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The Impact of Leadership Style on Innovation Performance in Small and Medium-sized Medical IT Enterprises: A Moderated Mediation Model

NI Weihua

Doctor of Management

Supervisor:
PhD Renato Pereira, Assistant Professor with Habilitation,
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Abstract

With the accelerated evolution of modern information technology, data processing technology, and the Internet of Things, medical IT enterprises are actively pursuing the development of products tailored to diverse user needs, while also providing corresponding medical big data information services. Nonetheless, in the context of rapid technological advancement, market supply-demand disparities, policy liberalization, and escalating industry competition annually, small and medium-sized medical IT enterprises face a myriad of challenges in achieving high innovation performance. These include a deficiency of advanced business ideologies, leadership styles that may influence enterprise coherence and employee innovative capabilities, and insufficient innovation backing.

This thesis examines these issues, offering both theoretical insights and empirical analysis. It first outlines the theoretical impact of leadership on innovation, constructing a model to explore how leadership style, self-efficacy, and support for innovation interconnect to affect performance. Through quantitative research, it assesses how different leadership styles (empowering, transactional, shared, and directive) influence employee innovation. It finds that self-efficacy mediates the relationship between leadership and innovation, with organizational innovation support plays a positive moderating role between innovative self-efficacy and innovation performance.

Empowering, transactional, and shared leadership styles enhance innovation performance by boosting employee creativity and support for innovation. In contrast, a directive style might reduce this positive effect. These findings offer new theoretical insights and practical strategies for small and medium-sized medical IT enterprises to overcome innovation challenges.

Keywords: Small and medium-sized enterprises; Medical IT technology enterprises; Leadership style; Innovation performance

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Resumo

Com a evolução acelerada das modernas tecnologias da informação, das tecnologias de processamento de dados e da "Internet das Coisas", as empresas de informação médica estão a prosseguir ativamente com o desenvolvimento de produtos adaptados às diversas necessidades dos utilizadores, ao mesmo tempo que fornecem os correspondentes serviços de informação médica de *big data*. No entanto, no contexto do rápido avanço tecnológico em que vivemos, das disparidades entre a oferta e a procura nos mercados, da liberalização das políticas e da escalada de concorrência, as pequenas e médias empresas de informação médica enfrentam uma miríade de desafios para alcançar um elevado desempenho de inovação. Estes incluem uma falta de mentalidade empresarial avançada, estilos de liderança que podem influenciar a coerência empresarial e as capacidades inovadoras dos colaboradores, e um apoio insuficiente à inovação.

Esta tese examina estas questões, oferecendo tanto perspetivas teóricas quanto análises empíricas. Primeiro, descreve o impacto teórico da liderança na inovação, construindo um modelo para explorar como o estilo de liderança, a autoeficácia e o apoio à inovação se interconectam para afetar o desempenho. Através de uma pesquisa quantitativa, avalia como diferentes estilos de liderança (empoderador, transacional, compartilhado e diretivo) influenciam a inovação dos funcionários. Constata que a autoeficácia medeia a relação entre liderança e inovação, e o apoio à inovação organizacional desempenha um papel moderador positivo entre a autoeficácia inovadora e o desempenho inovador.

Estilos de liderança capacitadores, transacionais e compartilhados melhoram o desempenho da inovação, estimulando a criatividade dos colaboradores e o apoio à inovação. Em contraste, um estilo diretivo pode reduzir este efeito positivo. Estas descobertas oferecem novos conhecimentos teóricos e estratégias práticas para que as pequenas e médias empresas de informação médica superem os desafios da inovação.

Palavras-chave: Pequenas e médias empresas; Empresas de informação médica; Estilo de liderança; Desempenho de inovação

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摘　要

随着现代信息技术、数据处理技术以及物联网手段的快速发展，医疗信息化企业正在积极研发出符合不同用户需求的产品，同时，也提供相应的医疗大数据的信息服务。然而，面临着科技革新迅猛、市场供需失衡与政策放开以及行业竞争逐年加剧的环境，中小型医疗信息化企业在追求高创新绩效的过程中遇到了一系列挑战，如经营理念尚显不够先进、领导风格各异可能影响企业一致性和员工创新能力、创新支持不足等问题。

本文从理论和实证两个方面深入探讨了上述问题。首先，通过收集和分析大量的理论研究资料，系统地梳理了领导风格对创新绩效影响的理论机制，并建立了一个有调节的中介模型来揭示领导风格、创新自我效能感、创新支持与创新绩效之间的关系。采用定量研究方法，通过数据分析探讨了不同领导风格(授权型领导、交易型领导和共享型领导、命令型领导) 对员工创新绩效的影响。研究发现创新自我效能感在领导风格与创新绩效之间起到中介作用，而组织的创新支持则在创新自我效能感与创新绩效之间发挥了正向调节作用。

研究结果显示，授权型领导风格、交易型领导风格和共享型领导风格可以通过提高员工的创新自我效能感和创新支持，进一步提升企业的创新绩效。反之，命令型领导风格则可能削弱这种正向影响。本文的研究结果不仅为理论研究提供了新的视角，也为中小型医疗信息化企业提供了解决问题和提升创新绩效的实践指导。

关键词：中小型企业；医疗信息化企业；领导风格；创新绩效

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Chapter 1: Introduction

1.1 Research background

The analysis of relevant policies and the current state of development within the medical informatics industry constitutes a crucial aspect of understanding the impact mechanism of leadership style on innovation performance. Concurrently, small to medium-sized enterprises (SMEs) within this sector inherently strive for high innovation performance. However, these organizations also encounter certain challenges in their performance management strategies.

1.1.1 Policies related to medical IT

Policy plays a crucial role in driving the advancement of Medical IT and smart healthcare in China. Since the implementation of healthcare system reform measures by the government in 2009, a series of policies have been introduced to establish regulatory standards and provide incentives and support. These policies have effectively guided the systematic and efficient adoption of Medical IT across the country.

In accordance with the principles of “demand-driven, people-oriented, unified authority, innovation-driven, open integration, co-construction and sharing, strengthened standards, and ensuring security” as outlined in documents such as the “Healthy China 2030 Planning Outline,” the “National Informatization Development Strategy Outline,” and the State Council's “Action Plan to Promote Big Data Development,” the top-level design of comprehensive strengthening of the construction of national health informatization, accompanied by industry planning, continuously improving institutional mechanisms, and enhancing collaborative efforts, has been continuously advancing. This has driven the broadening of new perspectives, the taking of new steps, and the creation of new situations in the construction of the national health informatization and health medical big data service system.

Firstly, we must adhere to the principle of planning first. In 2013, the National Health and Family Planning Commission and the Bureau of Traditional Chinese Medicine jointly issued “The Guiding Opinions on Accelerating the Construction of Population Health Informatization”, which defined the basic idea, overall framework and task objectives of

population health informatization construction during the "12th Five Year Plan" period. In June 2016, the Office of the State Council issued “The Guiding Opinions on Promoting and Regulating the Application and Development of Health Care Big data”, from the national strategic level, it proposes to standardize and promote the integration, sharing and open application of health care Big data, promote and expand the "Internet plus health care" service, and vigorously promote the convenience and benefit measures of smart health care; At the beginning of 2017, the National Health and Family Planning Commission issued “The ‘13th Five Year Plan’ National Population Health Informatization Development Plan”, which focused on consolidating the foundation, deepening the application and innovative development, defined 13 major tasks such as orderly promoting the opening and sharing of Big data, the basic resources of health information for the whole people, and 5 major projects such as improving the informatization capacity at the grass-roots level; In May, “The ‘13th Five Year Plan’ for National Health Network and Information Security” was issued, which will for the first time elevate security construction to the macro design level to standardize and promote. Through continuous improvement of top-level planning in recent years, the goals, ideas, and paths for the construction of national health informatization have been continuously optimized and clarified.

Secondly, there is a focus on enhancing policy design. The National Health and Family Planning Commission has released guidelines such as “The Guidelines on the Application Functions of Population Health Information Platform in the Overall Planning Region of the Province” and “The Guidelines on the Application Functions of Hospital Information Platform” to provide clear guidance on the specific functions of provincial, municipal, and county-level platforms, as well as hospital information systems. Moreover, they have issued 102 industry information standards to standardize and guide the systematic development of related initiatives across different regions. Simultaneously, efforts are being made to gather expertise in developing the index of basic resources for healthcare big data and a national standardization system. Normative documents on national healthcare big data management services, safety standards, and “Internet plus Medical” service management are being researched and formulated. These measures aim to establish a solid foundation for the creation of an authoritative, unified, and interconnected health information system for the entire nation.

Thirdly, it is crucial to enhance organizational leadership. The National Health and Family Planning Commission have established a dedicated leading group and office for network security informatization and healthcare big data work. Director Li Bin personally

leads the leading group and conducts regular special meetings to address major issues, promoting the adoption of a working pattern that emphasizes resource sharing and coordinated promotion. The leadership group office plays a significant role in overall planning, comprehensive coordination, initiating key projects, and conducting regulatory evaluations. It coordinates and promotes the formation of a robust workforce, ensuring the holistic, systematic, and coordinated development of information technology. In response to evolving needs, the Commission will adjust and establish an informatization and big data application office, specifically focusing on strengthening system construction, research and innovation, as well as effective implementation of work tasks.

During the "13th Five Year Plan" period, it is crucial to accelerate the process of informatization construction in order to achieve a moderately prosperous society. In April 2018, the General Office of the State Council issued the "Opinions on Promoting the Development of 'Internet plus Medical Health'", which aimed to strengthen supervision and establish relevant standards for the construction of "Internet plus Medical Health". In June 2019, the "Healthy China Action '2019-2030'" was launched, emphasizing the importance of promoting health-related information sharing between departments and regions. In July 2020, the "Maturity Evaluation Plan for Standardization of Hospital Information Interconnection (2020 Edition)" was released, outlining the evaluation process and criteria for hospital information interconnection, which identified two links and four stages of hospital evaluation work, and seven levels of hospital information interconnection evaluation.

In recent years, there has been a strong emphasis from leaders at all levels, both at the central and local levels, on the construction and development of information technology. Various organizations have shown great innovation in their work ideas and have taken proactive measures to strengthen the construction of population health information technology. As a result, significant progress has been made in this area, which has provided substantial support for improving health services, making informed decisions, advancing the reform of the medical and health system, and promoting the overall development of the health and family planning industry. This progress can be considered outstanding and effective in its contribution.

During the "14th Five Year Plan" period, the "The '14th Five Year Plan' for National Informatization" and "The '14th Five Year Plan' for National Health" issued by the government pointed out that the "14th Five Year Plan" period is an important opportunity period for innovation in the construction of national health informatization to lead the high-quality development of the health industry, and also a key window period for promoting

the transformation of quality, efficiency, and motivation in health work through digitization, networking, and intelligence. At the same time, we need to improve the “Internet plus health care” service system, further expand the “Internet plus health care” service model, optimize resource allocation, improve service efficiency, reduce service costs, and meet the growing health needs of the people.

The policies mentioned above are outlined in detail in Table 1.1.

Table1.1 Policies related to medical IT issued by various government departments in china

Release Agency	Year	Policy Name
General Office of the National Health and Family Planning Commission & National Administration of Traditional Chinese Medicine	2013	Guiding Opinions on Accelerating the IT Construction of Population Health
General Office of the State Council of China	2015	Platform for Action to Promote Big data Development
General Office of the Communist Party of China Central Committee & General Office of the State Council	2016	Outline of the "Healthy China 2030" Plan
General Office of the Communist Party of China Central Committee & General Office of the State Council of China	2016	Outline of National Information Development Strategy
General Office of the State Council of China	2016	Guiding Opinions on Promoting and Regulating the Application and Development of Big data in Health Care
General Office of the National Health and Family Planning Commission	2016	Application Function Guidelines for Provincial Coordinated Regional Population Health Information Platform Guidelines for Application Functions of Hospital Information Platform
General Office of the National Health and Family Planning Commission	2017	National Population Health IT Development for the 13th Five Year Plan
General Office of the National Health and Family Planning Commission	2017	National Health Network and Information Security for the 13th Five Year Plan
The State Council of China	2018	Opinions of the General Office of the State Council on Promoting the Development of "Internet + Medical Health"
National Health Commission of China (Established after 2018)	2019	Healthy China Action “2019-2030”
National Health Commission of China	2020	Notice on Issuing the Maturity Evaluation Plan for Standardization of Hospital Information Interconnection (2020 Edition)
Central Cyberspace Affairs Commission	2021	National Information for the 14th Five Year Plan
General Office of the State Council of China	2022	National Health for the 14th Five Year Plan

The sound national policies on Medical IT have provided a good development environment and opportunities for Medical IT enterprises. Medical IT enterprises need to continuously increase investment in technology research and innovation, improve product quality and service level, in order to meet the higher demand for Medical IT by the country and the market. At the same time, we focus on data security and privacy protection, actively participate in international cooperation and standardization, and promote the sustainable development of Medical IT enterprises.

1.1.2 Development status of medical information industry

Medical IT refers to the digitalization, networking and informatization of medical services. It refers to the collection, storage, processing, extraction and data exchange of patient information and management information between hospitals and departments under hospitals through computer science, modern network communication technology and database technology, and meets the Functional requirement of all authorized users (Avacheva et al., 2018).

The current development status of China's medical information enterprise is as follows:

(1) Rapid growth: With the popularity of internet technology and the rise of mobile internet, China's medical information enterprise has experienced rapid development. The market size of China's medical information enterprise has been continuously growing in recent years. According to a report by Market Research Online, the market size of China's medical information enterprise reached 194.28 billion yuan in 2021, with a year-on-year growth of 16.5%. Another report by Market Research Online predicts that the market size of China's medical information enterprise will reach 228.33 billion yuan in 2025, with a year-on-year growth of 17.4%.

China is actively promoting the use of medical information technology and encouraging hospitals and medical institutions to invest in the construction of information platforms. Most hospitals and medical institutions allocate funds to build information platforms to meet government requirements and their own needs, thereby driving the development of the medical information enterprise.

(2) Diversified applications: The medical information enterprise covers multiple areas, including electronic medical records, telemedicine, medical image processing, and pharmaceutical e-commerce.

Medical IT can be divided into narrow sense and broad sense. The narrow sense of medical IT mainly refers to the ability of collecting, storing, processing, extracting and data

exchange of patient diagnosis and treatment information and administrative management information for each department of the hospital by relying on the hospital IT system and utilizing electronic computer and communication equipment and meets the functional requirements of all authorized users. In a broad sense, Medical IT includes all the information products and technologies related to medical and health care. It refers to the use of modern information technology to transform the flow of the provision and utilization of medical and health services (Sun et al., 2016). In summary, based on the broad sense of Medical IT, the diversified applications of Medical IT encompass three core IT areas, namely medical IT, medical insurance IT, and pharmaceutical IT (Lee et al., 2022).

Medical IT refers to the medical payment system, has its particularity. The consumer and payer of medical services are often not the same party, so medical payment actually includes two stages: “payment+reimbursement”. In order to achieve accurate medical payment and reimbursement, different payment parties, such as social security and commercial insurance, will invest in payment IT construction, building payment channels and information networks connecting medical institutions.

Medical insurance IT refers to the IT market targeting hospitals, which includes four parts: hospital management informatization, clinical business system informatization, patient digital management, and intelligence.

Pharmaceutical IT refers to the IT market for pharmaceutical supply. Domestic pharmaceutical supply includes pharmaceutical distribution, pharmacies, internet pharmaceuticals, and other businesses. Pharmaceutical supply IT refers to the IT system behind the aforementioned businesses.

Driven by policies and technology, the demand for hospital end informatization construction will continue to be released in the next 2-3 years, and the scale of the core software market will maintain stable growth (Gong et al., 2022). According to the data analysis of IRE Consulting, the market size of China’s medical information core software is 32.3 billion yuan in 2021, with a compound growth rate of 19.2% from 2021 to 2024. It is estimated that the market size will reach 54.7 billion yuan in 2024. Focus on the field segmentation. Hospital informatization is still the main battlefield of manufacturers in the short term. Hospitals above Level III have strong demand for HRP and product modules of Digital Intelligence Center. Hospitals below Level III have increased their willingness to invest in HIS system and information center (especially integrated platform), with a compound growth rate of 15.3% from 2021 to 2024. The scale of clinical informatization is growing rapidly. The demand of tertiary hospitals for emerging medical applications is the

core engine to drive the market, with a compound growth rate of 24.7% from 2021 to 2024.

These systems provide more convenient services and solutions for healthcare facilities and patients. At the same time, the Chinese government has issued a series of policies to support the development of medical information, encouraging medical institutions to improve the quality and efficiency of medical services by using information technology.

1.1.3 The reasons for small and medium-sized medical IT enterprises to pursue high innovation performance

Based on modern information technology, data processing technology and Internet of Things, Medical IT enterprises are constantly developing products that meet the needs of different users. An information service enterprise of corresponding medical big data is provided between a hospital and a relevant public health platform, aims at solving the problems of unbalanced distribution of medical resources, the medical efficiency is not high, Promoting the Steady Implementation of the Strategy of Healthy China (Xu et al., 2021).

(1) Rapid technological innovation

With the development of science and technology, the Internet industry has developed vigorously in recent years. The rapid development of big data, artificial intelligence, cloud computing, internet of things, 5G and other technologies makes the smooth implementation of telemedicine, chronic disease monitoring, online medical treatment and other activities possible. Therefore, the popularization of the Internet and big data provides a good foundation and guarantee for the development of "Internet + medical treatment" (Zhang et al., 2021).

