

# Employee Innovation Performance Model for Traditional Small and Medium-Sized Technology Enterprises

Lianjie Feng, Jirapong Ruangoon

Dhonburi Rajabhat University, Bangkok, Thailand

**Abstract:** This research aimed to identify key factors influencing employee innovation performance in traditional small and medium-sized technology enterprises (SMEs) and propose a corresponding performance model. Using a quantitative approach, data were collected from 276 employees via structured questionnaires and analyzed through descriptive statistics, correlation analysis, multiple regression, and Structural Equation Modeling (SEM). The findings highlighted three critical psychological factors: self-efficacy, growth need strength, and creativity. Self-efficacy positively impacted creativity, while growth need strength enhanced creativity, indirectly boosting innovation performance. Creativity emerged as a crucial driver of innovation performance. The proposed model emphasized that fostering self-efficacy and growth need strength is essential for creating a creativity-conducive environment, ultimately driving employee innovation performance in traditional SMEs.

**Keywords:** Self-efficacy, Growth Need Strength, Creativity, Employee Innovation Performance.

## 1. Introduction

### 1.1. Research Background and Significance

Under the background of global economic integration and knowledge-based economy, traditional small and medium-sized science and technology enterprises (TSMEs), as an important part of the national economy, play a key role in technological innovation and industrial upgrading. However, due to small scale and limited resources, TSMEs face many challenges in market competition, and their innovation ability is directly related to the survival and development of enterprises. It is of great significance to construct a scientific and reasonable innovation performance model to guide enterprises' innovation activities and enhance their competitiveness (Liu et al., 2022). However, at present, the innovation performance management system of TSMEs is still not perfect, and there are some problems such as unscientific evaluation indicators, insufficient innovation investment and low conversion rate of achievements, which restrict the development of enterprises.

In enterprise management, the role of human resource management is becoming increasingly prominent. Performance management, as a key link, is crucial to stimulate the potential of employees and optimize the allocation of resources. For TSMEs, the number of employees is limited, and improving employee performance through performance management has a far-reaching impact on the overall development of the enterprise. However, there is a lack of specific studies on the impact of psychological factors (such as self-efficacy and growth need strength) on innovation performance in TSMEs. Existing models fail to explicitly explore how these psychological factors affect employee innovation performance through creativity (Mumtaz & Parahoo, 2020), and lack scientifically validated indicators and methods for the unique needs of TSMEs (Nappi & Kelly, 2022).

In addition, existing studies have not fully explored the indirect effects of self-efficacy and growth need strength on innovation performance through creativity (Gelaidan et al.,

2024), and the interaction between self-efficacy and knowledge capital and its impact on innovation performance need to be further studied. Therefore, there is an urgent need to apply and verify performance evaluation models in the context of TSMEs, develop accurate tools to measure the impact of psychological factors on innovation performance, and help enterprises develop more effective management practices and innovation strategies.

### 1.2. Research Objectives

The purpose of this study is to identify the key factors that affect employee innovation performance in traditional small and medium-sized technology enterprises, and to propose an employee innovation performance model suitable for traditional small and medium-sized technology enterprises. Specific objectives include:

(1) To identify key factors that affect employees' innovation performance, including psychological factors (such as self-efficacy, growth need strength) and behavioral factors (such as creativity).

(2) To propose an employee innovation performance model for traditional small and medium-sized technology enterprises.

### 1.3. Research Framework

Based on literature review and theoretical basis, this study constructs a conceptual framework to explore the relationship between self-efficacy, growth need strength, creativity and employee innovation performance (Figure 1.1). Self-efficacy, or an individual's confidence in their ability to perform a specific task, is seen as a key factor in promoting creativity development. Growth need strength, which reflects employees' intrinsic pursuit of personal and professional development, also has a positive impact on enhancing creativity. Creativity is seen as a direct driver of employee innovation performance, stimulating new and valuable ideas that in turn promote innovative outcomes at work. In addition, both self-efficacy and growth need strength have a positive impact on employees' innovation performance indirectly

through enhancing creativity, forming two core influence paths. This conceptual framework provides a theoretical framework for further research on the internal relations between variables.

