The Research on Organizational Innovation of High Tech Enterprises

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Abstract. This study focuses on the key issue of organizational innovation in high-tech enterprises, and explores in depth the multidimensional factors and their interactions that affect organizational innovation. Through a systematic review and case analysis of relevant literature both domestically and internationally, this article reveals the complexity and dynamism of organizational innovation in high-tech enterprises. Research has found that successful organizational innovation not only requires consideration of internal structural adjustments, cultural reshaping, and talent development, but also requires high sensitivity to external environmental changes. Especially in the context of rapid technological iteration and changing market demand, high-tech enterprises must break the traditional closed innovation model and actively explore new models such as open innovation and joint innovation. This article focuses on analyzing the characteristics, advantages, and implementation conditions of these innovative models, and points out that enterprises should flexibly choose according to their own development stage and strategic positioning. The research results indicate that there is a close interactive relationship between organizational innovation, technological innovation, and business model innovation. Enterprises should adopt systematic thinking and collaborate to promote various innovation activities. This study not only enriches the theory of organizational innovation, but also provides practical guidance for high-tech enterprises to enhance their innovation capabilities and market competitiveness.

Keywords: high-tech enterprises; Organizational innovation; Innovative Mode.

1 Introduction

In today's rapidly restructuring global economic landscape, innovation has become the core of national development strategies and corporate competitive advantages. As the main force of technological innovation, high-tech enterprises play an irreplaceable role in promoting economic transformation and upgrading, and cultivating emerging industries. However, with the acceleration of technological iteration, diversified market demand, and increasingly complex competitive environment, high-tech enterprises are facing unprecedented challenges. The traditional mode of technological innovation is no longer sufficient to address these challenges. More and more companies are real-

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izing that in order to maintain sustainable development in fierce market competition, they must extend the tentacles of innovation to all levels of organizational management. Organizational innovation, as a systematic and global transformation, is increasingly becoming the key for high-tech enterprises to break through development bottlenecks and achieve leapfrog growth.

However, organizational innovation is not an easy task. It involves reshaping and optimizing multiple dimensions such as enterprise management mode, organizational structure, operational processes, and corporate culture. For high-tech enterprises highly dependent on technological innovation, how to continuously optimize organizational structure and stimulate innovation vitality while maintaining technological leadership is an urgent research topic. This study focuses on the important issue of organizational innovation in high-tech enterprises, aiming to deeply analyze the key factors and their mechanisms that affect organizational innovation. We will explore the interactive relationship between organizational innovation, technological innovation, and business model innovation, analyze different types of organizational innovation models and their applicable conditions, and reveal the best practices of successful enterprises through case studies. Of particular note is that with the deepening of digital transformation, the new generation of information technology is reshaping the organizational structure and operational models of enterprises. The rise of new concepts and models such as open innovation, platform based organization, and ecosystem strategy provides new ideas and tools for organizational innovation in high-tech enterprises. This study will focus on exploring the application prospects and implementation strategies of these new innovative models in high-tech enterprises. In addition, this study will also focus on the differentiated performance of organizational innovation in high-tech enterprises at different stages of development. We believe that start-up, growth, and mature enterprises face different organizational challenges and need to adopt different innovation strategies. Through comparative analysis, we will provide targeted organizational innovation recommendations for different types of high-tech enterprises.

2 The Definition of High-Tech Enterprises and Organizational Innovation

2.1 The Definition of High Tech Enterprises

The concept of high-tech enterprises originated in the United States in the 1980s. The third edition of the Webster's New International Dictionary in the United States defines high-tech as "technology that includes or uses cutting-edge methods or instrument applications". The US Bureau of Labor Statistics mainly defines high-tech enterprises based on two indicators: research and development intensity and the proportion of technology personnel. Enterprises with these two indicators higher than twice the national manufacturing average are considered high-tech enterprises. Subsequently, other countries also proposed their own definition standards. Japanese management expert Shinichiro Tsuchiki believes that high technology includes dominant technologies that can endow new products with new functions, central technologies that im-

prove existing product functions, and technologies that form the foundation of the next generation of products. Canada uses the sector approach and personnel ratio method to define high-tech enterprises[1].