Medical IT enterprises belong to the industry of software and information technology service. As more and more businesses need to rely on the support of information technology, the Medical IT enterprises begin to build connection with the modern Internet technology platform (Sun et al., 2020). Therefore, the new technology is one of the reasons for the small and medium-sized Medical IT enterprises to innovate the business model.

(2) Imbalance between supply and demand in the market and policy liberalization

In recent years, the issue of population aging has gained significant attention as it continues to escalate. Concurrently, the demand for medical services has surged in the market, posing numerous challenges. Unfortunately, china, with its vast population, has yet to effectively address several persisting issues including inadequate medical resources, convoluted procedures, and suboptimal efficiency (Qiu et al., 2020). Furthermore, as the economy continues to grow and the standard of living improves, people are increasingly seeking higher quality and more efficient medical services. These practical challenges present

significant opportunities for the advancement of internet-based healthcare solutions.

At the same time, under the scope of the main proposition of deepening the reform of medical system, the state organs and units have successively issued a number of policies to promote the construction of medical IT, continue to strengthen the guidance and support for the construction, and encourage and advocate the development of “Internet plus medical treatment” (Liang et al., 2019). In order to respond to the national call and meet the needs of market development, small and medium-sized Medical IT enterprises continue to exploit online cloud service innovation business by using Internet technology while deeply cultivating traditional medical and health informatization business.

(3) Industry competition intensifies year by year

Intense competition within industries exerts invisible pressure on enterprises, compelling them to assess their situations and actively innovate their business models. In other words, the industry landscape forces companies to seek innovation. A well-designed business model enables a company to accurately identify customer value propositions and determine specific operations within the organization, thus helping it maintain its core competitive advantage and even surpass competitors in the face of fierce market competition.

In the medical information enterprise, prominent enterprises place great emphasis on market exploration and competitor analysis. They regularly conduct market research to understand consumer needs and continuously introduce new products tailored to different requirements. Leveraging localized resources for research and sales, extending service hours, adopting franchising methods for rapid expansion, and utilizing various means to provide medical services, these enterprises enhance their business performance and gain market share. Furthermore, they proactively offer comprehensive services to small and medium-sized medical information technology enterprises based on their unique characteristics and service requirements. By focusing on creating customer value and leveraging business model innovation, service innovation, maintaining a low profile, and risk management, these leading players have established a strong presence in China's e-commerce industry. However, small and medium-sized Medical IT enterprises face the challenge of homogeneous competition with industry leaders such as Weining Health, Donghua Software, Wanda Information, Neusoft, and others. According to statistics from the Prospective Industry Research Institute, there are approximately 600 software suppliers in the medical and health field, with large suppliers accounting for only about 15%, medium-sized suppliers accounting for around 60%, and the remaining 25% comprising small suppliers. Consequently, homogeneous competition has significantly impacted the profit margins and competitiveness of small and medium-sized

medical information technology enterprises.

1.1.4 Problems in performance management of small and medium-sized medical IT business performance management

In the contemporary realm of medical informatics, large enterprises command the market with their customer-centric service philosophies, strategic partnerships, innovative and differentiated business strategies, among other advantages. In stark contrast, small to medium-sized enterprises (SMEs) in the medical informatics sector exhibit significant deficiencies across multiple areas. Primarily, their business philosophies are less evolved compared to those of larger enterprises, with their capital investment, human resources, and management systems falling significantly short of the levels exhibited by their larger counterparts. Furthermore, a variety of leadership styles within these SMEs may detrimentally impact the organizational consistency, employees' innovation capabilities, and performance management systems. Lastly, these SMEs also display considerable weaknesses in supporting innovation, whether it pertains to fostering an innovation culture, allocating resources, tolerating risk, or implementing incentive mechanisms, all of which require further enhancement. The following discussion will delve into these issues in greater detail.

(1) The business philosophy of small and medium-sized medical IT enterprises is not advanced enough

In the realm of large-scale Medical IT enterprises, the focus has shifted to customer-centric service concepts, which have been thoroughly implemented within the company. By employing strategic partnerships, efficient supply chain management, proactive personnel policies, and innovative service approaches, these enterprises have been able to provide customers with efficient, convenient, fast, and secure financial services. Through innovation, differentiated operations, and risk management, they have also improved the efficiency of capital, operations, and management. By relying on lean services and differentiated competition, these enterprises have gained a competitive edge and expanded their market presence. However, small and medium-sized Medical IT enterprises are evidently falling behind their larger counterparts in terms of management concepts, capital investment, human resources, and management systems. Consequently, their development is encountering significant challenges (Iordanou, 2019).

(2) The leadership styles vary among small and medium-sized medical IT enterprises

Firstly, the differences between different leadership styles lead to a lack of consistency and unity in the enterprise. Various leadership styles may lead to different goal setting,

decision-making, and teamwork approaches, making it difficult for enterprises to form a unified culture and values. Lack of consistency may have a negative effect on the innovation performance of enterprises (Gürlek & Cemberci, 2020).

Secondly, some leadership styles may limit employees' innovation ability and motivation. For example, directive leadership style emphasizes direction and control, which may inhibit employees' autonomy and creativity. On the contrary, a shared leadership style encourages employees to participate in decision-making and share ideas, which is beneficial for stimulating innovation (Ali et al., 2020). If the leadership of a company does not adopt an appropriate leadership style, it may limit employees' innovation ability and affect the company's performance.

Thirdly, different leadership styles may lead to communication disorder. The transactional leadership style tends to be simple exchange and task oriented, while the shared leadership style emphasizes teamwork and open communication. If there are different leadership styles between enterprise leaders and employees, it may lead to poor information transmission, misunderstandings, and conflicts, thereby affecting performance management (Crews et al., 2019).

Fourth, small and medium-sized medical IT enterprises may lack flexibility in performance management and cannot adjust their leadership style according to different situations and needs. Different leadership styles are applicable to different situations and teams. If a company only adopts a fixed leadership style, it may not be possible to maximize the potential of employees and improve innovation performance (Lee, 2020).

(3) Inadequate support for innovation in small and medium-sized medical IT enterprises

Firstly, lack of innovative culture. Leadership's innovation support is the key to shaping a company's innovation culture. If the leadership lacks support and attention to innovation, employees may feel a lack of motivation to propose new ideas and problem-solving methods (Alblooshi et al., 2021). In this situation, small and medium-sized enterprises are unable to actively promote innovation, which affects the improvement of performance.

Secondly, lack of resources and investment. Leadership's innovation support involves providing necessary resources and investments for innovation. Small and medium-sized medical information technology enterprises usually have limited resources. If the leadership is unwilling or unable to provide the necessary financial, human, and technical support for innovation, innovation activities will be limited (Leitch et al., 2013). Lack of resources and investment may hinder innovative activities such as Product development, technology improvement and market expansion, thus affecting enterprise performance.

Thirdly, risk aversion. Leadership's innovation support also involves tolerance for risk. Innovation itself carries risks, but some leaders may be too cautious and have low tolerance for failure, so they are unwilling to bear the risks that innovation may bring (Meroño-Cerdán et al., 2018). In this situation, employees may feel pressure and dare not try new ideas and methods, which limits the development of innovation.

Fourth, lack of incentive mechanisms. The innovation support of leaders also involves the establishment of incentive mechanisms. If small and medium-sized Medical IT enterprises lack corresponding incentive mechanisms, such as reward systems, promotion opportunities, employees may lack enthusiasm to promote innovation (Li, 2017). In the absence of clear incentive measures, employees may be more inclined to follow established processes and methods rather than trying new innovative methods.

1.2 Research Problem

Innovative capability is crucial for the survival and development of medical IT enterprises. However, many small and medium-sized medical IT enterprises generally face issues such as low employee innovation enthusiasm, weak innovation capability, and poor innovation performance.

Currently, the study of innovation performance is still in its early stages, particularly with limited research conducted by Chinese scholars. There is not yet a comprehensive system in place to define, structure, and identify the influencing factors of innovation performance, which calls for further exploration and deepening of research in this area. Scholars have approached the study of innovation performance from various perspectives, primarily focusing on individual, team, and organizational levels. However, it is important to recognize that organizations are comprised of employees, and their individual work effectiveness and efficiency contribute to overall innovation performance. As a result, there is a growing interest among scholars in examining innovation performance from the employee perspective.

The positive impact of innovation on corporate performance has been widely acknowledged by researchers. As a result, experts and scholars have conducted extensive research on the factors that influence innovation performance, with a particular focus on the exploration of leadership styles. Leadership style is increasingly recognized as a crucial factor in determining an organization's ability to foster innovation and adaptability. However, existing research primarily concentrates on the impact of a single leadership style on innovation performance. For instance, many scholars agree on the positive influence of

transformational leadership on innovation performance (Iqbal et al., 2021; Sattayaraksa & Boon-itt, 2018)；However, it is difficult to unify opinions on the relationship between transactional leadership and innovation performance (Alrowwad et al., 2020; Novitasari et al., 2021)；there is still a lack of research on the relationship between shared leadership, empowering leadership, and innovation performance (Huafei et al., 2020; Singh et al., 2019). In addition, scholars generally believe that leadership style has an important effect on organizational innovation performance, but there is relatively little in-depth research and exploration of its mediating variable mechanism. The specific mechanism of leadership style and innovation performance needs further research, especially from the perspective of employees who are the main body of innovation. Studying the impact of leadership style on organizational innovation performance from the perspective of employees is of great significance.

1.3 Research questions

Based on the aforementioned research background, this thesis aims to investigate the impact of leadership style on innovation performance in small and medium-sized Medical IT enterprises. The thesis will focus on addressing the following three key questions:

Question 1: How do different leadership styles (empowering leadership style, transactional leadership style, shared leadership style, and directive leadership style) influence employee innovation performance?

Question 2: What is the mediating role of innovative self-efficacy in the relationship between leadership style and innovation performance?

Question 3: How does innovation support moderate the relationship between innovative self-efficacy and innovation performance?

1.4 Research Purpose and Significance

1.4.1 Research purpose

This thesis examines the influence of different leadership styles on innovation performance using social exchange theory, leader-member exchange theory, and social network theory. Leader-member exchange theory suggests that the quality of relationships between leaders and employees can influence individual behavior. Through this individual behavior,

leadership style can impact innovation performance by encouraging employees to engage in behaviors that align with the principles of a market economy. Additionally, two variables, namely innovative self-efficacy and innovation support, are introduced to uncover the mechanism through which leadership behavior affects innovation performance. This research aims to develop effective policies and measures that organizations can implement to enhance employee innovation performance.

Specifically, this study seeks to address the following research questions:

(1) How do different leadership styles (empowering leadership style, transactional leadership style, shared leadership style, and directive leadership style) influence employee innovation performance?

(2) What is the mediating role of innovative self-efficacy in the relationship between leadership style and innovation performance?

(3) How does innovation support moderate the relationship between innovative self-efficacy and innovation performance?

To answer these questions, this thesis first develops a theoretical model that incorporates leadership style, innovative self-efficacy, innovation support, and innovation performance through theoretical analysis and literature review. Subsequently, the validity of this model is tested using empirical research methods, and modifications are made based on the findings.

In summary, this study aims to provide effective management strategies and recommendations for small and medium-sized medical informatics enterprises. This is achieved through an in-depth examination of the relationships between leadership style, innovative self-efficacy, innovation support, and innovation performance, with the objective of enhancing employee innovation performance and promoting organizational development and progress.

1.4.2 Research significance

(1) Theoretical Significance

This thesis proposes and validates a theoretical model encompassing leadership style, innovative self-efficacy, innovation support, and innovation performance. This model augments our comprehension of the relationship between leadership style and innovation performance, elucidating the mediating role of innovative self-efficacy and the moderating role of innovation support. As such, it offers a novel theoretical perspective and analytical framework for research in related fields.

This thesis further refines the definition and measurement methodologies of innovative

self-efficacy and explores its mediation mechanism in the correlation between leadership style and innovation performance. This not only expands the body of knowledge regarding innovative self-efficacy but also provides guidance for future research.

Empirical findings from this study reveal that innovation support can moderate the relationship between innovative self-efficacy and innovation performance. This discovery addresses the gap in prior research on the mechanisms of innovation support, thereby facilitating a more profound understanding and utilization of innovation support to enhance employee innovation performance.

The study also undertakes an in-depth analysis of leadership style, shedding light on the impact of various leadership styles (such as empowering, transactional, shared, and command) on innovation performance. This contribution adds new empirical evidence to the field of leadership style studies and provides crucial backing for the theoretical construction of the relationship between leadership style and innovation performance.

By systematically investigating the interconnections between leadership style, innovative self-efficacy, innovation support, and innovation performance, this thesis makes significant contributions to the advancement of relevant theories and lays a robust foundation for subsequent research.

(2) Practical Significance

The research findings of this thesis offer invaluable managerial strategies for small and medium-sized medical information enterprises. By illuminating the impact of diverse leadership styles on innovation performance, organizations can select appropriate leadership styles based on their unique circumstances to augment employee innovation performance.

This thesis underscores the mediating role of innovative self-efficacy in the nexus between leadership style and innovation performance, recommending that corporations should concentrate on bolstering employees' innovative self-efficacy.Specifically, corporations can enhance employees' confidence in their innovative capabilities through training programs and incentives, thus stimulating their innovative endeavors.

This thesis unveils the moderating influence of innovation support on the relationship between innovative self-efficacy and innovation performance. It suggests that while fostering innovation, enterprises also need to extend necessary innovation support to their employees, such as resources, time, and a conducive environment, to assist them in better achieving their innovation objectives.

Moreover, this study holds certain referential value for policymakers. The government can extend policy support such as training programs and incentives to encourage businesses to

adopt effective leadership approaches, enhance employee innovative self-efficacy, and stimulate innovative activities throughout society.

1.5 Research Content and Methods

1.5.1 Research contents

The research content of this thesis primarily encompasses the following sections:

Chapter One serves as the introduction. This section principally introduces the background and significance of the study, explicating the challenges faced by small and medium-sized medical information enterprises, along with the roles of leadership style, innovative self-efficacy, innovation support, and innovation performance therein. Concurrently, the research objectives and principal research queries of this thesis are proposed.

Chapter Two is a review of the literature. This section systematically reviews and organizes pertinent literature to gain a profound understanding of the concepts and characteristics of leadership style, innovative self-efficacy, innovation support, and innovation performance, and investigates their interrelationships.

Chapter Three pertains to hypothesis formulation and research model construction. Drawing from the literature review, this section posits a series of research hypotheses and constructs a theoretical model grounded in these hypotheses.

Chapter Four involves research design. This chapter determines the scales for variables such as leadership style (including empowering leadership style, transactional leadership style, shared leadership style, and directive leadership style), innovative self-efficacy, innovation support, and innovation performance, and designs a questionnaire based on these to identify the research subjects. The reliability and validity of the questionnaire are established through a pre-survey, which serves as the basis for formal questionnaire distribution.

Chapter Five is dedicated to empirical analysis. Based on the results of questionnaire design and data collection, this section processes and analyzes the collected data via statistical analysis methods such as descriptive statistics, correlation tests, and regression analysis to validate the research hypotheses.

Chapter Six discusses the results. This section integrates the empirical analysis results of the preceding chapter to deliberate on the relationship between leadership style, innovation performance, and innovative self-efficacy, as well as the mediating role of innovative

self-efficacy and the moderating role of innovation support. It analyzes the similarities and differences between the research findings of this thesis and those of previous studies.

Chapter Seven concludes and provides an outlook. This section recapitulates the main research findings of this thesis, identifies the limitations of the study, and provides perspectives on future research directions.

Through an in-depth exploration of the relationship between leadership style, innovative self-efficacy, innovation support, and innovation performance, this thesis not only offers novel theoretical insights but also furnishes valuable references and guidance for the managerial practices of small and medium-sized medical information enterprises.

1.5.2 Research method

(1) Literature review method: The literature review methodology involved reading theoretical books and academic journals, primarily sourced from databases such as China Journal Network and China National Knowledge Infrastructure. The literature review formed the foundation of this thesis by exploring the relationship between construction project leadership style and project performance.

(2) Questionnaire survey method: Based on the constructed model, an online survey questionnaire was designed and distributed to selected survey subjects to obtain information on leadership style, innovative self-efficacy, innovation support, and innovation performance. To ensure the authenticity and validity of the collected data, reliability and validity analysis were first conducted, followed by factor analysis, analysis of variance and regression analysis to test the causal relationship between leadership style, innovative self-efficacy, innovation support, and innovation performance.

(3) Empirical research method: Following the constructed model, the selected survey subjects were surveyed using the Likert 5-level scale to analyze the relationships between leadership style, innovative self-efficacy, innovation support, and innovation performance in surveyed enterprises. The data collected were processed using statistical analysis software, SPSS28.0, to test the relationship between variables through reliability and validity analysis, correlation analysis, and regression analysis. The thesis analyzed the data characteristics of the sample, the relationships between variables, and their impacts after ensuring data consistency and validity. Finally, the research hypothesis is tested and reliable conclusions are drawn.

Chapter 2: Literature Review

2.1 Related variables

This section provides a literature review on four variables: leadership style, innovative self-efficacy, innovation support, and innovation performance.

2.1.1 Leadership style

2.1.1.1 Empowering Leadership Style

(1) The concept of empowering leadership style

In this ever-evolving and increasingly competitive era, traditional centralized management methods no longer suffice to meet the rapid developmental needs of contemporary enterprises. An excessively rigid and conservative management model can constrain employees' innovative thinking and impede enterprise development. To counter this challenge, an increasing number of enterprises are exploring new management models and leadership styles to invigorate their workforce and augment their competitiveness. Among various emerging management models and leadership styles, empowering leadership—characterized by encouraging employees towards self-management, self-leadership, and participation in goal-setting—has garnered considerable attention. Empowering leadership underscores granting employees’ greater decision-making latitude, fostering higher autonomy and a sense of responsibility within their work. This leadership style can stimulate employees' innovative thinking; enhance their job satisfaction and efficiency, thereby driving enterprise development.