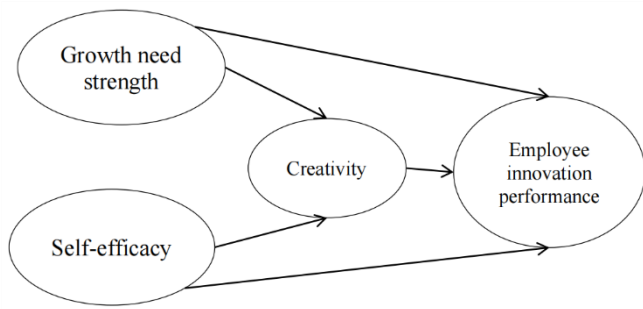


Figure 1.1. Conceptual Framework

## 2. Literature Review

### 2.1. Traditional Small and Medium-Sized Technology Enterprises

Traditional small and medium-sized technology enterprises (TSMEs) are defined by their small scale (measured by employee numbers, revenue, and assets) and focus on R&D, production, and sales of high-tech products or services, while retaining some traditional business models or technologies (Lu, 2020). These enterprises are key drivers of technological progress and industrial upgrading, yet they face significant challenges. These include an imperfect innovation performance management system, limited resources, insufficient R&D investment, and low innovation achievement conversion rate, which hinder sustainable development. To address these issues, a scientific innovation performance model is urgently needed to guide enterprise innovation activities. To support TSMEs, the government has introduced policies such as increased tax incentives for R&D investment, extended loss recovery periods, and financial subsidies. These aim to encourage R&D investment, enhance independent innovation capabilities, and accelerate the commercialization of technological achievements. However, despite policy support, TSMEs must still improve their innovation management to better adapt to market changes and competitive pressures.

### 2.2. Performance Model

Performance model is a key tool for evaluating and improving organizational performance, emphasizing customer focus, employee development, process management, and continuous improvement. Core elements include leadership, strategic planning, customer and market orientation, measurement and analysis, human resources, and business results. Well-known models like the Baldrige National Quality Award (MBNQA), European Quality Award (EQA), and Deming Award provide benchmarks for performance excellence. However, these models often lack specificity for traditional small and medium-sized technology enterprises (TSMEs) and are not directly applicable to their innovation management. Thus, constructing an innovation performance model tailored for TSMEs is both theoretically and practically significant.

### 2.3. Employee Innovation Performance

Employee innovation performance refers to the ability to create and implement new ideas, processes, products, or

services at work, encompassing technological, institutional, ideological, business model, and organizational structure innovations (Huang, 2022). Factors influencing this performance include individual psychological traits (e.g., self-efficacy, growth need strength), organizational culture, leadership style, teamwork, and external environment. Research indicates that while individual abilities are crucial, organizational support and incentives also significantly impact innovation performance (Akbari et al., 2021). Additionally, a supportive organizational culture can greatly enhance employees' innovative behaviors.

### 2.4. Growth Need Strength

Growth need strength refers to an individual's intrinsic motivation for personal and professional development. This concept is based on Maslow's hierarchy of needs theory, which emphasizes the individual's pursuit of self-realization and growth. Employees with high growth need intensity are more inclined to seek challenging tasks and actively learn new knowledge and skills to achieve personal and career goals. The research shows that growth need strength has a significant positive impact on employees' creativity and innovation performance. For example, Xu et al. (2024) pointed out that employees with high growth need strength not only perform better in creativity, but also indirectly improve innovation performance through enhanced creativity. In addition, the growth need strength can further promote the occurrence of innovative behavior by improving the work engagement and career satisfaction of employees. Therefore, meeting the growth needs of employees is one of the important strategies to enhance the innovation ability of enterprises.