The Ministry of Science and Technology of China defines high-tech as a technology based on modern natural science theory and at the forefront of science and technology, emphasizing its permeability, value-added, internationalization, and strategic nature. The Management Measures for the Recognition of High tech Enterprises further clarify the specific recognition standards for high-tech enterprises in terms of talent structure, research and development investment, technology income, and other aspects. For example, the proportion of employees with a college diploma or above needs to exceed 30%, the proportion of R&D personnel needs to exceed 10%, and R&D expenses need to account for more than 3% of annual total income. High tech usually includes fields such as information technology, biotechnology, new material technology, and new energy technology, which have important strategic significance in promoting industrial upgrading and economic development. These technologies can drive the transformation and upgrading of traditional industries, while also giving birth to a number of emerging industries, thereby enhancing the overall competitiveness of the country.

2.2 The Definition of Organizational Innovation

The concept of organizational innovation can be traced back to the early 20th century. In 1912, American economist Joseph Schumpeter first proposed the concept of "innovation" in his book "Economic Development Theory". He defined innovation as the "new combination" of introducing new production factors and conditions into the existing production system. Schumpeter emphasized that innovation is an economic category rather than a purely technological category. For enterprises, innovation means introducing science and technology into the production process, forming new production capabilities. Subsequently, the concept of organizational innovation has been further developed and defined among different countries and scholars. For example, some scholars define innovation as the implementation of new ideas, the emergence of new things, or new changes in organizations and their environments. Professor Fu Jiaji believes that organizational innovation is the reconstruction of the responsibilities, rights, and interests of members within an organization.

In the late 20th and early 21st centuries, the definition of organizational innovation became more systematic and diversified. It is regarded as the process in which enterprises restructure and integrate internal resources, adopt new management methods, organizational structures, and business processes to achieve management goals, thereby stimulating organizational vitality and improving operational efficiency[2]. This definition emphasizes that organizational innovation is a key area and focus of innovation in enterprise management. The scope of organizational innovation is constantly expanding, from internal changes within a single enterprise to business integration and strategic cooperation at the cross enterprise level. It involves multiple aspects such as the functional structure, management system, organizational structure, horizontal coordination, and operational mechanism of the enterprise, with the aim of better matching and coordinating various elements of the organization, and continu-

ously adapting to changes in the internal and external environment. In the context of globalization and digitization, organizational innovation is showing new trends. Flattening, flexibility, and networking have become the main directions of current organizational innovation, reflecting the adaptability needs of enterprises to rapidly changing market environments. These trends reflect the common characteristics of organizational innovation in different countries and regions, while also presenting different features due to differences in the economic, cultural, and institutional environments of each country.

3 Factors Affecting the Innovation of High-Tech Organizations

The organizational innovation of high-tech enterprises is influenced by various factors, which can be mainly summarized as follows:

3.1 External Environmental Factors

The rapid changes in the external environment pose challenges to organizational innovation in enterprises. Mascarenhas found through a survey of 184 companies that the more dynamic and competitive the environment in which a company operates, the stronger the organization's ability for self innovation[3]. Chen and Miller pointed out that market dynamism drives companies to acquire new ideas and concepts, driving organizational change[4]. In addition, Xie Qiuxin's research shows that environmental complexity and uncertainty have a significant impact on organizational innovation [5]. Ma Wenzhuo et al. found that environmental dynamism is positively correlated with exploratory innovation, while environmental competitiveness is positively correlated with exploitative innovation [6].

3.2 Entrepreneurial Capability Factors

Lee S believes that in the face of fierce competition and uncertainty, the ability of organizational leaders to accurately and timely obtain effective information from external sources, and make correct analysis and judgments, is a key factor in organizational innovation[7]. Research by Luan Xiuyun et al. shows that transformational leadership has a significant positive impact on organizational innovation[8]. Ren Lin'er et al. found that the foresight and innovative spirit of entrepreneurs are closely related to organizational innovation capabilities[9].

3.3 Internal Resource Factors of Enterprises

Scott et al. believe that innovation activities of enterprises are carried out under the joint influence of individuals, teams, and organizational atmosphere[10]. The internal driving force of organizational innovation comes from the resource endowment and capability foundation of the enterprise itself. Zhang Xuebiao pointed out that the structure and quality of personnel in enterprises will inevitably lead to adjustments in

values and behavioral norms, which in turn will affect the goals, structure, and strategy of the enterprise and promote organizational innovation[11]. He F's research shows that human capital, social capital, and organizational capital have a significant impact on a company's innovation capability [12].