Self-management constitutes a significant facet of empowering leadership. Under this paradigm, employees receive increased freedom and authority to plan and execute their tasks. They can independently determine their work style and progress, based on their expertise and interests, as well as the enterprise's requirements. Such latitude not only kindles employees' work enthusiasm but also improves their work efficiency. Self-leadership refers to employees being self-driven and proactively participating in the enterprise's decision-making and management. During this process, employees can offer constructive suggestions and strategies for the operation and growth of the enterprise based on their knowledge and experience. This

self-leadership behavior can not only elevate employee job satisfaction but also assist companies in better understanding and utilizing their expertise and abilities. Participation in goal-setting represents another critical characteristic of empowering leadership. Under this model, employees are encouraged to partake in the enterprise's goal-setting process. They can set pragmatic and feasible goals for the enterprise grounded in their understanding and judgment. This participatory sense can amplify employees' sense of responsibility and belonging, making them more motivated to complete tasks and thereby improving the enterprise's overall performance.

Empowering leadership grants employees increased freedom and authority by encouraging self-management, self-leadership, and participation in goal-setting, thus stimulating their innovative thinking and work enthusiasm. This leadership style holds significant reference value for modern enterprises as it can aid them in better adapting to the constantly changing external environment and bolstering their competitiveness.

The rudimentary form of empowering leadership can be traced back to research on employee participation in the 1940s (Lewin, 1947) , marking the earliest indication of power transition from leaders to subordinates. In the 1990s, scholars such as Manz and Sims termed it "super leadership," highlighting it as a leadership type that can inspire employees towards self-management. Subsequently, Pearce et al. (2003) formally introduced the concept of "empowering leadership" based on transactional and transformational leadership, positing that this leadership type encourages employees towards self-management, self-leadership, and goal-setting behaviors.

The notion of "empowerment" stems from participatory management. In participatory management, employees gain decision-making authority, thereby enhancing performance and job satisfaction. Presently, the academic community primarily elucidates the connotation of "empowerment" from two perspectives: situational empowerment and psychological empowerment, which some scholars refer to as "macro perspective empowerment" and "micro perspective empowerment".

Firstly, considering the perspective of situational empowerment, it is acknowledged in contemporary organizational management theory as a distinct and vital leadership model. Central to this perspective is the understanding of empowerment as a set of management practices employed by leaders, primarily emphasizing the distribution of decision-making authority. Examples include delegation of power to subordinates, formation of work teams, and encouragement of participatory decision-making during organizational design modifications. This viewpoint underscores the transfer of decision-making power from

leaders. Leach (2003) postulates that empowerment constitutes management strategies that augment employees' decision-making authority. Consequently, leaders cede some decision-making power to employees, thereby granting them increased autonomy within their daily duties. Utilizing this strategy allows employees to leverage their professional expertise and experience, along with their comprehension of the specific work environment, to make effective and adaptive decisions.

Furthermore, the situational empowerment perspective accentuates shifts in organizational design. Herein, leaders are required to reallocate organizational resources optimally to aid and facilitate employee decision-making. For instance, leaders may establish work teams enabling employees to engage in collective decision-making and problem-solving within the team framework. This cooperative model not only augments decision-making quality and efficiency but also bolsters team spirit and responsibility among employees. Simultaneously, advocating for employee participation in decision-making emerges as another crucial aspect of situational empowerment. By involving employees in decision-making, they acquire an enhanced understanding and focus on organizational goals and strategies, consequently improving their job enthusiasm and efficiency. Moreover, participating in decision-making can foster a sense of self-efficacy in employees, increasing their confidence when confronting challenges and accomplishing tasks.

The situational empowerment perspective provides modern enterprises with novel management approaches and methodologies. It emphasizes leadership power transfer, organizational design modifications, and employee participation in decision-making. The goal is to amplify employee decision-making authority, stimulate their job enthusiasm, and improve the overall organization's efficiency and effectiveness. Hence, this perspective holds substantial theoretical and practical value in comprehending and implementing modern organizational management.

Secondly, examining the psychological empowerment perspective, it has garnered significant attention in leadership style studies. In contrast to traditional centralized management approaches, this viewpoint primarily investigates the psychological transformations of subordinates post-empowerment; aiming to eradicate power distance, enhance employees' self-efficacy and organizational affiliation, thereby stimulating their intrinsic motivation. According to Conger and Kanungo's (1988) definition, “empowering leadership” is a process that removes factors causing employee powerlessness via formal or informal methods to boost self-efficacy. This definition concentrates not solely on material actions but, more importantly, on employees' psychological transitions. That is to say, an

empowering leader should equip employees with increased decision-making authority and resources while also assisting them in building confidence and stimulating enthusiasm and creativity.

In practice, leaders can utilize various strategies to realize psychological empowerment. For instance, they can bolster employees' self-efficacy through public commendation, feedback provision, and offering growth opportunities. When employees perceive their work as recognized and respected, they gain confidence in tackling challenges and completing tasks. Concurrently, leaders need to consider employees' sense of organizational belonging. When employees feel that they are an indispensable part of the organization, their satisfaction and loyalty increase, and this positive attitude further enhances their work efficiency and quality. To achieve this, leaders can enhance employees' sense of organizational belonging by establishing fair reward systems, creating open communication environments, and providing career advancement opportunities.

The psychological empowerment perspective provides leaders with a fresh theoretical framework and practical guidance. It emphasizes employees' psychological transitions and intrinsic motivation, seeking to augment their self-efficacy and sense of organizational belonging by eliminating power distance, thus inspiring their innovation and job enthusiasm. Therefore, this perspective possesses considerable theoretical and practical value for understanding and practicing contemporary leadership styles.

The diverse interpretations of "authorization" contribute to an array of understandings pertaining to "empowering leadership". Through the lens of situational empowerment, "empowering leadership" is conceptualized as the leader's action of power distribution amongst employees. This includes delegation of authority, power-sharing, fostering innovation, advocating for subordinates' expression of ideas and viewpoints, encouraging independent decision-making, promoting participatory decision-making, facilitating self-management in employees, skill development, supporting information sharing and teamwork, and providing guidance through communication with subordinates to augment employee performance (Konczak et al., 2000; Leach et al., 2003; Sharma & Kirkman, 2015; Tang et al., 2012). For instance, Arnold et al. (2000) identified empowering leadership as a leadership style that grants power to subordinates, encompassing elements such as participatory decision-making, guiding subordinates, sharing information, and expressing concern for subordinates. Conversely, Koncazk et al. (2000) suggested that empowering leadership behavior involves delegating authority, dividing responsibilities, promoting autonomous decision-making, sharing information, fostering skill development, and

encouraging innovation. Psychological empowerment-based perspective posits that empowering leadership can eradicate power distance, bolster employees' self-efficacy and organizational affiliation, with a focus on invigorating their intrinsic motivation. Predominantly rooted in the individual perspective of employees, it underscores managers enhancing employees' self-efficacy and work motivation via a series of actions, thereby enabling employees to perceive work value (Tang et al., 2012). For instance, Aharne (2005) articulated that empowering leadership behavior encompasses four dimensions: work meaning, self-efficacy, work influence, and autonomy. However, there are certain limitations associated with studying empowering leadership from a single viewpoint. Solely focusing on situational authorization tends to neglect employees' perception of power, while exclusively considering psychological empowerment may disregard macro factors. Consequently, current scholars advocate for the integration of these two research perspectives on empowering leadership, emphasizing not only the leader's empowering behavior but also the subordinates' psychological perception. This integrated viewpoint is termed as the "integration perspective". For instance, Srivastava et al. (2006) defined "empowering leadership" from an integrated perspective as "the behavior of a leader in empowering employees to enhance their internal motivation levels." Similarly, Su et al. (2014) posited that empowering leadership invigorates employee self-management and leadership consciousness through the process of power delegation, thereby amplifying employee motivation and team participation.

(2) The Dimensions and Measurement of Empowering Leadership

In the comprehensive domain of leadership style research, empowering leadership emerges as a pivotal and intricate theme. Predominantly, its measurement tools and dimensions are grounded in Western contexts, with localization efforts still in their nascent stages. Divergent understandings of authorization, specifically situational and psychological authorization, also give rise to differing perspectives on the measurement of empowering leadership.

The viewpoint of situational authorization underscores the transference of decision-making power and organizational structure modifications. This perspective prioritizes how leaders can transform the organizational environment and culture through management practices such as power delegation to subordinates, formation of autonomous work groups, and advocacy for participatory decision-making, thereby kindling employees' innovative spirit and work enthusiasm. Hence, the evaluation of empowering leadership from a situational empowerment standpoint predominantly assesses the effectiveness and extent of leaders implementing these managerial practices.

The perspective of psychological empowerment places greater emphasis on the internal emotions and attitudes of employees. It centers on whether authorized employees genuinely experience freedom and trust, whether they possess adequate self-efficacy and sense of belonging, and their satisfaction and loyalty towards their work and organization. Consequently, measuring empowering leadership from a psychological empowerment angle primarily involves evaluating the psychological state and behavioral alterations of employees post-authorization.

From the standpoint of situational authorization, notable measures include the Empowering Leadership Questionnaire developed by Arnold and Drasgow (2000) and the Leadership Authorization Behavior Questionnaire created by Konczak et al. (2000). The Empowered Leadership Questionnaire, which starts from the team level, bifurcates the traits of empowered leadership into five dimensions: leading by example (with 5 items, e.g., setting high standards through behavioral performance), guiding behavior (11 items, e.g., identifying skills that employees need to enhance), sharing information (6 items, e.g., explicating organizational decisions), participating in decision-making (6 items, e.g., encouraging team members to voice their ideas), and caring for interaction (10 items, e.g., attending to personal issues of subordinates). It comprises 38 items in total, with a reliability range of 0.85-0.91 and high internal consistency. The Leadership Authorization Behavior Questionnaire, originating from the individual level, includes 17 items across six dimensions: power delegation, emphasis on responsibility, autonomous decision-making, information sharing, skill development, and guidance on innovation performance. Its internal consistency coefficient ranges between 0.82 and 0.91.

Secondly, from the perspective of psychological empowerment, the Empowerment Leadership Scale devised by Pearce and Sims (2002) has extensive application, featuring 20 items encompassing six dimensions: encouraging teamwork, participating in goal setting, advocating self-reward, fostering autonomous behavior, promoting opportunity thinking, and endorsing self-development. The scale developed by Aharne et al. (2005) mainly incorporates four dimensions: promoting participatory decision-making, granting autonomy to diminish bureaucratic constraints, emphasizing work significance, and conveying confidence in performance. This scale primarily targets the impact of empowering leadership on subordinates' work motivation and self-efficacy. Its reliability coefficient varies from 0.79 to 0.89, signifying high internal consistency. Amundsen and Martinsen (2014) crafted an empowering leadership scale with three dimensions: empowerment, enabling employees, and inspiring them to enhance their own capabilities.

At present, the majority of measurement tools and models are underpinned by Western cultural norms and contexts. These instruments have significantly contributed to our comprehension and implementation of empowering leadership, yet their universal applicability across diverse cultures and contexts is questionable. For instance, in cultures characterized by a high degree of centralization or authority, an overemphasis on empowerment could potentially lead to confusion and inefficiency. Consequently, there is an urgent need to develop localized measurement tools that can adapt to various cultural and contextual nuances. In response to this need, Zhang et al. (2008) pioneered the development of a leadership empowerment behavior questionnaire grounded in the Chinese cultural context through empirical research. This questionnaire encompasses six dimensions: outcome and goal control, process control, power delegation, participation in decision-making, work guidance, and personal development support. The reliability of the questionnaire spans from 0.68 to 0.87, thereby enhancing its suitability within the Chinese context. Owing to the influence of traditional organizational hierarchy culture, the empowering leadership scale used in Chinese contexts demonstrates distinct differences from foreign scales, especially in areas such as process control, outcomes, and goals (Li, 2019) .

(3) Causal Variables of Empowering Leadership

①Precedent Variables of Empowering Leadership

After a comprehensive review of research findings on empowering leadership, it is evident that both domestic and international scholars predominantly focus on three areas: the individual characteristics of employees, leader or job attributes, and the environmental features of business organizations.

Firstly, the individual traits of employees significantly influence their perception of empowerment-oriented leadership behavior. This topic has been investigated from multiple perspectives, including an employee's length of service, intrinsic perception, emotional stability, job proficiency, and uncertainty avoidance. An employee's tenure is deemed a crucial factor affecting their perception of empowerment. Generally, more experienced employees are likely to accept and adapt to empowering leadership styles, attributed to their enhanced self-management and problem-solving capabilities. In contrast, newly hired employees may necessitate additional guidance and support. Internal perception can also shape employees' acceptance level of empowerment. As posited by Conger (1988), emotional stability can sway employees' intrinsic perception of empowerment. Psychologically stable employees are typically more receptive to and understanding of empowering behavior, while instability may foster resistance and misunderstanding. Job proficiency also plays a pivotal role. Irgens (1995)

discovered that employees with higher job proficiency are less susceptible to the risks associated with empowering leadership. This is because proficient employees often have a more accurate comprehension and execution of tasks, leading to lower error rates, which in turn gives leaders more confidence in delegating decision-making power to them. Uncertainty avoidance can further impact employees' acceptance of empowerment. Some employees may perceive uncertainty as escalating risk and pressure, thus preferring clear instructions and rules, while others may see uncertainty as a challenge and opportunity, making them more inclined to accept and utilize empowerment. Regarding individual traits, Spreitzer (1995) noted that an employee's perception of empowerment is influenced by their cognitive level, implying those employees' thinking patterns, knowledge structures, and learning abilities may all shape their understanding and response to empowerment.

Secondly, leader or job characteristics influence empowering leadership behavior. Scholars have conducted in-depth discussions on this topic from multiple perspectives, including gender; long-term outcome considerations, personal risk considerations, and trust in subordinates. Regarding the impact of gender, Slaughter's (2012) study suggests that the influence of gender on empowering leadership behavior is not significant. He found that there was a very small difference in scores between male and female leaders in four dimensions: decentralization, information sharing, skill development, and encouraging innovation. This may mean that although social stereotypes often suggest that female leaders excel in areas such as democracy and inclusiveness, gender differences may not be as significant in actual leadership behavior. Long term outcome considerations are considered an important factor influencing leader empowerment behavior. Zhang et al. (2009) found that leaders who consider long-term outcomes are more willing to share power. This may be because leaders with a long-term perspective are more likely to see the potential benefits of delegation, such as increasing employee autonomy and innovation, thereby improving organizational efficiency and effectiveness. Personal risk considerations can also affect the leader's authorization behavior. Yang et al. (2010) found that task performance risk considerations and organizational interest risk considerations are significantly negatively correlated with leader authorization behavior. This may be because when leaders believe that authorization may bring significant risks, they may choose a more conservative management approach to protect their own and the organization's interests. Trust in subordinates is considered an important factor affecting leader's authorization behavior. Wei et al. (2011) found that cognitive trust and emotional trust of subordinates in leaders can affect employees' perception of authorization from different perspectives. This means that the level of trust a leader has in their subordinates

may affect their authorization decisions, as well as their acceptance and response to authorization.

Thirdly, research on organizational environment mainly includes work roles, organizational culture, etc. For the study of work roles, Spreitzer (1996) found that factors such as the determinacy of work roles, the extent of organizational management, and the level of policy support have a significant impact on authorization behavior. Specifically, when job roles are clear, organizational management is moderate, and policies provide sufficient support, leaders tend to adopt empowering leadership behavior. On the contrary, if the job role is unclear, the management scope is too large, or the policy support is insufficient, the leader may be more conservative and difficult to implement authorization. For the study of organizational culture, Zhong (2016) conducted an empirical study by collecting data from 33 medical institutions. The results showed that organizational culture and leadership member exchange were significantly positively correlated with leadership authorization behavior. This indicates that in a positive, open, and respectful organizational culture, leaders are more likely to adopt an empowering leadership style, and their empowering behavior is also more likely to be recognized and responded to by subordinates. From the perspective of leader workload, Liu et al. (2013) found a significant positive correlation between workload and work authorization behavior. This may be because when leaders have a heavy workload, they are more in need of the help and support of their subordinates, and therefore more likely to delegate.

②Outcome Variables of Empowering Leadership

Empowering leadership, as a special form of leadership, transmits a series of friendly behavioral signals to employees by changing their authorized behavior, in order to improve their behavior and attitude, stimulate their work motivation, and thereby enhance the performance of employees and the organization. For the outcome variables of empowering leadership, existing research has mainly focused on two categories: attitudes and behaviors at the individual level.

For the outcome variable of attitude, many studies have found that empowering leadership can effectively improve employee job satisfaction, commitment, and self-efficacy. For example, when leaders delegate more decision-making power and responsibility to employees, they may feel more respected and trusted, resulting in increased job satisfaction and commitment. Meanwhile, as employees gain more autonomy and challenge, their self-efficacy may also be enhanced.

For the outcome variable of behavior, many studies have also found that empowering

leadership can effectively stimulate positive behaviors among employees, such as innovative behavior, cooperative behavior, and leadership behavior. For example, when employees gain more decision-making power and resources, they may be more willing to try new methods and ideas, so their innovative behavior may increase. Meanwhile, due to the need for employees to share decision-making power and responsibility within the team, their collaborative and leadership behavior may also improve.