### 2.5. Self-efficacy

Self-efficacy refers to an individual's confidence in his or her ability to accomplish a specific task or goal. This concept, developed by Bandura, emphasizes the influence of an individual's beliefs about his or her own abilities on his or her behavioral choices and degree of effort (Bandura, 2000). The measurement of self-efficacy is usually carried out through a questionnaire survey, and an individual's self-confidence in the face of complex tasks is assessed by the Likert scale. The influence mechanism of self-efficacy on innovation behavior is mainly reflected in the following aspects: First, employees with high self-efficacy are more willing to try new methods and maintain a positive attitude in the face of difficulties, thus increasing the probability of innovation behavior. Secondly, self-efficacy indirectly promotes innovation performance by enhancing employees' creativity. For example, Namono et al. (2022) pointed out that self-efficacy not only directly influences innovation behavior, but also indirectly drives innovation by enhancing creativity. Therefore, improving employees' sense of self-efficacy is one of the important ways to improve enterprises' innovation ability.

### 2.6. Creativity

Creativity is an individual's ability to generate new and valuable ideas. Measures of creativity typically include self-report questionnaires, behavioral tests, and expert assessments. The self-report questionnaire assessed individuals' innovative thinking and behavior in daily work by Likert scale; Behavioral tests measure creativity through actual tasks. Creativity plays a key intermediary role in the innovation process. Research shows that employee creativity

not only directly affects innovation performance, but also can further promote the realization of innovation results by improving the probability and quality of innovation behavior. For example, Zhou (2019) pointed out that creativity is a necessary component of innovation, and organizations that lack creativity struggle to achieve sustained innovation. In addition, creativity can indirectly promote innovation performance by enhancing employees' sense of self-efficacy and strength of growth needs. Therefore, creativity is one of the core elements of enterprise innovation management.

### 2.7. Hypothetical Development

Based on the above literature review, this study proposes the following hypothesis to explore the relationship between self-efficacy, growth need intensity, creativity and employee innovation performance:

H1: Self-efficacy has a positive impact on creativity.

H2: Growth need strength has a positive influence on creativity.

H3: Creativity has a positive impact on employees' innovation performance.

H4: Self-efficacy has an indirect positive impact on employees' innovation performance through creativity.

H5: Growth need strength has an indirect positive impact on employee innovation performance through creativity.

## 3. Research Methods

### 3.1. Research Design

This study aims to identify the key factors affecting employee innovation performance in traditional small and medium-sized technology enterprises (TSMEs) and build a corresponding model. The study adopted a quantitative method and collected data from 460 employees of HK Company in Guangdong through a structured questionnaire, covering dimensions such as self-efficacy, growth need intensity, creativity and innovation performance, and was measured by Likert scale. Data analysis includes descriptive statistics, correlation analysis, multiple regression analysis, and mediation effects analysis to test hypotheses and evaluate models. The study follows strict ethical principles to ensure the transparency of the data collection process and the voluntary nature of the participants. Finally, the research results provide empirical evidence and practical suggestions for TSMEs to improve innovation management.

### 3.2. Research Sample and Data Collection

#### (1) Sample selection

The study subjects were all 460 employees of HK Company in Guangdong Province. A simple random sampling method is adopted to ensure that each employee has an equal probability of being selected, thereby improving the representativeness of the sample. According to the minimum sample size suggested by the structural equation model (SEM)

(10 samples per observed variable), combined with the 25 observed variables in the study, the recommended minimum sample size is 250. Taking into account the potential for non-response or incomplete questionnaires, the sample size was increased by 10% to 276. This sample size is sufficient to support the robustness of the statistical analysis and the reliability of the results.

#### (2) Data collection tools

Data were collected via questionnaires distributed through email and online platforms, targeting subjective evaluations of key variables such as self-efficacy, growth need strength, creativity, and innovation performance. A pre-test was conducted to refine the questionnaire, which remained open for four weeks with reminders sent to non-responders. The collected data were then collated and reviewed to ensure integrity and reliability, providing a solid basis for analyzing factors influencing employee innovation performance.

