838,000 yuan	183	3.893	0.484		
	Over 838,001 yuan	127	3.986	0.627		
	Total	598	3.865	0.606		
	Below 230,000 yuan	97	3.726	0.677	5.847	0.001
	210,001 - 532,000 yuan	191	3.809	0.576	3.913	0.533
	Job	183	4.017	0.549		
	532,001 - 838,000 yuan	127				
	Involvement					
	Over 838,001 yuan					
	Total	598	3.872	0.582		
	Below 230,000 yuan	97	3.408	0.744	9.348	0.000
	210,001 - 532,000 yuan	191	3.550	0.702	3.619	0.736
	Job	183	3.890	0.705		
	532,001 - 838,000 yuan	127				
	responsibility					
	Over 838,001 yuan					
	Total	598	3.620	0.735		
	Below 230,000 yuan	97	3.572	0.711	5.453	0.001
	210,001 - 532,000 yuan	191	3.753	0.609	3.814	0.595
	Employee	183	3.897	0.589		
	532,001 - 838,000 yuan	127				
	Engagement					
	Over 838,001 yuan					
	Total	598	3.773	0.625		
	Below 230,000 yuan	97	3.419	0.666	8.695	0.000
Innovative	210,001 - 532,000 yuan	191	3.590	0.647	3.685	0.558
Work	532,001 - 838,000 yuan	183	3.831	0.662		
Behavior	Over 838,001 yuan	127				
	Total	598	3.642	0.640		

4.2 Structural Model Fit

The structural model in this study demonstrated good fit, with various indicators showing strong model fit. This suggests that the research model can accurately explain and predict relationships among the study variables and has high credibility and accuracy.

4.2.1 Model Path Analysis

These results support hypotheses H1b, H2b, H3b, H4b, and H5, indicating that Career Growth, Recognition, Job Involvement, Job responsibility, and Employee Engagement have a significant impact on Innovative Work Behaviour. In summary, based on the analysis of the path analysis results, the researcher has drawn the above conclusions, demonstrating the significant impact of various factors on Employee Engagement and Innovative Work Behaviour. These results help researchers gain a deeper understanding and explanation of the behaviours and relationships of the study subjects, providing essential insights for management practices and organizational decision-making.

Table 10 Path Analysis Results

Path			Unstandardized Path Coefficients	Standardized Path Coefficients	S.E.	T	P
CGH	→	EET	0.118	0.141	0.042	2.828	0.005
REC	→	EET	0.151	0.157	0.057	2.639	0.008
JIT	→	EET	0.424	0.251	0.104	4.098	***
JRY	→	EET	0.266	0.354	0.042	6.338	***
CGH	→	IWB	0.113	0.142	0.039	2.869	0.004
REC	→	IWB	0.148	0.163	0.054	2.721	0.007
JIT	→	IWB	0.277	0.173	0.099	2.812	0.005
JRY	→	IWB	0.188	0.265	0.041	4.536	***
EET	→	IWB	0.175	0.184	0.058	3.014	0.003

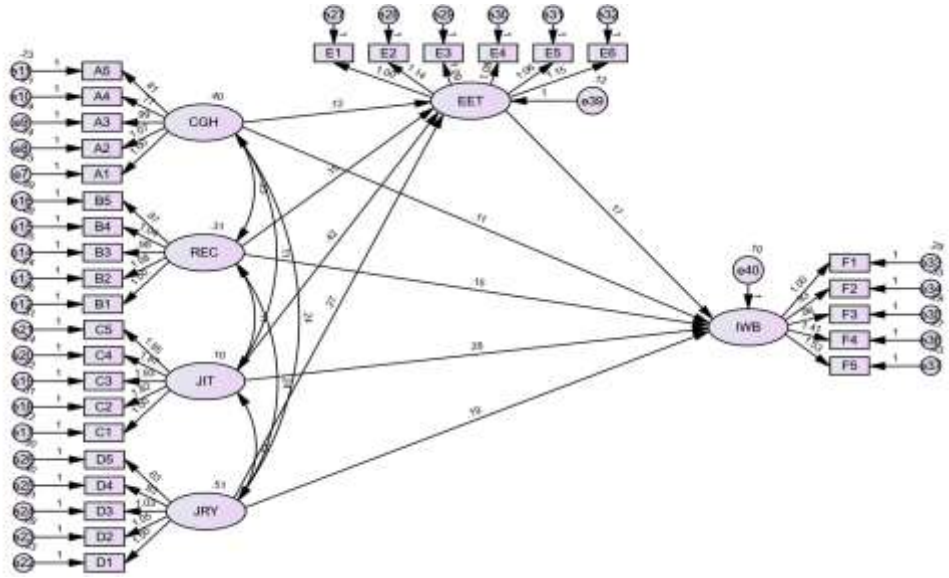


Figure 2 Adjust Model

4.2.2 Mediation Analysis

In this research, the researcher continued to use the bootstrap method to test the mediating effect of Employee Engagement. The results of the mediation analysis conducted using the bootstrap method demonstrate that Career Growth, Recognition, Job Involvement, and Job Responsibility have significant mediating effects on Innovative Work Behaviour through Employee Engagement. Employee engagement plays a crucial role in the paths between Career Growth, Recognition, Job Involvement, Job Responsibility, and Innovative Work Behaviour. These findings provide valuable insights for a deeper understanding of employee behaviour and organizational management, contributing to the optimization of employee performance and the enhancement of innovation capabilities.