Firstly, research on attitude related outcome variables. Konczak et al. (2000) found that employee psychological empowerment is a pathway through which empowering leadership affects employee job satisfaction and organizational commitment, and psychological empowerment plays a partial mediating role in this process. Sharma et al. (2015) found that leadership oriented work outcomes such as subordinate commitment and clear roles have the greatest effect on empowering leadership at the individual level. Chen et al. (2011) argue that empowering leadership can promote employee innovation and teamwork behavior, and reduce their tendency to quit. This process is mediated by employee psychological empowerment and emotional commitment. In addition, Aharne et al. (2005) found that empowering leadership can improve employee job performance and customer satisfaction by influencing their self-efficacy and adaptability, and this process is influenced by the contingency of subordinate authorization preparation. Chen and Aryee (2007) also demonstrated through empirical research that self-esteem and perceived internal social status mediate the effects of empowering leadership and employee performance. Some scholars also believe that the impact of empowering leadership on employee performance and job satisfaction is mediated by employee dereliction of duty resistance behavior (Vecchio, 2010) , and employee innovation performance can be effectively improved through empowering leadership (Audenaert et al., 2018). Chinese scholars have found through research that empowering leadership can enhance employees' creativity and innovative behavior (Han, 2018) .

Secondly, research on behavioral outcome variables. Empowering Leadership can have a certain impact on employee behavior. Xie et al. (2014) found that leaders can indirectly enhance trust between supervisors during the authorization process, thereby improving task proficiency and initiative. In addition, Du(2015) found that employee psychological empowerment is enhanced by empowering leadership, and the enhancement of psychological empowerment promotes the occurrence of constructive behavior.

2.1.1.2 Transactional leadership styles

(1) The concept of transactional leadership style

Transactional leadership was first formally proposed by Burns (1978) in his book

Leadership. He understands transactional leadership as a way for leaders to reward their employees for their contributions, stimulate their fighting spirit and enthusiasm, and achieve common organizational goals. This leadership style emphasizes a clear system of rewards and punishments and a clear division of roles. In this leadership model, the relationship between leaders and employees is mainly based on the principle of mutual benefit. Leaders provide necessary resources and support, while employees repay leaders by completing tasks and achieving goals. This clear expectation and reward mechanism can help employees understand their responsibilities and roles, and motivate them to improve work efficiency and quality. In addition, transactional leadership also emphasizes the measurement and evaluation of results. Leaders usually set clear goals and standards, and reward or punish employees based on their performance. This leadership style that emphasizes results can provide clear feedback, helping employees understand their performance and improvement needs.

Bass (1985) supplemented and improved this theory on the basis of previous studies, pointing out that in order to fully mobilize the enthusiasm of employees and help them find their work direction, it is necessary for leaders to scientifically plan the work content of subordinates and reasonably position their roles. Sergiovanni (1990) pointed out in his study of transactional leadership that it is a leadership style constructed on a barter basis, where superiors and subordinates follow pre contractual agreements to exert corresponding labor in order to achieve their respective goals. Leithwood (1992) pointed out that in order to ensure the smooth achievement of organizational goals; transactional leaders will introduce a series of reward and punishment systems. Pillai (1999) pointed out that transactional leadership can be understood as a reward and punishment trading process, which is mainly based on two factors: employee work effort and employee performance. Robbins (2001) believes that leaders not only need to clarify the roles of their subordinates, but also clarify their job requirements. Based on this, they need to set goals and find the right direction to effectively motivate their subordinates. Chen et al. (2007) pointed out that leaders should actively and comprehensively collect information on employee needs in order to develop targeted incentive measures and achieve effective improvement of employee performance. Firstly, clear organizational goals should be set and job requirements should be clearly defined; Secondly, efforts should be made to meet both the material and spiritual needs of employees. Wu et al. (2007) argue that the process of completing tasks can be seen as a transaction, and leaders should introduce effective reward and punishment systems in advance, combined with employee performance or rewards or punishments. Wu et al. (2010) defined transactional leadership as leaders rewarding and punishing employees based on their performance, and a

contractual relationship is constructed and maintained between the two.

(2) Dimensions and Measurement of Transactional Leadership

Bass (1985) and Bass and Avolio (1993) divided transactional leadership into two dimensions: contingency compensation and exception management. Contingent compensation refers to the implementation of appropriate rewards and avoidance of unnecessary punishment by leaders to increase the work enthusiasm of subordinates. It can be divided into two levels: one level is commitment to comprehensive compensation, and the other level is substantial total variable compensation(Chen & Shi, 2007). Leaders link goals with factors such as rewards, expectations, and exchange of commitments. Exception management refers to the process of providing feedback, correction, or punishment for behaviors of subordinates that do not meet goals or standards. Exception management can be further divided into active and passive exception management. The former refers to leaders taking the initiative to monitor potential deviant behaviors of subordinates and initiate targeted solutions, providing stronger support for achieving goals through strengthening rules. In the passive exception management mode, leaders will give their subordinates enough autonomy and only resort to punishment or corrective measures when they expose deviant behavior(Chen & Shi, 2007) .

Podsakoff et al. (1984) extracted two dimensions of transactional leadership, namely contingency rewards and contingency punishments, which are consistent with Bass's dimensions(MacKenzie et al., 2000). Chen et al. (2007) introduced an open-ended survey questionnaire during the research process, and based on systematic sorting, analysis, and induction, clarified the three dimensions of transactional leadership, namely contingency rewards and punishments, process monitoring, and expected investment. They also successfully developed a transactional leadership style scale, which refined 32 options based on the above dimensions.

(3) Other research literature on transactional leadership

Since the emergence of leadership style theory, it has sparked a large number of scholars to study it, and their effectiveness has been deeply analyzed and demonstrated. However, compared to this, the transactional leadership theory seems to have not received sufficient attention, and its effectiveness is also subject to significant controversy. The transactional leadership theory, based on a reward and punishment mechanism, emphasizes clear goals, timely feedback, and a direct correlation between performance and results. This leadership style is considered effective in some scenarios, especially in environments where tasks are clear and require efficient completion. However, some viewpoints suggest that excessive reliance on transactional leadership may bring some potential problems. Transactional

leadership may overemphasize external incentives while neglecting the intrinsic motivation of employees, which may have a negative impact on their job satisfaction and commitment in the long run. In addition, due to the fact that transactional leadership mainly relies on clear rules and reward and punishment mechanisms, it may inhibit employees' innovation ability and adaptability, especially in constantly changing and innovative environments.

① The direct outcome variable of transactional leadership

Transactional leadership is a leadership style that is based on rewards and punishments, and influences employee behavior through goal setting and feedback evaluation. Previous studies have delved into the direct outcome variables at the organizational, team, and individual levels.

At the organizational level, Bryant (2003) found that transactional leadership can have a positive impact on organizational knowledge utilization. This may be because, under clear reward and punishment mechanisms, employees are more willing to share and apply knowledge to achieve or exceed set goals. Meanwhile, Wang et al. (2012) also found that contingency rewards and exception management, as key strategies for transactional leadership, can have a positive impact on organizational innovation performance. This may be because these strategies can motivate employees to seek new solutions and methods, thereby enhancing the organization's innovation capability.

At the team level, although transactional leadership may sometimes have a negative impact on the operational performance of the organization's comprehensive business unit, this does not mean that transactional leadership is ineffective in all situations. On the contrary, this may suggest that the effectiveness of transactional leadership may be influenced by other factors such as team task types, member structures, and cultural backgrounds.

At the individual level, Houghton et al. (2005) found that transactional leadership may have a negative impact on the psychological empowerment of subordinates. This may be because transactional leadership places too much emphasis on rules and procedures, which may limit employee autonomy and innovation. However, Wei et al. (2009) found that transactional leadership can enhance employee innovation performance. This may be because transactional leadership can help employees better understand and complete innovative tasks through clear goals and feedback.

② Related mediating variables and moderating variables

Jung et al. (2000) argue that in the entire process of transactional leadership affecting employee performance, employee trust and their personal values play a certain mediating role.

Walumbwa et al. (2011) selected 212 employed bank employees as the research subjects to conduct a correlation analysis around the variable reward dimension of transactional leadership. The results observed that in the process of influencing employees' perception of organizational commitment in this dimension, procedural fairness perception and procedural fairness atmosphere played a completely mediating role. Wei et al. (2009) pointed out that in the process of transactional leadership affecting the innovation performance of subordinates; the team empowerment atmosphere plays a central role. Specifically, when the team empowerment atmosphere is in a lower state, the negative impact of the former on the latter is stronger; when the team authorization atmosphere is in a high state, the negative impact of the former on the latter is less significant. Pieterse et al. (2010) found through a survey of 230 employees that when employees have high levels of psychological empowerment, transactional leadership can have a significant negative impact on the innovative behavior of subordinates. Domestic scholars Liu et al. (2012) pointed out that organizational learning can play a certain mediating role in the entire process of transactional leadership affecting organizational innovation. Yang et al. (2015) selected 182 enterprises from the high-tech industry and conducted relevant research on them. They observed that when the intensity of organizational competition changes, the effect of transactional leadership on organizational performance also changes to some extent.

In the past three years, literature has shown that research using transactional leadership as an independent variable has gradually decreased, and more studies have chosen to pair it with other leadership styles and explore its impact on outcome variables from a binary perspective. This transformation may reflect scholars' deep understanding of the complexity and dynamism of leadership styles. Peng et al. (2019) conducted a comparative study on three leadership styles: transformational, transactional, and laissez faire, starting from the theory of holistic leadership. They found that these three leadership styles have different relationships with workplace deviant behavior. This research method helps us to have a more comprehensive understanding of the characteristics and impacts of different leadership styles, as well as how they collectively affect employee behavior and performance. Meanwhile, Peng et al. (2021) also conducted a study based on leadership theory and found that knowledge sharing plays a certain mediating role in the process of transactional leadership affecting the creativity of R&D teams, while team heterogeneity plays a certain moderating role. This discovery reveals the potential mechanisms by which transactional leadership influences outcome variables, and also highlights the importance of how team characteristics influence this process. In addition, researchers such as Xu and Li (2019), Li Wei et al. (2020), He and

Zhang et al. (2021), and Li et al. (2021) have explored the impact of transactional leadership on outcome variables from a dual perspective. Their research not only further enriches our understanding of transactional leadership, but also provides us with more diverse analytical perspectives and tools.

In recent years, research has shown that scholars are increasingly focusing on the complexity and dynamics of leadership styles, as well as their interaction effects with other factors. This transformation not only helps us gain a deeper understanding of transactional leadership, but also helps us design and implement leadership strategies more effectively, thereby improving organizational efficiency and effectiveness. However, due to the complexity and dynamism of leadership styles, further research and exploration are needed on how to flexibly apply and optimize these theories and methods.

2.1.1.3 Shared Leadership Style

(1) The concept of shared leadership style

The concept of shared leadership style has attracted the attention of scholars as early as the last century. Follett (1924) was one of the earliest scholars to propose this viewpoint, believing that in certain special circumstances, leadership should come from individuals with relevant strengths or skills. That is to say, different people can play leadership roles at different times and situations.

Compared to Follett's viewpoint, Benne (1948) emphasizes that leadership should be a shared responsibility among multiple parties, rather than focusing on individuals. This means that in a team or organization, each member may and should assume a portion of leadership responsibilities, rather than relying solely on one or a few leaders. Stogdill (1950) further elaborated on the connotation of shared leadership, believing that leadership is the behavior of influencing others to achieve team goals based on the differences brought about by different roles. This indicates that leadership is not only a behavior, but also a process of influence and dynamic interaction. In this process, all members can participate in leadership activities in different ways based on their roles and abilities. These early studies provide important theoretical foundations for us to understand and develop shared leadership. They emphasize the decentralization and dynamism of leadership, as well as the contribution of each member to the leadership process.

When an organization faces a new environment, the original organizational requirements will also change accordingly. In order to better adapt to this change, the theory of shared leadership is born. Hiler et al. (2006) argue that shared leadership is a more liberal form of leadership compared to other types of leadership. Ensley (2006) pointed out that shared

leadership is leadership conducted by members with different expertise in specific contexts. Based on previous research, Liu (2009) pointed out that shared leadership is a dynamic process that gradually spirals upwards, and leadership power will transfer to different members at different times. Hoch and Kozlowski (2014) argue that shared leadership can be defined as the degree to which the behavior of team members promotes team processes. Su et al. (2017) confirmed in their study that shared leadership has a positive impact on employee innovation behavior, while power distance has a positive moderating role between the two. Gu (2018) pointed out in his research that team conflict significantly inhibits shared leadership. Zhou (2020) and others found through research that shared leadership has a positive impact on team creativity.

(2) Measurement and Dimensions of Shared Leadership

As a leadership style, the measurement and dimension setting of shared leadership are important steps in evaluating the effectiveness of this leadership style. According to relevant research, the most widely used measurement method currently is questionnaire survey, and the measurement perspective is mainly based on three aspects: vertical leadership perspective, leadership task and role perspective, and team process perspective.

Firstly, an evaluation rooted in a vertical leadership perspective. This primarily involves gauging the degree of similarity between shared and vertical leadership styles within the workplace. The core emphasis is placed on delineating the distribution and transfer of leadership power among team members. This viewpoint accentuates the dynamism and decentralization inherent in leadership, striving to comprehend and quantify how leadership ebbs and flows and transitions among team members across diverse contexts and temporal points. For instance, Pearce and Sims (2003) devised a scale encompassing five dimensions.

Secondly, based on the perspective of leadership tasks and roles, measurement focuses on evaluating how each member takes on and completes their leadership tasks and roles in shared leadership. This perspective emphasizes the contribution of each member to shared leadership, especially how they influence and drive team goals and decisions through their own strengths and abilities. Regarding the measurement method based on the perspective of vertical leadership, some domestic and foreign scholars have put forward different opinions, believing that not all members will have behaviors similar to vertical leadership. Therefore, measuring shared leadership from the above perspective may not be accurate. In response to this situation, scholars such as Hiller (2004) developed a measurement questionnaire from the perspective of leadership tasks and roles, which includes 4 dimensions and 25 items, specifically divided into planning and organization, problem solving, support and care, and

development and guidance. Among them, planning and organization mean that team members make decisions together based on organizational goals and need to effectively utilize resources during implementation; Problem solving refers to the ability of team members to effectively solve problems in their work through team skills and strengths; Support and care refer to mutual understanding and support among team members, as well as mutual encouragement when encountering difficulties, emphasizing the cultivation of a team atmosphere.

Thirdly, measurement based on team process perspective. This perspective places greater emphasis on the interaction and coordination process within the team. This perspective attempts to understand and measure how team members can achieve smooth transfer of leadership and smooth achievement of team goals through effective communication, negotiation, and cooperation in a shared leadership environment. Hoch et al. (2014) developed a shared leadership scale from this perspective, consisting of 16 items. Four team learning items were used to measure cognitive processes, five items were used to measure emotional factors, and seven items were used to measure behavioral dimensions through member exchange.

In order to better fit the localization context in China, domestic scholar Liu (2009) developed a shared leadership scale consisting of 20 items based on this context. The Likert 5-point scale method was used for scoring. The above scales can effectively measure the leadership level exhibited by team members in their work. Liu's scale was developed based on the localization context in China, so it can better reflect the actual situation of teams and organizations in China. This scale can help us more accurately understand and evaluate the implementation and effectiveness of shared leadership in China, thereby providing us with more practical and operational research and management tools.

(3) Causal Variables of Shared Leadership

①The outcome variables of shared leadership

By reviewing relevant literature in the past, this thesis mainly divides the outcome variables of shared leadership into individual level, team level, and organizational level. At the individual level, shared leadership emphasizes that every member has the potential to play a leadership role, which not only enhances individual job satisfaction and participation, but also enhances employee career development and self realization. Furthermore, as shared leadership encourages employees to leverage their strengths and take on leadership responsibilities, it helps to stimulate their work enthusiasm and innovation. At the team level, shared leadership can improve team flexibility and adaptability by allocating leadership power

among members, enabling the team to better respond to changes and challenges in the environment. At the same time, as team members have the potential to become leaders, this may also promote communication and cooperation within the team, thereby improving team efficiency and effectiveness. At the organizational level, shared leadership can help build an equal and open organizational culture, which not only helps to improve employee sense of belonging and loyalty, but also helps to attract and retain excellent talents. In addition, as shared leadership can better utilize internal resources and capabilities within the organization, it may help improve the organization's innovation capability and competitive advantage.

Firstly, at the individual level, shared leadership significantly bolsters employee satisfaction and work efficiency. Bergman (2012) posits that shared leadership can augment employee satisfaction. This is attributed to the fact that in a shared leadership framework, every employee potentially assumes leadership roles and actively participates in tasks, invariably enhancing their job satisfaction. Concurrently, Konu (2008) found that shared leadership stimulates employees' intrinsic motivation, thereby boosting their work efficiency. This is because shared leadership endows employees with increased autonomy and responsibility, rendering their work more valuable and meaningful, hence fostering greater engagement.

Secondly, at the team level, research on shared leadership is primarily bifurcated into two categories: one explores the relationship between shared leadership and team performance, while the other compares it with vertical leadership. Regarding the first category, it has been substantiated that shared leadership can ameliorate team performance, organizational efficacy, and team effectiveness(Ensley et al., 2006). Furthermore, it can effectively mitigate conflicts (Bergman, 2012). Teams with a high degree of shared leadership exhibit superior understanding and trust, which facilitates greater work commitment and positively impacts team performance(Sweeney et al., 2018).As for the comparative studies involving shared leadership and vertical leadership, the latter posits that leadership solely originates from leaders, whereas shared leadership contends that mutual influence among team members can also manifest as a form of leadership(Mayo, 2002). Hoch (2013) conducted an empirical study on 184 team members and their leaders from 43 teams, revealing that compared to team composition, team leadership style exerts a more profound impact on team innovation behavior. Both horizontal shared leadership and vertical leadership are positively associated with team innovative behavior. Yuan (2015) compared shared leadership and vertical leadership as moderating variables to examine the relationship between cross-border team activities and team innovation performance. The conclusion demonstrated that shared

leadership, as a moderating variable, can more effectively enhance team innovation performance.