### 3.3. Data Analysis Methods

The study employed four analytical methods to investigate the factors influencing employee innovation performance in traditional small and medium-sized technology enterprises (TSMEs) and construct a comprehensive model:

(1) Descriptive Statistics: Summarized sample characteristics using mean, standard deviation, skewness, and kurtosis for key variables such as self-efficacy, growth need strength, creativity, and innovation performance. This analysis revealed the central tendency and variability of the data, providing a foundation for further analysis.

(2) Correlation Analysis: Assessed the strength and direction of relationships between variables using Pearson correlation coefficients. This revealed correlations among self-efficacy, growth need strength, creativity, and innovation performance, offering a preliminary basis for hypothesis testing.

(3) Multiple Regression Analysis: Tested the direct effects of self-efficacy and growth need strength on creativity and innovation performance. Regression models quantified these relationships and evaluated their statistical significance.

(4) Structural Equation Modeling (SEM): Verified hypotheses and path relationships between variables, considering both direct effects and the mediating role of creativity. SEM also evaluated model fit using indices such as  $\chi^2/df$ , CFI, TLI, and RMSEA.

Through these methods, the study identified self-efficacy, growth need strength, and creativity as key factors influencing innovation performance in TSMEs. The comprehensive model revealed direct impacts of these factors on innovation performance and clarified their internal relationships through mediating effect analysis.

## 4. Data Analysis Results

### 4.1. Descriptive Statistics

Table 4.1. Descriptive Statistics of Variable

Variable	Max	Min	Mean	Standard deviation	Skewness	Kurtosis
Employee Innovation Performance	5	1	3.977	1.028	-0.786	-.0276
Growth Need Strength	5	1	3.803	1.032	-0.504	-0.627
Self-efficacy	5	1	3.910	1.022	-0.635	-0.510
Creativity	5	1	3.784	1.004	-0.459	-0.522

Descriptive statistics analyzed the overall characteristics of

the four dimensions (employee innovation performance,

growth need strength, self-efficacy, creativity). The results showed that employees were positive in innovation performance (mean 3.977) and self-efficacy (mean 3.910), close to 4, indicating that employees generally believed that they were well in innovation and self-ability. The intensity of growth demand (mean 3.803) and creativity (mean 3.784) scored slightly lower, but still at the above average level. The standard deviation was between 1.004 and 1.032, indicating that there are some differences in employee performance in all dimensions, but the overall distribution is relatively concentrated. Both skewness and kurtosis values were negative, indicating that the data distribution was biased to high scores and relatively flat, indicating that most employees had high scores on these dimensions, but some employees still had low scores. These results provide the basis for subsequent analyses, revealing overall employee performance and

differences in innovation-related dimensions.

## 4.2. Reliability and Validity Analysis

### 4.2.1. Reliability Analysis

Reliability analysis evaluated the internal consistency of the questionnaire by Cronbach's  $\alpha$  coefficient. Table 4.2 Results show that Cronbach's  $\alpha$  coefficients of employee innovation performance, growth need strength, self-efficacy and creativity are 0.92, 0.899, 0.936 and 0.931, respectively, and  $\alpha$  coefficients of the overall questionnaire are 0.952. All coefficients are higher than 0.899, far exceeding the acceptable standard of 0.7, indicating that the questionnaire has high reliability. This means that the questionnaire can stably measure variables of all dimensions, and the data results have high reliability, which provides a solid foundation for subsequent analysis.

**Table 4.2.** Reliability Test Results

Dimension	Cronbach's $\alpha$ coefficient	Standardized Cronbach's $\alpha$ coefficient	Number of terms	Sample number
Employee innovation performance	0.92	0.921	10	460
Growth need strength	0.899	0.898	5	460
Self-efficacy	0.936	0.936	5	460
Creativity	0.931	0.931	5	460
Overall	0.952	0.952	25	460

### 4.2.2. Validity analysis

**Table 4.3.** Validity Test Results

KMO test and Bartlett test		
<b>KMO value</b>	0.949	
<b>Bartlett sphericity test</b>	Approximate chi-square	8841.225
	df	300
	P	0.000**

Note: \*\* and \* represent the significance level of 1% and 5% respectively.