Table 11 Mediation Analysis Results

Path	β	Lower	Upper	P
CGH→IWB	0.142	0.029	0.248	0.014
REC→IWB	0.163	0.017	0.314	0.030
JIT→IWB	0.173	0.027	0.310	0.019
JRY→IWB	0.265	0.133	0.395	0.000
CGH→EET→IWB	0.026	0.003	0.072	0.021
REC→EET→IWB	0.029	0.002	0.083	0.034
JIT→EET→IWB	0.046	0.012	0.106	0.004
JRY→EET→IWB	0.065	0.018	0.130	0.006

4.3 Results of Hypothesis

Table 4.12 Results of Hypothesis

Content		Results
H1a.	Career Growth (CGH) has a positive correlation with Employee Engagement (EET) among the employees of Hi-tech company.	**Accepted**
H1b.	Career Growth (CGH) has a positive correlation with Innovative Work Behavior (IWB) among the employees of Hi-tech company.	**Accepted**
H2a.	Recognition (REC) has a positive correlation with Employee Engagement (EET) among the employees of Hi-tech company.	**Accepted**
H2b.	Recognition (REC) has a positive correlation with Innovative Work Behavior (IWB) among the employees of Hi-tech company.	**Accepted**
H3a.	Job Involvement (JIT) has a positive correlation with Employee Engagement (EET) among the employees of Hi-tech company.	**Accepted**
H3b.	Job Involvement (JIT) has a positive correlation with Innovative Work Behavior (IWB) among the employees of Hi-tech company.	**Accepted**
H4a.	Job Responsibility (JRY) has a positive correlation with Employee Engagement (EET) among the employees of Hi-tech company.	**Accepted**
H4b.	Job Responsibility (JRY) has a positive correlation with Innovative Work Behavior (IWB) among the employees of Hitech company.	**Accepted**
H5.	Employee Engagement (EET) has a positive correlation with Innovative Work Behavior (IWB) among the employees of Hitech company.	**Accepted**
H6.	Employee Engagement (EET) mediates the relationship between Career Growth (CGH), Recognition (REC), Job Involvement (JIT), Job Responsibility (JRY), and Innovative Work Behavior (IWB) among the employees of Hi-tech company.	**Accepted**

5. Discussion and Conclusion

5.1 Discussion

The findings of this study shed light on the intricate relationships between various factors influencing employee engagement and innovative work behavior in the context of Hi-tech company Technologies. Firstly, the results confirm the significant impact of career growth, recognition, job involvement, and job responsibility on both employee engagement and innovative work behavior. These findings align with previous research, highlighting the importance of providing employees with clear career paths, acknowledgment for their contributions, meaningful work tasks, and well-defined job roles to foster their engagement and encourage innovative behavior. The path analysis results provide valuable insights into the specific pathways through which these factors influence employee engagement and innovative work behavior. For instance, the strong positive coefficients between career growth, recognition, job involvement, job responsibility, and employee engagement suggest that enhancing these factors can lead to higher levels of employee engagement. Similarly, the positive coefficients between career growth, recognition, job involvement, job responsibility, and innovative work behavior indicate that employees who perceive greater opportunities for growth, recognition, and involvement tend to exhibit more innovative behaviors in the workplace. Furthermore, the mediation analysis reveals the mediating role of employee engagement in the relationship between career growth, recognition, job involvement, job responsibility, and innovative work behavior. This suggests that employee engagement serves as a crucial mechanism through which these factors influence innovative work behavior. By fostering a work environment that promotes employee engagement, organizations can effectively stimulate innovative behaviors among their workforce.

5.2 Conclusion

In conclusion, this study provides empirical evidence supporting the significant impact of career growth, recognition, job involvement, and job responsibility on employee engagement and innovative work behavior among Hi-tech company Technologies' employees. The findings underscore the importance of creating a supportive work environment that offers clear career paths, recognizes employees' contributions, involves them in meaningful tasks, and assigns well-defined job responsibilities. These results have practical implications for organizational management and HR practices. By prioritizing initiatives aimed at enhancing career growth, recognition, job involvement, and job responsibility, organizations can foster a culture of employee engagement and innovation, ultimately driving organizational success and competitiveness in the dynamic Hi-tech industry. Moving forward, future research could explore additional factors influencing employee engagement and innovative work behavior, such as leadership styles, organizational culture, and worklife balance policies. Additionally, longitudinal studies could investigate the long-term effects of these factors on organizational performance and innovation outcomes. Overall, continued research in this area will contribute to a deeper understanding of the dynamics shaping employee engagement and innovation in the ever-evolving Hi-tech industry landscape.

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