Thirdly, at the organizational level, research has corroborated that shared leadership promotes corporate performance positively. Grounded in emotional practice theory, Keith (2012) investigated the influence mechanism between shared leadership and corporate performance within the senior management teams of new startups. The findings suggest that the positive emotions of the executive team act as a mediating variable between shared leadership and corporate performance.

②The antecedent variables of shared leadership

The antecedents of shared leadership can also be examined from individual, team, and organizational perspectives, providing a comprehensive understanding framework.

At the individual level, some characteristics of team members, such as integrity and honesty, can have an impact on the strength of the role of shared leadership. Team members with these qualities are more likely to be accepted as leaders by other members, thereby driving the implementation of shared leadership.

At the team level, some studies have revealed the positive impact of certain factors within the team on shared leadership. Hoch (2013) suggests that transformational and empowering leadership may have a positive impact on shared leadership by influencing the development of collective will and team self-management skills. Meanwhile, Wood (2007) also confirmed that the behavior and structure of the team itself can positively promote the formation and implementation of shared leadership.

At the organizational level, Carson's (2007) study suggests that the key to forming shared leadership includes not only internal team factors, but also external factors such as organizational and social support. These factors can provide the necessary environment and conditions to support and promote the development of shared leadership.

2.1.1.4 Directive Leadership Style

(1) The concept of directive leadership style

Directive leadership refers to a leadership style that leads through guidance, command, and giving instructions, with strong control. Command management is a continuous behavior, not a random behavior. Command management does not involve fighting or similar incidents, it is just a relatively unfriendly language. Command management refers to the behavior itself rather than the behavioral intention (Tepper, 2000; Zhu et al., 2009). Tepper's (2000) study shows that leadership commands are not intentionally detrimental to subordinates, but leaders openly insult subordinates, inevitably resulting in adverse effects on individuals. Directive

leadership is a highly positive and personalized leadership style that helps to improve the work goals of individuals and their teams, thereby achieving higher performance outcomes (Cropanzano et al., 1993; Hogan, 1994) .

This leadership behavior with typical Chinese cultural characteristics is defined by Taiwanese scholars Zheng et al. (1995) as paternalistic leadership. With the development and deepening of research, the explanation of the concept of authoritarian leadership has shifted to the paternalistic leadership proposed by Fan and Zheng (2000). Authoritarian leadership, as one of the dimensions of paternalistic leadership style, more accurately and vividly reflects the Confucian culture of "hierarchy" (Zheng et al., 2003) . As a leadership style with Chinese characteristics, it gradually became independent of paternalistic leadership and has received attention and research from scholars. Authoritarian leadership emphasizes the absolute authority of individual leaders in the process of enterprise management, controlling the majority of people or things in the enterprise, requiring employees to obey to a high degree, demonstrating strict hierarchy, and employees will exhibit respectful and obedient behavior (Zheng et al., 2009) .

(2) Measurement and dimensions of directive leadership

At present, there is no unified standard definition for the dimensions of directive leadership in the academic community. Scholars have divided directive leadership into different dimensions based on their own research understanding. In the early stages of research, scholars such as Zheng(2000) divided directive leadership into two dimensions: authoritarian leadership and strict leadership, with one focusing more on power and authority, and the other on standards and rules. When scholars such as Zheng (2000) conducted research on issues related to paternalistic leadership, they proposed the "ternary model", which further divides directive leadership into five aspects, describing them as: authority, authoritarianism, concealment, severity, and education. Scholar Farh (2008) integrated research on directive leadership based on previous studies, and added a dimension of "strict discipline" in addition to negative dimensions such as authoritarianism, forming three dimensions of "strict discipline, image rectification, and educational behavior". Scholars such as Zhou (2009) found in their research on employee psychological efficacy that the dimensions of authoritarian leadership and strict leadership have different effects on it, continuing the research on the division of the two dimensions of directive leadership. In addition, when scholars Chen and Leung (2012) used attribution theory as a theoretical basis for their research, the research findings showed that directive leadership can be divided into two dimensions: instructional and authoritarian leadership. At the same time, scholar Chiang

(2012) divided the characteristics of directive leadership in decision-making and implementation into two dimensions: decision making and decision execution. Wang (2013) divided directive leadership into four dimensions in her study: authoritarian style, ability to suppress subordinates, image rectification, and educational behavior.

At present, scholars at home and abroad have not formed a unified view on the measurement of Directive leadership, and different scholars use different scales in their measurement research. In the early stages of the study, Zheng et al. (2000) developed a scale based on the ternary model of parental leadership style, dividing directive leadership into five dimensions and thirteen measurement items. Later, scholars such as Zheng Boxun developed a more straightforward and understandable parental leadership scale based on local context research in China. In this scale, directive leadership was simplified into five measurement items. (Zhou et al. (2009) fully combined the scales of other scholars with the perspective of cultural integration, and ultimately developed a directive leadership measurement scale that includes eighteen measurement items, such as "leaders require me to obey orders". This scale has been proven to be highly reliable in subsequent studies and can be used as a mature scale for research.

(3) The Result Variables of directive leadership

Directive Leadership is influenced by the Chinese Confucian culture of "superiority and inferiority", which often creates a high power distance between leaders and employees. The pressure of authoritative management can have different effects on the attitudes and behaviors of employees, as well as on the operation of organizations.

Firstly, the impact of directive leadership on employees:

Directive leadership emphasizes strict control over employee work and demands unconditional obedience from employees. Once perceived by employees, it can cause panic and tension within them due to excessive pressure (Witte et al., 2007), leading to restlessness at work and having a negative impact on their work outcomes. On the one hand, there is a significant positive correlation between directive leadership and employee silence behavior (Timming, 2015), employee implicit deviant behavior (Zheng et al., 2020) , and employee unethical behavior (Jiang et al., 2020). On the other hand, directive leadership is also one of the reasons why employees exhibit negative behavior and attitudes (Schaubroeck et al., 2017). Research has confirmed that directive leadership has a significant negative impact on employee helping behavior (Xia et al., 2022), advising superiors and colleagues (Li & Sun, 2015; Qiu et al., 2014), innovative behavior (Guo et al., 2019; Ma & Zhang, 2018), unsafe behavior (Jiang et al., 2019), and ethical voices of employees (Zheng et al., 2019). Moreover,

because directive leadership leaders often act arbitrarily and have a serious style, intentionally distancing themselves from employees in daily work can bring enormous pressure to them. Employees often appear obedient and agree on the surface, but it is difficult to accept it from the bottom of their hearts, which can reduce their enthusiasm for things beyond work tasks and further reduce their motivation to repay the organization. Therefore, studies have shown that directive leadership behavior can reduce the occurrence of organizational citizenship behavior among employees (Zheng et al., 2003; Zhang & Huai, 2012) . Meanwhile, studies have shown a curvilinear relationship between directive leadership, OCBS, and organizational bias (Ali et al., 2019). Moreover, due to the different intermediate influencing mechanisms, in the research results on the relationship between directive leadership and employee performance, it can be found that directive leadership has three different results: negative correlation (Wang, 2019), positive correlation (Hou & Peng, 2019), and insignificant (Song, 2011).

Secondly, the impact of directive leadership on organizations:

Directive leadership, as a unique leadership style, not only has an impact on individual employees, but also has a significant impact on the overall organization. For individual employees, (Wu (2008) suggests that directive leadership may have a negative impact on their sense of organizational commitment. Wan(2010) further elaborated that directive leadership may hinder the development of organizational citizenship behavior. In addition, Li and Du (2015) also pointed out that directive leadership may hinder internal organizational change.

Meanwhile, the impact of directive leadership on organizational performance is complex. On the one hand, Jin et al. (2016) conducted a study on research team leaders and found that directive leadership has a significant positive impact on both subjective and objective innovation performance at the team level. Huang et al. (2015) also pointed out that directive leadership can improve organizational efficiency and revenue. However, on the other hand, Liu and Wang (2015) confirmed a significant negative correlation between directive leadership and organizational performance.

2.1.2 Innovative self-efficacy

(1) The concept of innovative self-efficacsy

The concept of self-efficacy originated from Albert Bandura's research based on social cognitive theory in the 1970s. He defined self-efficacy as an individual's self-awareness and beliefs about completing specific tasks, which have a significant impact on their action choices and coping strategies when facing difficulties. Specifically, individuals with high

self-efficacy typically have a high level of trust in their own abilities and believe that they can successfully complete tasks or overcome challenges. This belief can drive them to actively face difficulties and persevere until the task is completed. On the contrary, individuals with low self-efficacy may have doubts about their abilities, making them more likely to choose to give up or avoid difficulties. The study by Lee et al. (2021) further confirms the importance of self-efficacy. They found that self-efficacy can not only affect an individual's choice of action, but also their level of effort in overcoming difficulties when choosing different activities. That is to say, self-efficacy can shape individual behavior patterns and coping strategies, thereby having a profound impact on their work performance and quality of life.

Self-efficacy describes an individual's confidence in executing a specific behavior, expectations for the success of that behavior, or beliefs in their own abilities or self orientation (Schutzler et al., 2019). Self-Efficacy expectations have been shown to affect whether a person will attempt a certain behavior, how much effort they will put into the behavior, and how long a specific behavior will last. Therefore, stronger self-efficacy is associated with a positive attitude towards having available (internal and external) resources to overcome difficult tasks. Self-Efficacy does not necessarily reflect objective reality or the actual available resources and skills that a person may possess, but rather a belief in what tasks they can accomplish. Observing how individuals learn from their surroundings; success experience refers to an individual achieving successful results in a task at different times and forming a positive attitude towards this achievement based on their experience (Lee et al., 2021); oral persuasion refers to persuading and encouraging behaviors related to achievable tasks, and the professional knowledge and personal traits of the persuader are very important; the psychological state is related to how individuals interpret their state, and negative psychological states such as distress and anxiety generate negative beliefs, reducing their self-efficacy (Javed et al., 2021).

Different types of self-efficacy may arise in different fields and contexts. Kong et al. (2019) proposed that innovative self-efficacy is a creative specific motivational state based on social cognitive theory, which determines employee motivation, how much effort they allocate to innovative tasks, and how much effort they maintain under trial and error conditions. Newman (2018) believes that innovative self-efficacy is a special type of self-efficacy, which is a belief in an individual's ability to achieve creative results. Ding He et al. (2018) also proposed the same argument, stating that innovative self-efficacy is a special form of self-efficacy, which is an individual's belief in their ability to complete innovative tasks. Therefore, this study believes that innovative self-efficacy is a special form of

self-efficacy that emphasizes an individual's confidence in their ability to complete innovative work or tasks, reflecting the fusion of innovation and self-efficacy. It reflects an individual's perceptual ability to generate new ideas that create value.

(2) Measurement of innovative self-efficacy

Innovative self-efficacy combines the perspectives of creative innovation theory and general self-efficacy, mainly focusing on the individual's self-awareness and belief in their ability to engage in innovative activities.

Early measurement tools often regarded creative self-efficacy and innovative self-efficacy as the same concept and used a one-dimensional structure for measurement. This measurement method evaluates an individual's innovative self-efficacy in a holistic manner, whether it is in the process of generating new ideas or implementing them in various innovative processes. However, as research on innovative self-efficacy deepens, scholars gradually realize that innovation is a complex process that includes multiple stages such as problem discovery, idea generation, idea promotion, and idea implementation. Therefore, they began to attempt to categorize innovative self-efficacy into multiple dimensions based on the process of innovation. This multidimensional measurement method can more accurately capture the changes and impacts of innovative self-efficacy at different stages of innovation, providing richer and more detailed information.

Firstly, a single dimensional scale:

The scales developed by Tierney and Farmer (2002) and Carmeli and Schaubroeck (2007) are widely used. Tierney and Farmer (2002) developed a series of original items based on the theories of self-efficacy (Bandura, 1997) and creativity (Amabile, 1989) to reflect the innovative ability of employees in the workplace, forming an innovative self-efficacy scale consisting of three items, such as "I am confident in creatively solving problems". The scale has good reliability and validity (Tierney & Farmer, 2004) . Later, Beghetto (2006) developed a student innovative self-efficacy scale with 5 items targeting middle school students in order to measure their level of confidence in academic abilities. Subsequently, Carmeli and Schaubroeck (2007) used Chen et al. (2001)'s 8-item general efficacy scale and matched it with innovative contexts to obtain the Innovation Efficacy Scale, which has good reliability and validity. Based on the Chinese context, Gu and Peng (2010) used the 8 item scale of Carmeli and Schaubroeck (2007) to study the impact mechanism of organizational innovation atmosphere, organizational innovation support, and superior developmental feedback on subordinate innovation behavior, all of which had good reliability and validity.

Secondly, multidimensional scales:

Taiwanese scholar Lin (2004) developed the Teacher Innovative self-efficacy Scale based on the Tierney and Farmer (2002) Innovative self-efficacy Scale, with teachers as the research object. The scale is divided into three dimensions: positive teacher self, negative teacher self, and resistance to external environment. These three dimensions aim to comprehensively reveal the innovative self-efficacy of teachers. Firstly, the positive dimension of teachers themselves reflects their positive beliefs and self affirmation of their innovative abilities. Secondly, the negative dimension of teachers themselves is explored from another perspective to explore the possible doubts or shortcomings that teachers may have about their own innovative abilities. Finally, the dimension of balancing external environment demonstrates the degree to which teachers rely on their own innovative abilities to solve and respond to challenges or difficulties.

Another representative scale is the Innovative self-efficacy Scale for High School Students developed by Hill et al. (2008). This scale focuses on high school students and covers three dimensions: ability self-efficacy, cognitive self-efficacy, and task self-efficacy. Each dimension is tailored to the specific age stage and developmental needs of high school students, evaluating their confidence in their problem-solving abilities when facing new problems or challenges. This scale has a total of 10 items and has been tested and verified to have good reliability.

(3) Causal variables of innovative self-efficacy

Innovative self-efficacy is a special form of self-efficacy that specifically refers to an individual's self-evaluation of their ability and confidence in carrying out innovative activities. Gist's (1992) theoretical model provides an important framework for studying causal variables of innovative self-efficacy. The analysis of task requirements is one of the key factors affecting innovative self-efficacy. According to Gist's theory, individuals will conduct cognitive analysis on tasks to assess their difficulty, complexity, and uncertainty. If individuals believe that the requirements of the task exceed their ability range, their sense of innovative self-efficacy may decrease. On the contrary, if individuals believe they have sufficient ability to complete tasks, their sense of innovative self-efficacy may increase. The attribution analysis of success or failure is also an important factor affecting innovative self-efficacy. If individuals attribute success to their own abilities and efforts, their sense of innovative self-efficacy may be enhanced. On the contrary, if individuals attribute failure to their own shortcomings, their sense of innovative self-efficacy may decrease. The evaluation of resources or constraints can also affect innovative self-efficacy. If individuals believe they have sufficient resources to complete tasks, or if they can overcome constraints, their sense of

innovative self-efficacy may increase. On the contrary, if individuals believe that resources are insufficient or constraints are difficult to overcome, their sense of innovative self-efficacy may decrease.

Gist's theoretical model also suggests that the outcome of innovative self-efficacy can affect job performance. Individuals with high innovative self-efficacy may have more confidence and motivation to try new ideas and methods, which may improve work performance. However, individuals with low innovative self-efficacy may develop fear and resistance towards innovative activities, which may lead to a decrease in job performance. Based on this model, scholars have conducted in-depth research on the causal variables of innovative self-efficacy.

(2) The outcome variable of innovative self-efficacy

Innovative self-efficacy is an individual's evaluation of their ability to implement innovative behavior, and its outcome variables mainly include creativity, innovative behavior, and innovation performance. In many studies, innovative self-efficacy is seen as an important mediating factor between leadership behavior, group atmosphere, and job nature, as well as innovative behavior and performance.

Tierney and Farmer (2011) have emphasized the mediating role of innovative self-efficacy in a series of studies. They found that in the organizational environment, when employees have high confidence in their innovative abilities, their innovative behavior and performance will significantly improve. This sense of self-efficacy is shaped by leadership behavior, group atmosphere, and the nature of work.

Choi (2004) also delved into the role of innovative self-efficacy within organizations, stating that innovative self-efficacy plays a crucial bridging role between employee innovation behavior and innovation performance. Employees have a higher sense of innovative self-efficacy and can better cope with challenges and difficulties, thereby improving work performance.

The research by Gu and Peng (2010) further confirms the positive impact of innovative self-efficacy on individual creativity, innovative behavior, and innovation performance. They found that innovative self-efficacy has a direct positive impact on employees' innovative behavior.

In addition, research by Ng and Lucianetti (2016) and Du et al. (2015) also support this viewpoint. Their research findings indicate that a high level of innovative self-efficacy can not only enhance employee innovation behavior, but also improve their innovation performance, thereby driving the innovation capability of the entire organization.

From another perspective, Gu and Peng (2011) explored the positive impact of innovative self-efficacy on employee innovative behavior, and a theoretical model mediated by achievement motivation and work involvement level. They believe that when employees have a high sense of innovative self-efficacy, their achievement motivation and level of work involvement will also correspondingly increase, thereby stimulating more innovative behavior.

In addition, innovative self-efficacy not only has a direct impact on the innovation process, but also plays an important regulatory role. Related studies have found that it can effectively regulate the relationship between factors such as innovation atmosphere, self innovation expectations, and innovation work engagement and employee creativity.