3.4 Organizational Culture and Structural Factors

Hofstede believes that different organizations have different thinking patterns, and the key variable that distinguishes them is organizational culture. Organizational culture affects employees' reactions to the environment, which in turn has an impact on the organizational level[13]. Zhou Enli pointed out that organizational structure is the carrier of organizational culture dissemination, and the type of organizational culture affects the preferences and choices of enterprises towards organizational structure[14].

3.5 Impact of Enterprise Development Stage

Li Gang analyzed that the shift in strategic focus will cause a change in the focus of enterprise work, leading to changes in the importance of various departments and employee positions, and ultimately triggering corresponding adjustments in the relationship between various management departments and responsibilities. The research by Zhang Peng et al. shows that different types of organizational culture have varying impacts on product innovation [15]. Jill J, Rajneesh N, Irina S found that organizational structures of certain models are more conducive to organizational innovation [16].

3.6 Information Technology and Knowledge Management Factors

Wang Zhongming's research shows that under the conditions of information technology, strategic management, and organizational culture, the three basic dimensions of network skills, system connections, and participation in applications have significant effects on the various characteristic variables of organizational innovation interfaces [17]. Zhou Xiao and He Shengming believe that knowledge and information are the foundation of organizational innovation, and organizational innovation cannot be separated from the support of numerous knowledge and information. Mu ñ oz G F C, Romero M A pointed out that information technology promotes organizational innovation by improving information acquisition and knowledge sharing[18]. Lim emphasized the core role of knowledge creation in organizational innovation [19].

4 Research on Innovation Models of High Tech Enterprises

New paths such as openness, collaboration, user participation, and platform based innovation provide vast space for enterprises to integrate resources, understand needs, and drive change (see Figure 1). This article will systematically analyze the characteristics, logic, and practical paths of mainstream innovation models, providing reference for enterprises to pulse and innovate development.

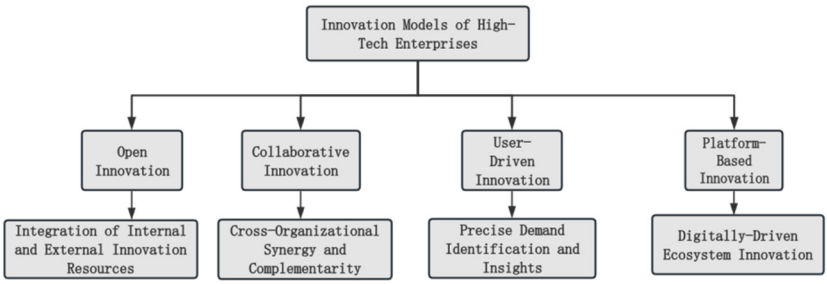

Fig. 1. Research Framework of Innovation Mode.

4.1 Open Innovation

Open innovation promotes the full flow and collision of internal and external creativity in enterprises by building a collaborative innovation network of industry, academia, research and application, reducing research and development costs and risks, and improving innovation efficiency and success rate [20].

To successfully implement open innovation, high-tech enterprises need to systematically restructure their concepts, systems, platforms, and other aspects. To establish the value concept of openness and sharing, we need to shift from the past 'autonomy is king' to 'openness first', and learn to humbly engage in dialogue and cooperation with the outside world[21]. To establish a sound management system and evaluation mechanism for open innovation, mobilize the enthusiasm of all parties to participate, and ensure the reasonable sharing of innovative achievements. We need to build an open innovation platform that combines online and offline channels to promote efficient allocation of innovative elements such as creativity, capital, talent, and market[22]. More importantly, high-tech enterprises need to continuously enhance their position as innovation entities, improve their technological innovation and rapid iteration capabilities in open cooperation, and accelerate the construction of independent and controllable core competitive advantages.

4.2 Joint Innovation

Joint innovation refers to the establishment of strategic partnerships between enterprises and external organizations, such as universities, research institutes, upstream and downstream enterprises, to integrate their respective advantageous resources and jointly carry out technology research and development and achievement transformation. On the one hand, through joint innovation, enterprises can leverage the professional skills and talent reserves of their partners, accelerate the research and application of new technologies, and enhance the technological content of their products and services[23]. On the other hand, all parties involved in the cooperation can share research and development costs and market risks, and improve the cost-effectiveness and success rate of innovation through "teamwork".