Validity analysis verified the applicability of the data through KMO test and Bartlett spherical test. The KMO value is 0.949, close to 1, indicating that there are many common factors among the variables, and the data structure is good, which is very suitable for factor analysis. As can be seen from Table 4.3, the  $\chi^2$  value of Bartlett sphericity test is 8841.225, the degree of freedom is 300, the p value is 0.000\*\*, and the significance level is less than 0.01, rejecting the null hypothesis that the correlation coefficient matrix is the identity matrix, and further confirming the significant

correlation between the variables. This indicates that the questionnaire design is reasonable, can effectively measure the potential characteristics of each dimension, and provides a scientific basis for model construction.

## 4.3. Correlation Analysis

Correlation analysis revealed the relationships between the four dimensions. Table 4.4 Results show that there were significant positive associations between employee innovation performance and growth demand strength, self-efficacy and creativity, with correlation coefficients of 0.563, 0.651 and 0.619, respectively. This indicates that the higher the intensity of their growth needs, self-efficacy and creativity, the higher their innovation performance. Moreover, the correlation coefficients between the strength of growth demand and the self-efficacy and creativity were 0.541 and 0.474, respectively, and the correlation coefficient between self-efficacy and creativity was 0.568, i. e. These results support the research hypothesis, showing that the dimensions are interrelated and jointly affect employee innovation performance.

**Table 4.4.** Correlation Analysis of Variables

	Employee innovation performance	Growth need strength	Self-efficacy	Creativity
Employee innovation performance	1(0.000**)			
Growth need strength	0.563(0.000**)	1(0.000**)		
Self-efficacy	0.651(0.000**)	0.541(0.000**)	1(0.000**)	
Creativity	0.619(0.000**)	0.474(0.000**)	0.568(0.000**)	1(0.000**)

Note: \*\* and \* represent the significance level of 1% and 5% respectively.

## 4.4. Regression Analysis

Regression analysis was used to examine the direct impact of growth need strength, self-efficacy, and creativity on employee innovation performance. Table 4.5 shows that the

intensity of growth demand ( $\beta = 0.265$ ), self-efficacy ( $\beta = 0.346$ ), and creativity ( $\beta = 0.245$ ) all had a significant positive impact on employee innovation performance. The R2 value of the model was 0.496, indicating that these three variables explained 49.6% of the variation in employee innovation performance. This shows that improving the strength of employees' growth needs, self-efficacy and

creativity are the key strategies to improve innovation performance. In addition, the regression analysis also verified the independence between the variables by tolerance and

variance inflation factor (VIF), indicating that the model does not have serious collinearity problems.

**Table 4.5.** Regression model coefficient

	Non-standardized coefficient		Standardization coefficient	t	P	Collinear statistics	
	B	Standard error	Beta			Tol	VIF
<b>(constant)</b>	1.085	0.140		7.766	0.000**		
<b>Growth need strength</b>	0.239	0.037	0.265	6.447	0.000**	0.654	1.529
<b>Self-efficacy</b>	0.298	0.036	0.346	8.286	0.000**	0.635	1.576
<b>Creativity</b>	0.217	0.036	0.245	6.083	0.000**	0.681	1.469

**Dependent variable: Employee innovation performance**

Note: \*\* and \* represent the significance level of 1% and 5% respectively.