Carmeli and Schaubroeck's (2007) study suggests that innovative self-efficacy plays a moderating role in the relationship between family, client, leader innovation expectations, and innovation work engagement. They use self innovation expectations as a mediating variable and believe that an individual's confidence in their own innovation ability, namely innovative self-efficacy, will affect the relationship between self innovation expectations and innovation work engagement. When a person has a high degree of self-efficacy in their innovation ability, the relationship between their self innovation expectations and innovation work engagement is closer.

On the other hand, Jaiswal and Dhar (2015) explored the moderating role of innovative self-efficacy in the relationship between transformational leadership and employee creativity. They view innovation atmosphere as a mediating variable and believe that innovative self-efficacy affects the relationship between innovation atmosphere and employee creativity. In their research, it was found that the stronger the sense of innovative self-efficacy, the closer the relationship between innovation atmosphere and employee creativity. This study used 46 teams and 372 employees from 16 tourism hotels in India as research subjects to further verify the moderating role of innovative self-efficacy.

Both studies have demonstrated the importance of innovative self-efficacy in the innovation process. It can not only enhance individual innovation motivation and behavior, but also influence factors such as innovation atmosphere, self innovation expectations, and innovation work engagement, thereby better promoting employee innovation creativity. Therefore, for enterprises or organizations, enhancing employee innovative self-efficacy can undoubtedly enhance their innovation ability, thereby improving overall innovation performance.

2.1.3 Innovation support

(1) The connotation of innovation support

Due to the belief that organizational innovation support can effectively stimulate employee creativity, it has received widespread attention from scholars in the field of organizational behavior (El Kassar et al., 2022; Jaiswal & Dhar, 2017; Kwan et al., 2018) . Hunter et al. (2007) proposed that organizational atmosphere can affect employee creativity and innovative behavior. Similarly, Zhou and George (2001) also believe that organizations convey a signal to employees that they value innovation through a sense of organizational innovation support. Organizational innovation support is an important factor in stimulating employee creativity, as when employees realize that their organization values and supports creativity, they will do their best to demonstrate high creativity (Aldabbas et al., 2021). Zhou and George (2001) defined organizational innovation support as the degree to which employees perceive that the organization encourages innovation. This definition will also be used in this study. The concept of organizational innovation support is similar to that of organizational innovation atmosphere. According to Hunter et al. (2007), organizational atmosphere (such as organizational innovation atmosphere) is a construct in a specific field that affects the performance level in that particular field. The organizational atmosphere has a perceptual attribute, conveying the behavioral expectations of the organization and the potential outcomes of these behaviors to employees. Scholars believe that this information affects employee work behavior performance (Parker et al., 2003). Similarly, adjusting one's behavior in order to obtain positive evaluations may also be the result of employees responding to these expectations about organizational behavior. The sense of organizational innovation support mentioned above is about the perception of employees towards the characteristics of organizational innovation support. In terms of implementation, Cooke and Rouseau (1998) clearly distinguished these two constructs, although they used organizational atmosphere rather than organizational innovation support in their research, their conceptualization is the same because both reflect views on organizational structure and feelings as members of the organization.

Overall, introducing new changes into the existing system is challenging, especially as this move does not guarantee success (Harris et al., 2014; Zhou & George, 2001). Therefore, a sense of organizational innovation support is the driving force behind creativity and innovative behavior, as it makes employees feel that the organization values and appreciates suggestions and ideas that can improve the situation, thus giving employees more freedom

and social emotional support to engage in innovative activities (Ren & Zhang, 2015).

(2) The moderation role of innovation support

According to the theory of self consistency (Korman, 1970), when employees feel that they have high work efficiency and value, they tend to implement behaviors that can be appreciated by the organization (Pierce et al., 1989), in order to maintain their value and significance within the organization. Therefore, although this study suggests that organizational self-esteem is a mediating mechanism driving deviant innovative behavior, the strength of this drive may depend on a situational factor. This study suggests that organizational support for creativity can become an effective boundary condition to strengthen the relationship between organizational self-esteem and deviant innovative behavior. Zhou and George (2001) defined organizational support for creativity as the degree to which employees perceive the organization's encouragement, respect, reward, and recognition of creativity. Studies have shown that organizations that support innovation have strong creativity and tend to drive organizational change (Scott & Bruce, 1994; Siegel & Kaemmerer, 1978). In this situation, employees with high organizational self-esteem who perceive the organization's support for creativity may tend to prioritize innovation in order to maintain and enhance their level of self-esteem within the organization. In addition, organizations that support innovation can significantly influence the work priorities and content of high organizational self-esteem employees by tolerating risks and evaluating employee performance more from the perspective of work outcomes rather than emphasizing ways to achieve goals (Koseoglu et al., 2017). Correspondingly, employees' attention may shift towards unleashing creativity in non-traditional ways, they may deviate from regulations to produce innovative results, and they can also predict that their ideas may be rejected (Criscuolo et al., 2014). More specifically, deviant innovative behavior may lead to disruptive inventions, but it may also pose risks to implementers (Mainemelis, 2010). The combination of employees' perception of organizational support for creativity and their own organizational self-esteem may affect their judgment of the value and risk of deviant innovative behavior (Le & Lei, 2019). This positive attitude may make them more open-minded about deviant innovative behavior and ultimately expand their participation in such behavior (Baer & Oldham, 2006).

In addition, organizational support for creativity can also provide resources for employees, transforming organizational self-esteem into deviant innovative behavior. Given that participating in deviant innovation behavior requires resources, sufficient resources (such as autonomy, time, etc.) can serve as promoting factors for deviant innovation behavior (Yu &

Frenkel, 2013). Organizations that support innovation provide employees with work autonomy, allowing them to independently decide their work(Scott & Bruce, 1994). This allows employees with high organizational self-esteem to allocate some time to practice their ideas without formal approval (Carnevale et al., 2018; Haggard & Park, 2018; Zhang et al., 2019). On the contrary, employees with high organizational self-esteem may not have the time to implement their own ideas if they do not have the freedom to exercise work autonomy, i.e. perceive low levels of organizational support. In fact, previous studies have shown that employees with high autonomy have strong discretion in deviant innovative behavior (Lin et al., 2016). At the same time, the availability of time can stimulate employees to engage in exploratory activities and help reduce their dependence on established ways of doing things, thereby stimulating their creativity (George, 2007; Globock & Salomo, 2015).

2.1.4 Innovation performance

(1) The connotation of innovation

The concept of innovation was first proposed by economist Schumpeter (1912) in his book “Economic Development Theory”. He believes that innovation is a new combination of production factors by entrepreneurs, which drives economic development and social progress. Schumpeter divides innovation into five main aspects: product innovation, technological innovation, market innovation, resource allocation innovation, and organizational innovation.

Product innovation refers to the process of meeting consumer needs by developing new products or improving existing ones. This innovative form can lead the market trend, win market share, and promote the development of enterprises and the economy. For example, the emergence of smartphones is a disruptive product innovation that has changed people's communication methods and driven the prosperity of the global consumer electronics market. Technological innovation refers to the activity of developing new technologies or improving existing technologies to improve production efficiency or product quality. Technological innovation can not only enhance the competitive advantage of enterprises, but also promote the technological progress of the entire industry and even the entire country. For example, the emergence of the Internet is a major technological innovation, which has greatly improved the efficiency of information dissemination and promoted the process of global informatization. Market innovation refers to increasing product sales by discovering and exploring new sales channels, target markets, or marketing strategies. Market innovation can help enterprises expand market share and enhance market competitiveness. For example, the rise of e-commerce is an important market innovation that breaks traditional sales models and allows

consumers to purchase goods and services more conveniently. Resource allocation innovation mainly refers to how enterprises optimize and integrate internal and external resources to achieve optimal resource allocation and improve economic benefits. This innovative approach plays a crucial role in improving operational efficiency and reducing production costs for enterprises. For example, lean production is a successful resource allocation innovation strategy that improves production efficiency and product quality by eliminating waste in the production process. Organizational innovation refers to the reform and innovation carried out by enterprises in management mode, organizational structure, and corporate culture. This innovative form is conducive to improving the management efficiency of the enterprise, stimulating the innovative spirit of employees, and thus enhancing the overall competitiveness of the enterprise. For example, Google's flat management model is a successful organizational innovation that emphasizes employee self-management and team collaboration, greatly improving the work efficiency of the enterprise.

The concept of innovation proposed by Schumpeter, which refers to entrepreneurs combining new production factors, including product innovation, technological innovation, market innovation, resource allocation innovation, and organizational innovation, remains an important theoretical basis for the study of innovation in the economic community. These five innovative forms can exist alone or influence each other, jointly promoting the development and progress of enterprises and society.

Subsequently, scholars conducted research on innovation from different perspectives. In organizational management, the definition of creativity is relatively broad. Amabile (1996) proposed that "creativity is the generation of new and useful ideas, and innovation is the successful implementation of new and useful ideas." It can be seen that innovation originates from creativity, and the creative process can identify key problems and opportunities, thereby generating new ideas. West and Farr (1989) defined innovation as the intentional introduction or application of new ideas, processes, products, or programs in a role, group, or organization to benefit role performance, group, organization, or broader society. Innovation is viewed as a multi-stage process based on different levels. Subsequently, Scott and Bruce (1994) pointed out that individual innovation refers to the process of generating, adopting, and implementing new ideas or methods. Innovation is also seen as a multi-stage process, with different activities and behaviors in each stage, measured by innovative behavior. Anderson and West (1998) proposed work team innovation based on the research of West and Farr (1989), pointing out that there is less research focusing on work team level analysis, which is an obvious drawback because innovation is usually initiated by teams and subsequently

developed into routine practices within organizations. Han (2006) constructed an innovation performance model while developing a job performance scale. He proposed that innovation performance comprises innovation willingness, innovation action, and innovation outcome. Shin et al. (2017) pointed out that innovative behavior is a complex behavior that includes the generation and implementation of novel ideas and processes. The concept of innovative behavior focuses more on the innovation process rather than the outcome. The investment in the innovation process is a precursor to the generation of innovation performance, while creativity focuses on the generation of novel and useful ideas. Innovative behavior not only includes the generation of new ideas, but also the adoption and implementation of new products and processes, Innovation performance emphasizes the generation, adoption, and implementation of novel ideas and processes, as well as the resulting outcomes.

In summary, compared to creativity, innovation has a broader meaning; the concept of innovation can be realized at three levels: organization, team, and individual; innovation behavior is a combination of discontinuous activities such as innovation (Schroeder et al., 1989). Innovation behavior mainly focuses on the innovation process, and innovation performance focuses on both the innovation process and the innovation results (Shin et al., 2017). Despite these differences, there are still many studies in related academic research that exchange creativity and innovation, making it sometimes difficult to strictly distinguish between the two.

(2) The connotation of entrepreneurial performance

The research on employee innovation performance has always been a focus of scholars, and its definition mainly includes two types, namely result oriented and process oriented.

The result oriented definition mainly focuses on the specific outcomes generated by innovative activities. This type of definition emphasizes the quantifiability and observability of innovation performance. For example, the number of new products, the number of patents, and the success rate of innovative projects are commonly used indicators of innovation performance. The advantage of this approach is that it can clearly reflect the actual effects of innovative behavior, while also facilitating performance evaluation and management by enterprises. However, it may overlook the complex processes behind innovation activities, such as employee innovative thinking, innovative skills, team collaboration, and other factors. The process oriented definition shifts attention to the process and behavior of innovative activities. This type of definition emphasizes aspects such as employee participation, level of investment, and collaboration in the innovation process. For example, the frequency of employee participation in innovation projects, the degree of contribution in innovation

activities, and the collaborative relationship with colleagues can all be used as indicators to measure innovation performance. This approach helps to understand and stimulate the innovation potential of employees, and promotes the formation of an innovation culture. However, due to the difficulty in quantifying the behaviors and activities involved in the innovation process, it may pose certain difficulties in performance evaluation.

Both definitions have their own emphasis, but both attempt to capture the full picture of employee innovation performance. In practical research, scholars usually choose the appropriate definition method based on the research objectives and background. For enterprises or researchers who focus on innovative results, a result oriented definition may be more attractive; for enterprises or researchers who focus on the innovation process and hope to understand and promote employee innovation behavior, a process oriented definition may be more applicable.

(3) Causal Variables of Entrepreneurial Performance

① The antecedent variable of innovation performance

The influencing factors of employee innovation performance mainly include individual factors and situational factors.

Firstly, individual factors:

The individual factors that affect employee innovation performance mainly include innovative self-efficacy, self innovation expectations, intrinsic motivation, personality, gender, etc. If employees have a high sense of innovative self-efficacy, they are often more willing to participate in innovation activities, thereby improving innovation performance. Self innovation expectation is the expectation of employees towards the results of their innovative behavior. Employees have positive expectations for innovative outcomes, which may enhance their motivation to engage in innovative activities. Intrinsic motivation is the internal driving force for employees to engage in innovative activities out of interest and satisfaction. In addition, personality is also an important factor affecting employee innovation performance, such as openness, flexibility, and adventurousness, which are often associated with high innovation performance. In addition, gender is also considered to affect innovation performance.

Tierney and Farmer (2002) proposed the new concept of innovative self-efficacy and validated its positive effect on employee creativity and innovation based on data from two different companies. Janssen and Yperen (2004) pointed out that employee goal orientation has a positive impact on employee innovation performance, and the quality of leadership member exchange relationship plays a mediating role. Carmeli and Schaubroeck (2007) used

140 valid questionnaires from two service-oriented organizations in Israel as the research subjects and validated the positive effect of self innovation expectations on innovation work engagement based on the Galetian effect. Tierney and Farmer (2011), based on the role identity theory, believe that innovative role identity has a positive impact on self innovation efficiency, which in turn has a positive effect on employee innovation performance. They used a longitudinal research design method to collect data over two time periods to test the model hypothesis. Ng and Lucianetti (2016) pointed out the positive effects of multiple self-efficacies on employee innovation behavior, including self innovation efficacy, self persuasion efficacy, and self change efficacy. Chang et al. (2016) studied 437 paired questionnaires filled out by 112 superiors and 437 subordinates, and the results showed a positive correlation between healthy perfectionism and innovative behavior. Kang et al. (2016) studied 39 CEOs and 105 managers and found that invention enthusiasm has a positive effect on employee innovation behavior. Luksyte et al. (2018), based on the role consensus theory, believed that innovative behavior is more attributed to males rather than females, and recruited 407 participants to view three pictures of a male or female white person on a website, evaluating how charming, cute, warm, and capable they are. They then controlled for the potential impact of attractiveness on employee innovative behavior and evaluated employee innovative behavior, the results of this experimental study indicate that innovative behavior is more attributed to males rather than females.

In the Chinese context, Gu and Peng (2011) explored the effect of innovative self-efficacy on employee innovative behavior using 478 valid questionnaires. The research results showed that innovative self-efficacy has a positive effect on employee innovative behavior through achievement motivation and work involvement. Sun et al. (2012) proposed based on motivation theory that intrinsic motivation has a positive impact on employee innovation behavior, and used 575 employees engaged in scientific and technological innovation and research and development from 16 companies as the research subjects. The research results verified the hypothesis. Wang et al. (2013) and Zhang et al. (2014) verified the positive impact of feedback seeking behavior on innovation behavior, while Liu et al. (2016) also verified the moderating role of feedback seeking behavior on the relationship between learning practice community participation and employee innovation behavior. Chen et al. (2013) pointed out that proactive personality is beneficial for role breadth efficiency and intrinsic motivation, thereby promoting employee innovation behavior, when constructing a cross layer impact mechanism of transformational leadership and proactive personality on employee and team innovation performance. They used 611 team members from 106 research

and development project teams of 37 companies in China as the research subjects and adopted a longitudinal research design method to collect data at two time periods; the hypothesis was validated through analysis and testing. Gu et al. (2014) proposed positive emotions as a mediating variable based on positive organizational behavior when studying the relationship between organizational innovation support and innovation behavior of R&D personnel. 298 R&D personnel in high-tech enterprises were selected as research subjects, and the research results showed that positive emotions have a positive effect on innovation behavior. Huang and Peng (2015) proposed that work happiness affects employee innovation performance through internal identity perception and organizational self-esteem, and transactional leadership has a cross level moderating mediating role. They validated the hypothesis by using 355 leader employee paired questionnaires from 73 teams as research subjects.

Secondly, situational factors:

The situational factors that affect employee innovation performance mainly include organizational atmosphere, leadership behavior, human resource management practices, and job nature. The organizational atmosphere is the general perception and perception of innovation attitude in an organization, and an open and supportive organizational atmosphere may stimulate employees' innovative behavior. Leadership behavior, especially transformational or supportive leadership, can promote innovative behavior among employees by providing support, guidance, and motivation. Human resource management practices, such as selection, training, motivation, and performance evaluation, can also influence employee innovation performance. In addition, the nature of work, such as complexity, autonomy, and challenge, can also influence employees' innovative behavior.

In terms of organizational atmosphere, Zhou and George (2001) studied 149 office employees of oil drilling equipment manufacturing companies and found that organizational innovation support has a positive effect on employee innovation; Kang et al. (2016) proposed that the organizational innovation atmosphere has a positive impact on employee innovation behavior, with invention enthusiasm as a mediating variable. The proactive atmosphere moderates the relationship between innovation atmosphere and invention enthusiasm. The stronger the proactive atmosphere, the stronger the positive effect of innovation atmosphere on employee innovation behavior. The risk-taking atmosphere moderates the relationship between invention enthusiasm and employee innovation atmosphere, and the stronger the risk-taking atmosphere, The stronger the positive effect of invention enthusiasm on the innovation atmosphere of employees; Ng and Lucianetti (2016) argue that perceived organizational trust and respect have a positive impact on employee innovative behavior. A

longitudinal study was conducted on 267 Italian employees, and data was collected at three time points over a period of 8 months. The results showed that perceived organizational trust and respect generate new ideas for innovative behavior through innovative self-efficacy, persuasive self-efficacy, and transformational self-efficacy The three stages of promotion and implementation have a positive impact.