However, collaborative innovation is not a simple "combination", but an art that tests a company's vision, mindset, and wisdom. On the one hand, enterprises need to have a long-term vision, identify and select partners who meet their own development needs and can form complementary advantages[24]. We should not only be of the same family background, but also have a similar taste. In negotiations, we should adhere to the principle of mutual benefit and win-win, clarify our respective rights and obligations, and ensure the sharing of benefits and responsibilities. On the other hand, joint innovation should focus on implementation and make efforts in mechanisms, platforms, culture, and other aspects[25].

4.3 User Participatory Innovation

In today's user demand-oriented world, more and more high-tech enterprises are paying attention to and practicing user participatory innovation. Users are no longer passive providers of demand and recipients of products, but rather the source of creativity, participants in research and development, and rapid iteration of products[26]. On the one hand, enterprises encourage and guide users to participate in demand research, creative ideation, product design, and other aspects through online communities, experience centers, and other channels, and quickly obtain user feedback on the use of innovative achievements. On the other hand, user participatory innovation has also accumulated massive user data and insights for enterprises[27]. By relying on data analysis and intelligent algorithms, enterprises can accurately depict user profiles and gain insights into user needs, laying the foundation for continuous innovation of products and services.

Of course, user participatory innovation is not an easy task and places higher demands on the organizational capabilities of enterprises. To establish the concept of "customer first" and embed user participation into the entire process and chain of innovation. The breadth and depth of user participation are not necessarily better[28]. The key is to focus on the strategic priorities of the enterprise, choose appropriate participation modes and channels, and involve both the "most familiar with the product" and the "least familiar with the product". At the same time, attention should be paid to guiding and motivating the enthusiasm and continuity of user participation, while ensuring the quality of participation, improving user experience and enhancing brand stickiness[29].

4.4 Platform Based Innovation

With the accelerated penetration of digital technology, platform based innovation is becoming the "high ground" for high-tech enterprises. It promotes interaction and collaboration among different entities by connecting massive and dispersed resource elements, which can not only achieve large-scale and personalized innovation by breaking down the whole, but also leverage social and cluster innovation by gathering sand into a tower[30]. Enterprises can rely on platforms to reconstruct innovation processes, modularize and restructure innovative elements such as user needs, cutting-edge technologies, and professional talents, and achieve "plug and play". Enter-

prises can also leverage the platform to aggregate industry upstream and downstream forces, and "leverage intelligence to contribute" through co creation, crowdsourcing, crowdfunding, and other methods to integrate innovative resources on a larger scale and deeper level, stimulate cross-border integration "chemical reactions", and incubate disruptive technologies and products[31].

However, platform based innovation is not simply a matter of building blocks. It places extremely high demands on the digital and intelligent capabilities of enterprises. Enterprises need to comprehensively and systematically plan and layout digital bases such as cloud computing, big data, artificial intelligence, blockchain, etc., and consolidate the infrastructure for platform innovation[32]. The operation of the platform requires precise and intelligent orchestration and scheduling. We should make good use of algorithms, data and other means to achieve precise matching and dynamic optimization of innovative resources, and improve collaborative efficiency[33].

5 Conclusion and the Future Outlook

5.1 Conclusion

The organizational innovation of high-tech enterprises is a multidimensional and dynamic process, influenced by multiple internal and external factors. Internal factors include organizational structure, corporate culture, human resource management, etc. External factors involve market environment, policies and regulations, technological changes, etc. Enterprises need to comprehensively consider these factors in order to develop effective organizational innovation strategies[34].

Successful organizational innovation requires enterprises to choose suitable innovation models based on their own development stage and external environment. The open innovation, collaborative innovation, user participation innovation, and platform innovation models explored in this study each have their own characteristics and advantages. Enterprises should flexibly choose and combine these innovative models based on their actual situation to enhance the effectiveness of organizational innovation.

There is a close interactive relationship between organizational innovation and technological innovation[35]. High tech enterprises should promote organizational innovation and technological innovation in a coordinated manner, by building a flexible, open, and learning oriented organizational structure, cultivating an innovative culture, strengthening talent development and knowledge management, and enhancing sensitivity and responsiveness to external environmental changes, in order to achieve sustained competitive advantages for the enterprise[36].