### 4.5. Intermediary Effect Test

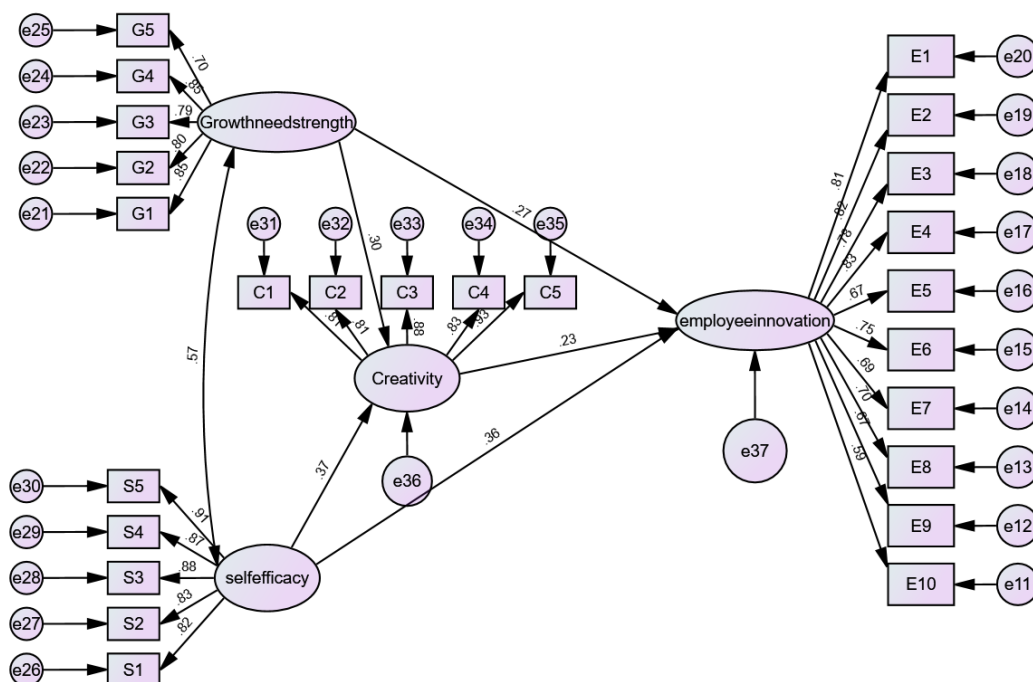
The Intermediary effect test analyzes the mediation role of creativity between the strength of growth demand, self-efficacy and the innovation performance of employees through the structural equation model (SEM). The results in Table 4.6 and Figure 4.1 show that the intensity of growth needs and self-efficacy not only directly affect innovation

performance, but also indirectly affect innovation performance by improving creativity. Specifically, the indirect effect of growth need strength through creativity on innovation performance was 0.07, and the indirect effect of self-efficacy through creativity was 0.086, both of which were statistically significant. This suggests that creativity plays an important intermediary role in the formation of employee innovation performance, further supporting the research hypothesis.

**Table 4.6.** Intermediary effect test

Path	Effect value	SE	Bias-corrected 95%CI			Percentile 95%CI		
			Lower	Upper	P	Lower	Upper	P
<b>Growth need strength -&gt;Employee innovation performance</b>	0.267	0.056	0.16	0.38	0.000**	0.159	0.379	0.000**
<b>Self-efficacy -&gt;Employee innovation performance</b>	0.363	0.058	0.254	0.48	0.000**	0.253	0.479	0.000**
<b>Growth need strength -&gt;Creativity-&gt;Employee innovation performance</b>	0.07	0.02	0.037	0.116	0.000**	0.034	0.111	0.001**
<b>Self-efficacy -&gt;Creativity -&gt;Employee innovation performance</b>	0.086	0.025	0.043	0.144	0.000**	0.041	0.139	0.000**
<b>Total indirect effect</b>	0.156	0.038	0.084	0.233	0.000**	0.082	0.231	0.000**
<b>Total effect</b>	0.785	0.036	0.707	0.849	0.000**	0.707	0.849	0.000**

Note: \*\* and \* represent the significance level of 1% and 5% respectively.