In terms of leadership behavior, Janssen and Yperen (2004) pointed out that the quality of leadership member exchange relationships has a positive effect on employee innovation performance; Carmeli and Schaubroeck (2007) argue, based on the Pygmalion effect, that the innovation expectations of leaders, families, and customers have a positive impact on innovation work engagement, which in turn affects employee innovation; Dhar (2016) believes that ethical leadership has a positive correlation with service innovation behavior through leader member exchange, with work autonomy as the moderating variable. A paired questionnaire of 468 employees and 117 leaders from small and medium-sized tourism hotels in North Arkansas, India was used as the research object. The results showed that ethical leadership has a positive impact on subordinate service innovation behavior, and with leader member exchange as the mediating variable, the higher the level of work autonomy, the stronger the relationship between leadership member exchange and service innovation behavior; Dong et al. (2017) pointed out that dual oriented transformational leadership has a positive impact on team and employee creativity, which in turn affects team and individual innovation performance. The model hypothesis was validated using 171 employees from 43 teams in 8 companies as research subjects; based on the Chinese context, Yang et al. (2016) explored the mediating role of constructive responsibility perception on the relationship between authentic leadership and employee innovation performance from the perspectives of social exchange theory and situational theory. The adequacy of work resources had a moderating mediating role; Feng (2017), Wang and Sun (2018) respectively proposed the cross level effects of differentiated transformational leadership and team empowerment leadership on employee innovation behavior.

In terms of human resource management practices, Prieto (2014) pointed out that high participation in human resource management practices has a significant positive impact on employee innovation behavior, with management support and colleague support as mediating variables; Chang et al. (2014) established a cross layer model of high commitment human resource work systems on employee creativity, and studied 65 high-tech companies recognized by the Chinese Ministry of Science and Technology. Using a multi-source survey and time longitudinal design method, the research results showed that high commitment

human resource work systems have a positive impact on employee creativity, while team cohesion and task complexity play a moderating role.

In terms of job nature, Janssen (2000), based on the theory of personal adaptation and social exchange, pointed out that when the perceived fairness of effort return is higher than the perceived unfairness of effort return, job demand has a positive impact on employee innovation behavior. The study focused on 170 non managerial employees from the Dutch food industry organization, the research results indicate that when perceived effort reward fairness is higher than perceived effort reward unfairness, job demand has a significant positive impact on employee innovation behavior; Tierney and Farmer (2011) pointed out that the demand for innovative work has a positive impact on innovation efficacy, which in turn benefits innovation performance; Shin et al. (2017) pointed out from the perspective of meaning construction that the demand for innovative work has a positive effect on employee innovative behavior. The intrinsic interest in innovation moderates the relationship between work innovation demand and employee innovative behavior. The lower the level of intrinsic interest in innovation, the stronger the positive effect of innovative work demand on employee innovative behavior, the perception of performance reward expectations and organizational value perception moderates the binomial interaction between innovative work needs and intrinsic innovation interests on employee innovation behavior. When the perception level of performance reward expectations is high, innovative work needs have a positive effect on employee innovation behavior with low intrinsic innovation interests, and when organizational value perception is high, innovative work needs have a positive effect on employee innovation behavior with low intrinsic innovation interests.

②The outcome variable of innovation performance

There is relatively little research on the outcome variables of employee innovation performance, mainly including team innovation and performance evaluation. (Chen et al. (2013) established a cross hierarchical model of the impact of transformational leadership and proactive personality on employee innovation and team innovation, pointing out that the average innovation performance of team employees has a positive effect on team innovation. Luksyte et al. (2018), when studying the relationship between innovative behavior and performance evaluation, believed that innovative behavior includes task and situational performance, which is seen as a form of initiative. Only when evaluators consider innovation to be uncertain, will negative evaluations be given, thus proposing the hypothesis that innovative behavior will be rewarded with good performance evaluation. Gender will regulate the relationship between innovative behavior and performance evaluation. Through

experimental and field research, the results indicate a positive correlation between innovative behavior and performance evaluation, with males having a stronger relationship between innovative behavior and performance evaluation compared to females.

2.2 Theoretical basis

Based on literature review and analysis, this section uses three theories, namely social exchange theory, leadership member exchange theory, and social relationship theory, as the theoretical basis for this study.

2.2.1 Social exchange theory

(1) The connotation of social exchange theory

Social exchange theory, originating in the late 1950s, is an interdisciplinary framework that integrates economics, sociology, and psychology (Yin, 2018).

Social exchange, an integral component of social interaction, is premised upon a reciprocal behavior model, wherein parties are mutually engaged in the exchange of assistance, support, or other resources. Social exchange embodies a mutually beneficial, reciprocal behavioral dynamic predicated on benefits, concomitantly imposing an obligation on beneficiaries to reciprocate. Nevertheless, the unpredictability associated with the timing and likelihood of returns introduces an element of uncertainty into social exchange. Therefore, beneficiaries must balance potential gains against associated risks and uncertainties before deciding to participate in such exchanges. Meira and Hancer (2021) assert that successful exchanges necessitate both parties exchanging their advantageous resources to achieve mutual benefit and underscore the fundamental driving forces of self-interest and interdependence. Regarding the relationship between knowledge sharing behavior and social exchange theory, knowledge providers aim to obtain corresponding rewards through external knowledge sharing efforts, while knowledge recipients are required to provide compensation to acquire knowledge from others. Leaders engage closely with a group of members, often entrusting them with important tasks and bestowing them with greater trust and attention. Referred to as "members of the circle," these individuals exhibit high levels of work enthusiasm. The trust, respect, and care received from leaders evoke a reciprocal mindset among employees, significantly influencing their attitudes toward the organization. Consequently, these employees actively seek opportunities to assist their leaders in overcoming challenges, thereby exemplifying positive work attitudes and behaviors (Saher et al., 2021).

The Social exchange theory refers to the reciprocal and interactive exchanges between leaders and their subordinates. The establishment of LMX relationships primarily hinges on two aspects: the exchange of labor for rewards and the reciprocation of loyalty with care and support. This symbiotic relationship, combined with the realization of organizational development and improved performance through subordinates' hard work, establishes a cooperative and interdependent connection between leaders and subordinates. Consequently, this reciprocal relationship contributes substantially to the stability and development of the organization. This interdependent relationship between employees and leaders can be characterized as a social exchange relationship (Zeglat & Shrafat, 2022).

(2) Social exchange in organizations

The concept of social exchange relationships in organizations, as proposed by Clark and Mills, has received increased attention from scholars studying social exchange. The formation of social exchange relationships is emphasized as a means to ensure the quality of contracts between individuals and organizations (Lee, 2021). Existing research by scholars from both domestic and international contexts has identified two main forms of social exchange relationships in organizations.

Firstly, the exchange relationship between employees and organizations encompasses various aspects such as organizational support, organizational commitment, team support, and team commitment. Organizational support is often regarded as a reciprocal behavior between employees and the organization, where employees reward the organization with organizational citizenship behavior and higher project performance upon receiving support from the organization (Utomo et al., 2023).

Secondly, exchange relationships between internal leaders and subordinates, as well as among employees, are also prominent. These include leader-member exchange (LMX) and team-member exchange (TMX). Research conducted by Obeng et al. (2021) has demonstrated that leader-member exchange is a fundamental social exchange relationship that enhances employee work efficiency. Although the concept of team-member exchange was introduced later, Kim et al. (2021), drawing on social exchange theory, argue that it signifies the exchange and mutual assistance of resources among team members, representing a social exchange relationship among subordinates in the workplace.

This thesis focuses on examining the exchange relationships that exist between leaders and subordinates, as well as among subordinates themselves within an organization. Specifically, it investigates the concepts of leader-member exchange (LMX) and team-member exchange (TMX). These two types of exchange relationships are particularly

relevant within a team setting, where team members are predominantly involved. Leaders, as representatives of organizations, are central to the exchange relationship between leaders and employees, which not only reflect the relationship between employees and individual leaders but also represent the exchange relationship between employees and the organization as a whole. The interaction between leaders and employees can give rise to exchange relationships of varying qualities, which in turn influence employees' work attitudes and behaviors (Ghufran Ali Khan et al., 2022).

On the other hand, team-member exchange represents a horizontal interactive relationship among employees. The exchange of resources, support, and assistance between team members fosters cooperation and mutual benefit within the team (Lau et al., 2021). Hence, an in-depth analysis of this reciprocal relationship is imperative to a holistic exploration of the degree of interaction between team members, encompassing leaders and other personnel. Delving into the social exchange dynamics within an organization affords us a more profound understanding of the inherent patterns and mechanisms that regulate team interactions. Therefore, scrutinizing these social exchange relationships can illuminate the interdependence and interactional patterns between leaders and members. Ultimately, the examination of social exchange relationships offers a more comprehensive understanding of their mechanisms of influence on team performance. Hence, this theory aligns coherently with the research content of this thesis.

2.2.2 Leader-member exchange theory

(1) The connotation of leader-member exchange theory

Leader-Member Exchange (LMX) is a leadership theory originally proposed by scholars like Graen, drawing on the role formation system theory and social transaction theory. This theory centers on the dyadic relationship between leaders and employees, emphasizing a leadership approach based on interpersonal connections. According to LMX theory, leaders establish an exchange relationship with their followers, and the quality of this relationship significantly influences the subordinates' sense of responsibility, decision-making authority, resource acquisition motivation, and work performance (Zhou et al., 2021).

The Leader-Member Exchange (LMX) theory underscores the dynamic interplay between leaders and their subordinates, construing it as a process of social exchange. This interaction is fundamentally predicated on mutual trust and respect, frequently extending beyond the purview of conventional employment relationships and evolving into emotional affiliations. Within the LMX framework, leaders extend support, assistance, and resources to their

members. This could manifest in various forms, including compensation, professional development opportunities, and the delegation of increased responsibilities and authority. Conversely, team members are expected to reciprocate by delivering robust work performance, loyalty, and efficiency to their leaders. The cornerstone of this reciprocal exchange relationship is the notion of interdependence and reciprocity. Trust plays a pivotal role in cultivating an effective exchange relationship between leaders and their subordinates. Leaders must engender trust within their team members, convincing them of their commitment to fulfill their promises and extend necessary support. Similarly, team members must place their trust in their leaders, confident that their efforts and contributions will be acknowledged and rewarded. This trust-based exchange relationship fosters cooperation and interaction between both parties, thereby bolstering team cohesion and efficacy. Furthermore, leader-member relationships often embody emotional characteristics. The interaction transcends the boundaries of work-related tasks and encompasses elements such as caring for, supporting, and fostering the personal development and well-being of team members. Such emotional bonds serve to establish deeper connections, further enhancing team cohesion and loyalty. In conclusion, the LMX theory portrays the leader-member relationship as a social exchange rooted in trust and respect. This unique relational paradigm often transcends conventional employment dynamics, morphing into emotionally charged relationships that facilitate team cohesion and improved performance.

Based on the LMX relationship, Seers (1996) proposed the concept of Team member Exchange (TMX) in 1989. And based on social exchange theory, explain team member exchange as "the overall perception of individual team members towards the exchange relationships they form with other members". Subsequently, the academic community began to explore LMX and TMX. In 1995, the author further explained the concept from the perspective of reciprocity: "The reciprocal relationship formed between members in terms of viewpoint transmission, helping others, and corresponding aspects such as viewpoint acceptance and obtaining help from others. At the same time, it was emphasized that individuals with low-quality team member exchanges only maintain work and business interactions with other members, and lack cooperation with other members; Individuals with high-quality team member exchanges not only engage in work related exchanges with other members, but also in emotional, life related aspects. They are more willing to contribute to the team and can also receive rewards and support from others. Subsequent scholars' research on TMX also mostly adopts the definition given by Seers from the perspective of reciprocity. Some scholars also believe that TMX is an individual's overall perception of team

relationships, which is the degree to which they perceive the quality of their interactions with other members in their work (Kang & Jang, 2022).

The Leader-Member Exchange (LMX) theory encapsulates the concept of Team Member Exchange (TMX), which is essentially an individual's comprehensive perception of team relationships. TMX embodies an individual's understanding of their interactions' quality with fellow members in a professional environment and can be considered as a reflection of one's alignment with their designated position and role within the team. The formation of TMX is contingent upon the nature of interaction and communication among team members. An elevated sense of TMX is cultivated when individuals experience acceptance, respect, and support from other team members. The mutual exchange of perceptions within the team significantly influences its operations and performance. A high degree of TMX can foster intra-team cooperation and communication, thereby bolstering team cohesion and trust. Furthermore, it has the potential to invigorate individual work motivation and commitment, enhancing overall team performance and creativity. Conversely, a low level of TMX may precipitate discord and conflict within the team, causing individuals to feel neglected, ostracized, or incapable of assimilating into the team. In such instances, individuals might curtail their contribution to the team, leading to decreased work efficiency, or they might even contemplate exiting the team. In this regard, the role of leaders becomes pivotal in establishing and sustaining perceptions of TMX. They are responsible for fostering a supportive and inclusive work atmosphere that promotes interaction and cooperation among team members. Additionally, leaders can augment the perception of TMX by offering positive feedback, acknowledgment, and rewards. To sum up, TMX represents an individual's overarching perception of team relationships and their assessment of the quality of interactions with other team members. It wields considerable influence over team operations and performance, and leaders serve a crucial role in instituting and preserving perceptions of TMX.

(2) Innovation in leadership member exchange

The Leader member exchange (LMX) theory suggests that leaders do not use the same style to interact with all subordinates, but rather develop different types of exchange relationships with each subordinate, ranging from strict adherence to employment contracts to mutual trust and respect.

Under high-quality LMX relationships, leaders provide material support (funds, equipment) to make subordinates more likely to engage in innovative activities; leaders encourage and inspire subordinates to take risks and actively engage in innovative activities

by providing emotional support. Due to the fact that leaders are the most significant representatives of implementing management behaviors, policies, and processes, subordinates often generalize their perception of leaders as their perception of the organization. Therefore, subordinates with high quality relationships with leaders often believe that the organization provides innovation support behaviors such as higher autonomy and greater decision-making scope. Scholars have pointed out that leaders who define team goals and control key resources can create work environments and conditions that inspire subordinates to engage in innovative efforts to achieve their goals (Siyal et al., 2021). Some scholars' further point out that leadership behavior may have an effect on perceived work environment, which can have an effect on employees' innovative behavior. It can be seen that leader member exchange has an effect on employees' thinking and perception of the organization and its value (Mehmood et al., 2021).

The quality of communication between leaders and subordinates can affect their work attitude, behavior, and results. Proposing new ideas is a risky behavior in an organization, as they represent a change in the existing order. However, high-quality leadership member exchange relationships can reduce employees' risk and encourage them to actively propose new ideas. Under high-quality leadership member exchange relationships, subordinates can gain greater autonomy, decision-making scope, and opportunities to increase individual influence, as well as have more time to engage in unstructured work. Conception and experimentation with innovative ideas to improve existing products and processes often require additional time, resources, and freedom. Leaders who exchange relationships with senior members encourage their subordinates to think freely, exchange information, and support them in providing diverse problem-solving methods; Subordinates are not limited by the viewpoints conveyed by the command chain, and have more opportunities to engage in unconventional thinking and behavior involved in innovative work. In addition, subordinates with high leadership members exchanging relationships report engaging in more challenging work tasks, taking on more work related risks, and obtaining more task related resources and cognitive information compared to subordinates with low leadership members exchanging relationships. Under low-quality leadership member exchange relationships, employees cannot rely on their leaders to obtain the additional support needed to turn potential innovative ideas into reality. The low-level potential support from leaders strengthens employees' tendency to stay away from innovative activities; under high-quality leadership member exchange relationships, the tremendous support and autonomy from leaders can help employees overcome work-related problems and increase the chances of innovation success.

Employees will become more confident that their innovative behavior will lead to higher work performance. On the other hand, in high-quality leadership member exchange relationships, the leader's inherent trust in subordinates provides a more comfortable working environment for subordinates to propose innovative ideas. When leaders trust and respect their subordinates, they are more likely to evaluate their innovative ideas and believe that those innovative ideas are meaningful and important. Employees under high leadership member exchange relationships feel safer when engaging in innovative behavior and expect to take fewer risks. Their leaders often do not hold them accountable for innovation failures.

2.2.3 Social network theory

(1) Relevant literature of social network theory

Since the 1960s, social relationship networks have become a focus of Socioeconomics research. From existing research abroad, the rapid development of social relations research benefits from the widespread application of network analysis methods. The social network analysis method takes "Ties" as the unit of analysis, believing that only in a structural network composed of various relationships can individual behavior and social interaction between individuals be better understood, because the characteristics and structure of social relationships affect and constrain individual interaction behavior. From the perspective of social relations, Dong et al. (2018) defines a social relationship network as "the overall structure composed of the connections between individuals within a group, known as the social relationship network of that group". Samad (2020) pointed out that social networks are specific connections between individuals within a group. Muller and Peres (2019) believe that social networks are a series of social relationships or social connections that connect actors, and are a stable system composed of social relationships between individuals. Zuo and Zhao (2021) pointed out that social networks are a complex of social entities and various social relationships between them, and are a type of "resource" that can provide more resources.