5.2 Future Outlook

Conduct in-depth research on the dynamic complementarity between organizational innovation and technological innovation. As Vahter and Vadi (2024) pointed out, there is a dynamic complementary relationship between technological innovation and organizational innovation[37]. Future research can explore the performance of this

complementarity in different industries and enterprise sizes, as well as how to optimize the synergistic effects between the two

Exploring organizational innovation from the perspective of sustainable development. Guimei and Putthiwat (2024) emphasized the importance of green supply chain integration and dual green innovation for corporate performance[38]. Future research can focus on how high-tech enterprises can integrate sustainable development concepts into their organizational innovation processes.

Research on organizational innovation models in the context of digital transformation. With the rapid development of new generation information technology, exploring how digital transformation can reshape the organizational structure and innovation models of high-tech enterprises will be an important research direction.

Reference

1. Zhao Wenyan, Chen Yisheng. Research on High tech Development Zones, the Cradle of Emerging Industries [M], Beijing: Science and Technology Literature Press, 1999, 37-39.
2. Wang Weihao, Research on Organizational Innovation and Change in High tech Enterprises [D], Master's Thesis, Hefei University of Technology, May June 2004.
3. Gao Jian, Research on Organizational Structure Change of Netcom Q Company under Technological Innovation Environment [D], Master's Thesis, Ocean University of China, 2008.
4. Cong Min. Research on Organizational Structure Based on Organizational Culture [D], Master's Thesis, Harbin Institute of Technology, 2000.
5. Xie Qiuxin. Research on the Relationship between Emotional Ability, Organizational Resilience, and Innovation Performance of High tech Enterprises [D]. Harbin University of Commerce, 2024.
6. Ma Wenzhuo. Research on the Impact of Transformational Leadership and Organizational Resilience on Innovation Performance of High tech Enterprises [D]. Harbin University of Commerce, 2024.
7. Lee S .Technological innovation and profit[J]. Journal of Open Innovation: Technology, Market, and Complexity,2024,10(3):100335-100335.
8. Luan Xiuyun, Zhang Qian, Li Haodong. Research on the relationship between organizational sense of support, organizational identity and innovation performance —— Take the employees of high-tech enterprises as an example [J]. Modern Business, 2021, (21): 107-110. DOI: 10.14097/j.cnki.5392/2021. 21.034.
9. Ren Lin'er, Shen Jiaxin, Nie Li. The Current Situation and Countermeasures of Organizational Innovation in High tech Enterprises in Jilin Province [J]. Science and Technology Innovation and Productivity, 2020, (10): 1-2+5.
10. Scott S G,Bruce R A.Determinants of innovative behavior: a path model of individual innovation in the work place[J].Academy of ManagementJourna1,1994,37(3).
11. Zhang Xuebiao, Liu Hongxia, Qian Chen, et al. Research on the Organizational Model of Agricultural Research with Enterprises as the Innovative Subject [J]. Agricultural Economics, 2024, (07): 103-105.
12. He F ,Bonifacio D G .The Impact of Transformational Leadership on Employee Creativity and Organizational Innovation: The Moderating Effect to Intrinsic Motivation[J].Academic Journal of Management and Social Sciences,2024,7(3):73-77.