**Figure 4.1.** Structural Equation Path

## 5. Conclusions and Recommendations

### 5.1. Conclusion

This study examines factors influencing employee innovation performance in traditional small and medium-sized technology enterprises (TSMEs) and constructs a relevant performance model. Surveying 276 employees of HK Company in Guangdong Province, the research identifies self-efficacy, growth need strength, and creativity as key drivers of innovation performance, with creativity acting as a core mediator. Self-efficacy significantly enhances creativity (path coefficient 0.368), while growth need strength directly promotes creativity (path coefficient 0.3) and indirectly boosts innovation performance (indirect effect 0.07). Creativity has a strong positive impact on innovation performance (path coefficient 0.234). The model suggests that improving self-efficacy and growth need strength can foster creativity, ultimately driving innovation performance. This provides TSMEs with a scientific tool to enhance innovation capability and achieve sustainable development in competitive markets.

### 5.2. Recommendations

This paper proposes practical suggestions to enhance employee innovation performance in traditional small and medium-sized science and technology enterprises (SMEs) by focusing on cultivating self-efficacy, encouraging growth need strength, and fostering a creative innovation culture. To build self-efficacy, SMEs should adopt supportive leadership, provide autonomy and regular feedback, and offer continuous skill development. Encouraging growth involves prioritizing personal development plans, designing clear career paths, and promoting a learning-oriented culture. Creating a creative culture includes encouraging open idea-sharing, allocating time and resources for creative thinking, and incentivizing creativity through recognition and rewards. These recommendations are grounded in the proposed employee innovation performance model, which integrates self-efficacy and growth need intensity as dual drivers of creativity, identifies creativity's mediating role, and contextualizes innovation theory in SMEs. Future research should focus on expanding sample size and diversity, broadening research variables, combining multiple methods, conducting cross-cultural comparisons, using advanced statistical techniques, and addressing ethical and data privacy issues to deepen understanding of innovation performance mechanisms and

support SMEs in developing effective management strategies.

## References

- [1] Akbari, M., Bagheri, A., Imani, S., & Asadnezhad, M. (2021). Does entrepreneurial leadership encourage innovation work behavior? The mediating role of creative self-efficacy and support for innovation. *European Journal of Innovation Management*, 24(1), 1-22.
- [2] Bandura, A. (2000). Cultivate self-efficacy for personal and organizational effectiveness. *Principles of Organizational Behavior: The Handbook of Evidence-Based Management*, 3rd Edition (120-136). Oxford, UK: Blackwell.
- [3] Gelaidan, H. M., Al-Swidi, A. K., & Al-Hakimi, M. A. (2024). Servant and authentic leadership as drivers of innovative work behaviour: the moderating role of creative self-efficacy. *European Journal of Innovation Management*, 27(6), 1938-1966.
- [4] Huang, S. Q. (2022). Research on High performance work system and Employee Innovation behavior: The mediating role of innovation self-efficacy. *Chinese Business Theory*, 1, 152-155.
- [5] Lv, T. Y. (2020). Research on risk management of small and medium-sized high-tech enterprises under the new situation. *Business News*, 5, 108-109.
- [6] Liu, P.F, Han, X. L., & Li, L. R., (2022). Research on the Impact of Digital Economy on Enterprise Innovation Performance. *Business Research*, 4, 5-15.
- [7] Mumtaz, S., & Parahoo, S. K. (2020). Promoting employee innovation performance: Examining the role of self-efficacy and growth need strength. *International Journal of Productivity and Performance Management*, 69(4), 704-722.
- [8] Nappi, V., & Kelly, K. (2022). Review of key performance indicators for measuring organizational performance. *International Journal of Productivity and Performance Management*, 71(1), 182-210.
- [9] Namono, R., Obanda, P. W., Ayebale, D., Isiagi, E., & Wofuma, G. (2022). Strategizing for innovative work behavior in higher education institutions: the role of creative self-efficacy. *Continuity & Resilience Review*, 4(3), 249-266.
- [10] Xu, B. H., Gao, Y. H., & Deng, C. J. (2024). The effect of growth demand intensity on employee innovation behavior. *Journal of Management*, 21(9), 1335-1344.
- [11] Zhou, H. J. (2019). Organizational innovation and creativity: a review from an individual perspective. *Productivity Research*, 9, 156-160.