13. G. Hofstede, What is culture a reply to Baskerville. Accounting, Organizations and Society. 2003 28(7-8).
14. Zhou Enli. Research on the Impact of Strategic Learning on the Performance of High tech Enterprises [D]. Harbin Engineering University, 2019. DOI: 10.27060/d.cnki.ghbcu.2019.000391
15. Zhang Peng. Research on Corporate Social Capital, Organizational Learning, and Technological Innovation Performance [M]. Central Compilation and Translation Press: 201901. 214.
16. Jill J ,Rajneesh N ,Irina S .International business and organizational innovation: an agenda for future research[J].Multinational Business Review,2024,32(3):305-322.
17. Zhou Xiaojuan. Agricultural Industrialization Consortium: Symbiotic Mechanism and Evolutionary Path of Management Organization Innovation - Based on the Experience of Qionglai City, Sichuan Province [J]. Rural Economy, 2024, (04): 111-120.
18. Muñoz G F C ,Romero M A .Progressing toward Teal Organizations: An Assessment of Organizational Innovation in the Spanish Public Administrations[J]. Sustainability, 2024, 16(11):.
19. Lim (S ,Ok M C ,Yang Y .A meta-analytic investigation of innovation predictors in tourism and hospitality organizations[J].Tourism Management,2024,105104965-.
20. Liang Taike. Research on the Relationship between Organizational Innovation Atmosphere, Organizational Learning, and Process Innovation Performance of Enterprises in Xinxiang High tech Development Zone [D]. Henan University of Technology, 2021.
21. Yang Minxiang, Wei Hongjie. Carefully organized and innovatively applied high-quality completion of flexible annual inspection [J]. North China Electric Power, 2024, (06): 56-57.
22. Jiang Changchang, Ren Jing, Liu Pei, et al. Digital Economy, Organizational Inertia, and Green Innovation in Enterprises: Strategies for Promoting Sustainable Development. Scientific Decision making, 2024, (06): 1-15.
23. Li Fuli, Cheng Wen, Dong Jingyu. Stimulating Employee Creativity to Assist Organizational Innovation and Development [J]. Tsinghua Management Review, 2024, (05): 76-83.
24. Pan Lipeng, Liu Shuchun, Qin Shanmin, et al. Research on the Digital Transformation of Enterprise Management from the Perspective of Organizational Innovation [J]. Research Management, 2024, 45 (06): 126-135. DOI: 10.19571/j.cnki. 1000-2995.2024.06.013
25. Liu Xia, Kong Xiang. Total Factor Innovation, Organizational Resilience, and Corporate Performance under Uncertain Shockings: The Regulation of Remote Knowledge Search. Economic Forum, 2024, (06): 122-131.
26. Wang Xueli, Chen Han, Wu Yuke. Dancing Together: The Interwoven Journey of AI with Employee Creativity and Organizational Innovation [J]. Tsinghua Management Review, 2024, (05): 62-67.
27. Li Yilian. Ensuring the Sustainable Revitalization of State owned Enterprises through Innovative Development in Organizational Work [N]. Jilin Daily, June 11, 2024 (002) DOI:10.28447/n.cnki.njlrb.2024.002209.
28. Hu Xuming. Research on the Relationship between Green Innovation, Organizational Legitimacy, and Corporate Performance [D]. Inner Mongolia University of Finance and Economics, 2024. DOI: 10.27797/d.cnki.gnmgc.2024.0000066
29. Zhang Xuebiao, Liu Hongxia, Qian Chen, et al. Research on the Organizational Model of Agricultural Research with Enterprises as the Innovative Subject [J]. Agricultural Economics, 2024, (07): 103-105.
30. Liu Pingping. Dual Innovation, Organizational Resilience, and High Quality Development of Enterprises [D]. Hebei University of Economics and Business, 2024.

31. Liu Chang. Organizational Resilience, Internal Control, and Innovation Performance [D]. Shandong University of Finance and Economics, 2024. DOI: 10.27274/d.cnki.gsdjc.2024.001214
32. Zhao Xiaole, Chen Ting. Exploration of the realistic difficulties and paths of organizational innovation in China's agricultural industrialization under the background of rural revitalization [J]. Agricultural Economics, 2023, (12): 14-17.
33. Wang Guohong, Yue Xiangyu, Huang Hao. Cooperative Culture, Enterprise Innovation, and Organizational Resilience [J]. Industrial Technology and Economics, 2023, 42 (12): 105-114.
34. Wang Juanru, Liu Jieyi. Research on the Impact of Cross border Search and Organizational Resilience on Enterprise Green Technology Innovation [J]. Research Management, 2024, 45 (05): 125-133. DOI: 10.19571/j.cnki. 1000-2995.2024.05.013
35. Zhang Haitao, Zhang Jianjun, Xu Hexian, et al. Research on the mechanism of innovative leadership promoting breakthrough innovation among employees [J]. Research Management, 2024, 45 (05): 172-181. DOI: 10.19571/j.cnki. 1000-2995.2024.05.018
36. Yin Yue, Jin Fu. Research on the Mechanism of Empowering Enterprise Organizational Innovation Management with Digital Economy [J]. China Arab Science and Technology Forum (in Chinese and English), 2023, (08): 52-56.
37. Vahter P ,Vadi M .The relationship of technological and organizational innovation with firm performance: Opening the black box of dynamic complementarities[J].Technological Forecasting& Social Change,2024,206123516-123516.
38. Guimei Y ,Putthiwat S .A conceptual framework of green supply chain integration toward enterprise performance through ambidextrous green innovation: an organizational capability perspective[J].Journal of International Logistics and Trade,2024,22(2):93-106.