Therefore, this thesis defines social relations as the connection dimension of social networks, which refers to the actual bond connection between individuals due to contact and interaction. This connection can bring certain social resources to individuals, where individuals can be individuals, groups, or organizations.

Social relations, a pivotal aspect of human society, function as conduits through which individuals forge ties with others and secure access to information, support, and resources. These relationships contribute significantly towards the establishment of trust, cooperation, and resource sharing within societal frameworks, thereby enhancing individuals' quality of

life and augmenting work productivity. Individual social connections can manifest in diverse forms, including familial, friendly, collegial, and partnership bonds. Each relationship type emerges at various hierarchical levels and scopes, exerting a profound influence on an individual's social capital and mental health. Social relations serve dual purposes for individuals: providing support and emotional security alongside access to resources. For instance, friendships offer emotional and social reinforcement, familial ties yield love and a sense of belonging, and professional connections present career opportunities and workplace assistance. At the organizational or group level, social relationships stimulate collaboration and cooperation. The creation of positive social ties enables organizations to foster knowledge dissemination, seamless information flow, and collaborative efforts. Moreover, these relationships assist in shaping organizational culture and values, boosting team cohesion and overall performance. Despite these advantages, social relations are not devoid of challenges such as conflicts, exclusion, and power struggles resulting from poor interpersonal ties. Trust deficits and cooperation obstacles among individuals may obstruct the healthy development and efficient functioning of social relationships. Therefore, both individuals and organizations must comprehend and adeptly manage their social relations. Individuals can bolster their social capital and gain increased access to social resources by actively participating in social activities, cultivating robust interpersonal ties, and effectively resolving conflicts. Concurrently, organizations can nurture healthy social relations by promoting collaboration, fostering team spirit, and creating conducive work environments.

In essence, social relationships represent the connective dimension of social networks, signifying the actual ties formed between individuals due to contact and interaction. Such connections equip individuals with crucial social resources, encompassing support, emotional security, and tangible resources. Therefore, understanding and managing social relationships are vital tasks for both individuals and organizations, as they facilitate collaboration, enhance living standards, and improve work efficiency.

(2) Innovation in social network theory

Innovation is inherently intertwined with social interaction and interpersonal dynamics. It is deeply embedded within social networks, and individuals primarily seek innovation through the social networks they are a part of. Drawing on the theory of social relations, a social network can be defined as a collection of social actors and their interconnected relationships. Numerous scholars have examined the link between social networks and innovation behavior, as well as innovation performance. The following analysis delves into this relationship in detail:

One is the study of social networks on innovative behavior. Lesser (2009) pointed out in his research that social networks can enable network members to build internal and external relationships and communicate information, thereby improving their innovative behavior and their own value to the organization; Malik (2022) studies the exchange patterns of mutual benefit, reciprocity, and trust formed by the external social network construction of high-tech enterprise employees, and the knowledge sharing formed through this can affect the implementation of employee innovation behavior; Qi et al. (2019) proposed and validated the positive impact of the strength of internal and external connections in social networks on the innovative behavior of knowledge-based employees from the perspective of employee relationship needs; based on the perspective of social networks, Chabbouh and Boujelbene (2023) explored the output of user participation in innovation behavior and enterprise innovation performance in open communities. The results showed that some dimensions of social networks have a certain promoting effect on user participation in innovation behavior; starting from the perspective of social networks and based on the theory of strong weak relationships in social networks, Waheed et al. (2019) analyzed the impact of strong weak relationships among network members on individual innovation behavior through different innovative behaviors of online community members.

The second is the study of social networks on innovation performance. Dahesh et al. (2020) conducted research on the structure and relationship dimensions of social networks, and the results showed that the location advantage and connection strength of corporate social networks are beneficial for product innovation performance and process innovation performance; from the perspective of organizational contingency, based on the three major theories of social networks, Jiao et al. (2019) divided social networks into three dimensions: network centrality, connection strength, and network size. He studied and proved that the performance of technological innovation in enterprises is influenced by different variables of social networks; from the perspective of social network embedding, Nu'man et al. (2020) conducted empirical research and found that both social network structure and relational dimensions can affect the innovation performance of enterprises; from the perspective of social network structure, Wang and Zhao (2019) collected data and conducted empirical analysis. The results showed that having a central position in the industrial alliance network and strong relationships with network members can promote the improvement and enhancement of technological innovation performance of enterprises when the scale of the enterprise is large enough.

In addition, in the study of social relations, there are two aspects of research: strong

relationships and weak relationships. In terms of the power of strong relationships, in the special social context of "relationship handling" in China, the power of strong relationships is particularly prominent. Relationships between each other rely on emotional bonds to maintain and develop through repeated human exchange. When a company faces environmental turbulence during its start-up or operation period, the valuable information flow provided by strategic partners under strong relationships is similar to that of a sedative for the company, and there are many benefits for the company. Sharing information among each other can also improve the innovation performance of the company (Xu et al., 2020). The second is the power of weak relationships, which is opposite to strong relationships. Individuals in weak relationships have a lower frequency of interaction and are not familiar with each other. Due to a lower level of familiarity with each other, information resources among members are more heterogeneous, which can better convey non redundant knowledge and information, providing possibilities for innovation. In addition, in addition to the advantages of heterogeneous information, the weak emotional maintenance and lack of reciprocal commitments between weak relationships can reduce the costs required in the process of enterprise connection. Enterprises will develop a certain level of risk judgment ability, have a certain degree of relative independence, and less dependence on external enterprises can also reduce the network constraints of enterprises, allowing them to search for more valuable resources based on their own unique means, to achieve exploratory innovation (Hasche et al., 2020).

In a nutshell, it is apparent that social networks exert a profound influence on the innovation process. Individuals, while embedded within these networks, seek out innovative strategies and directions. They acquire fresh perspectives and stimulate creativity through the exchange of information, sharing of knowledge, and collaboration with others. These networks function as a nexus, connecting individuals from various fields and backgrounds, thus fostering cross-disciplinary and cross-industry innovation. Studies reveal that certain attributes of social networks – namely density, diversity, and centrality – are instrumental in the birth and proliferation of innovation. In essence, innovation is deeply intertwined with social interaction and inter-personal communication, with social relationship networks serving as conduits for innovation advancement. Through these networks, individuals can amass the requisite knowledge, resources, and support needed to mold and disseminate innovative ideas. Therefore, a comprehensive understanding and strategic utilization of social networks hold immense significance for propelling innovation development.

2.3 Literature critique

This chapter provides a comprehensive review of the pertinent literature concerning social exchange theory, leader-member exchange theory, and social relationship theory. A meticulous examination was undertaken, concentrating on literature published within the past five years. This focused on conceptual definitions within social exchange theory, leader-member exchange theory, and social relationship theory, in addition to social exchanges within organizations, innovation within leader-member exchanges, and innovation within social relationship theory. The applicability of these theories to the present study was scrutinized. Current research predominantly confines itself to mono- or bi-modal leadership models, revealing a significant dearth of studies exploring the impact mechanism of multiple leadership styles on innovation performance from the perspective of innovative self-efficacy.

The present study postulates that exchange relationships within an organization, whether between leaders and subordinates or among peers, can exert considerable influence on employee work attitudes and behaviors. Within high-quality leader-member exchanges, inherent trust from leaders towards their subordinates cultivates an environment conducive to proposing innovative ideas. Innovation is intrinsically tied to social interaction and is embedded within social networks. Concurrently, employee innovative ideas and behaviors are influenced by various factors, including organizational context and personal psychological cognition. Hence, this thesis employs innovative self-efficacy as a mediating variable, facilitating a more profound comprehension of innovation management within employees of small to medium-sized medical information enterprises.

Chapter 3: Hypotheses and Construction of Research Models

3.1 Research hypotheses

As early as the beginning of the 20th century, the leadership Trait theory began to appear. During this period, scholars were committed to exploring the common traits of outstanding leaders. In the trait theory, excellent leadership qualities were constantly developed and summarized, but the importance of each trait could not be accurately identified. In addition, the theory overemphasized the role of innate quality, ignoring the impact of acquired behavior and environment (Verawati & Hartono, 2020).

In the 1940s, the leadership behavior school began to focus on the leadership behavior exhibited by excellent leaders and linked it to leadership efficiency. It focused on cultivating leadership behavior and improving leadership effectiveness through acquired learning. In this process, Blake proposed the famous management grid theory, which considers leaders' behavior types from the perspectives of caring for tasks and caring for subordinates (Hunt & Fedynich, 2019). The theory of leadership behavior broadened the scope of research on leadership at that time, but the specific type of leadership behavior that produces effective leadership has not been discussed. The Contingency theory of leadership emerged in the 1960s brought the leadership theory into a new stage of development. The Contingency theory pointed out that situational factors are very important for effective leadership. This theory broke people's understanding of the absoluteness of leadership behavior, and believed that leaders should make corresponding leadership behaviors according to the different situations. After the 1980s, with the development of the global economy and technology, enterprises around the world flourished, and traditional leadership theories and conclusions could no longer meet the actual needs of the current market. Many scholars began to pay attention to the research of new leadership theories, such as transformational leadership, paternalistic leadership, directive leadership, empowering leadership, inclusive leadership, transactional leadership, charismatic leadership, shared leadership, visionary leadership, and so on, related research is also becoming increasingly in-depth (Vasilescu, 2019). From the perspective of leadership contingency theory, the effects of leadership styles in different situations vary greatly. In Chinese culture, especially in the context of small and

medium-sized medical informatization enterprises, empowering leadership style, transactional leadership style, shared inclusive style and directive leadership style are common leadership styles. Therefore, the leadership styles in this thesis refer to empowering leadership style, transactional leadership style, shared inclusive style and directive leadership style.

3.1.1 Leadership style and innovation performance

(1) Empowering leadership style and innovation performance

The empowering leadership style is a paradigm of leadership that endorses the enhancement of employees' autonomy and responsibility. This style of leadership has significant links with the social exchange theory, given its foundation on the mutual interdependence and reciprocity between leaders and their subordinates. As per the principles of the social exchange theory, employees often cultivate a sense of gratitude when they are shown care, support, and trust by their leaders. Such emotions make them feel valued and respected, thus fostering a sense of duty and obligation to reciprocate these sentiments to their leaders. This reciprocation can manifest itself through an amplified dedication towards organizational goals, enhanced work performance, and an increased loyalty and support towards leaders. In the framework of an empowering leadership style, leaders delegate more power and autonomy to their employees, encouraging them to contribute actively in decision-making processes and problem-solving scenarios. Such empowerment can invigorate the employees' motivation and creativity at work, facilitating their engagement in tasks with a heightened sense of ownership, subsequently improving their work performance. However, while enjoying such empowerment, employees also encounter certain responsibilities and pressures. They are required to shoulder increased responsibilities and decision-making powers, necessitating higher competencies and self-discipline. This induced sense of responsibility and pressure serves as a motivator for employees to exert themselves further, thereby enhancing innovation performance. Hence, an empowering leadership style stimulates employees' autonomy and sense of responsibility by fostering positive social exchange relationships, consequently boosting innovation performance. The sense of 'gratitude' engendered in employees upon receiving their leaders' care motivates them to reciprocate, resulting in elevated work engagement and innovative drive. This symbiotic relationship aids in creating a conducive work environment and team collaboration, promoting the initiation and execution of innovative ideas.

Leadership style is an important factor affecting employee innovation behavior and performance. Previous studies have shown a significant relationship between empowering

leadership and employee job performance (Kundu et al., 2019). After Alrowwad et al. (2020) combined employee psychological engagement with empowering leadership style, the research results showed that leadership empowerment behavior is a psychological mechanism that drives employees' internal psychological cognition through their external psychological cognition, and ultimately stimulates the improvement of their own learning ability, thereby promoting the improvement of employees' innovation performance. When employees realize that their work is not only interesting but also meaningful, they will seek solutions by increasing their investment and gain a sense of satisfaction from it, which may lead to higher job performance. When employees realize that their work will have a significant effect on organizational decision-making, they will take pursuing high-performance work and creative work methods as a responsibility, constantly pursuing improvement and innovation performance, and expanding and improving performance levels through sharing (Tang et al., 2020).

In a word, empowering leadership, by matching employees' psychological expectations, on the one hand, promotes employees to constantly improve their knowledge stock and knowledge structure through learning, and on the other hand, promotes employees to strive to implement innovative behavior based on trust in leaders and organizations. The combination of these two aspects can improve employees' innovation performance and make corresponding achievements for leadership authorization and organizational support.

(2) Transactional leadership style and innovation performance

The core idea of transactional leadership style is based on the principles of trading. A contractual relationship is established between leaders and employees, where employees receive corresponding rewards based on completing tasks or achieving goals. This style invariably delineates a clear power structure and defines explicit expected outcomes. Primarily, transactional leadership underscores the establishment of a contractual bond, implying that a lucid contract is put in place between the leaders and their subordinates. This contract explicates the tasks to be accomplished, the goals to be realized, and the rewards that would ensue. By providing tangible returns for efforts, this type of relationship promotes higher investment and motivation from the employees towards their work. Moreover, a significant emphasis of transactional leadership is on task completion and goal realization. Leaders delineate clear tasks and objectives, necessitating employees to adhere to preset timeframes and quality standards. Employee remuneration is contingent directly on performance outcomes, thereby incentivizing maximum effort for task completion and return maximization. Furthermore, the transactional leadership style accentuates power and control.

Leaders, within this paradigm, wield decision-making authority and control, which includes setting tasks, resource allocation, and monitoring employee performance. It becomes incumbent upon employees to comply with leader directives and regulations to facilitate seamless task execution.

The characteristic of transactional leadership contingency rewards allows employees to focus on achieving specific corporate goals, which helps the company achieve established goals. However, it can cause employees to lose a certain degree of innovation motivation (Udin et al., 2022), which is not conducive to the company's innovation performance. Hansen and Pihl-Thingvad (2019) believes that innovative behavior differs significantly from traditional behavior and is characterized by opportunism, while transactional leadership's proactive exception management and contingency rewards can lead employees to act strictly according to their leaders' instructions, potentially creating a relatively closed cultural environment and organizational structure within the organization, thereby mechanizing employee behavior and hindering the emergence of innovative behavior. Some scholars have demonstrated through empirical research that transactional leadership is positively correlated with innovation performance. Feng Cailing believes that transactional leadership can guide employee behavior through contingency rewards and active exception management, which is conducive to achieving corporate goals (Kittikunchotiwut, 2019).

In summary, this thesis believes that transactional leadership is more focused on achieving organizational goals, which is beneficial for achieving enterprise innovation goals.

(3) Shared leadership style and innovation performance

Due to the unique nature of the industry, medical information technology enterprises have gathered a large number of knowledge-based employees who usually have higher education. They do not do repetitive work every day, but use their knowledge and skills to obtain useful information in their work, and process this information to solve problems encountered in their work. Existing research has shown that employees with high levels of knowledge have a higher level of innovation awareness compared to ordinary employees, which can bring higher value to enterprises. Therefore, how to improve employees' innovation awareness has become a focus of attention for every enterprise (Cooke et al., 2019). In order to enhance employees' innovation awareness, medical informatization enterprises encourage employees to participate in specialized activities such as skill training and knowledge sharing. Through these activities, employees can improve their knowledge literacy, which in turn affects the daily performance of the enterprise. These impacts will further affect the innovation ability of medical informatization enterprises.

Innovation ability, as the core competitiveness of medical informatization enterprises, will have a crucial effect on the development of medical informatization enterprises. Shared leadership, through the sharing of power and responsibility, achieves the goal of sharing leadership rights and responsibilities among all team members, providing each team member with a deeper sense of participation, enhancing team members' sense of ownership, and achieving the goal of enhancing member enthusiasm. This has a positive effect on the development of employee innovation ability and the accumulation of enterprise innovation ability; shared leadership advocates team learning, promotes cross disciplinary learning and progress among members, and strives to create a good learning atmosphere within the team (Khan et al., 2020). The competitive pressure in medical information technology enterprises is generally high, but the updates and iterations are fast. Therefore, employees need to learn independently, which is matched with team learning in shared leadership. Through team learning, it is beneficial for knowledge-based employees to update their knowledge, improve their skills, and enhance their abilities, laying the foundation for their innovation performance, and enabling them to play a greater role in medical information enterprises; the pace of medical information technology enterprises is fast and efficiency is emphasized, and the team expectation in shared leadership requires the team to prioritize efficiency. Team members should be work oriented and think about how to complete their work more quickly and efficiently, providing a continuous source of motivation for achieving innovation performance (Song et al., 2020); medical information technology enterprises advocate collaborative work, while shared leadership advocates team collaboration, which complements each other. This can promote mutual trust among members, avoid unnecessary conflicts, improve team member interaction, establish trust and cooperation mechanisms, and provide an appropriate environment for achieving innovation performance.

Hence, this thesis believes that shared leadership style will have a positive effect on the innovation performance of employees in small and medium-sized medical informatization enterprises.

(4) Directive leadership style and innovation performance

Directive leadership style emphasizes personal authority and absolute control over employees, requiring them to obey themselves without reservation. From the perspective of leaders, they exhibit a authoritarian style. They exercise strict control over their employees, are unwilling to authorize them, and enjoy information exclusively. They adopt a downward communication approach. In addition, they disregard suggestions and rely on their own experience and understanding for all decisions; on the other hand, from the perspective of

members, they exhibit submissive behavior and will unconditionally accept the leader's appointment. They even show fear towards the leader, do not dissent, do not openly conflict, and do not actively communicate with the leader (Stone & Jawahar, 2021).

Leaders with a directive based leadership style typically require members to achieve high performance through strict discipline. When the leader's intention is conveyed to members, they will try their best to avoid making mistakes. Members often do not consider putting in extra effort, but only contribute to the work that the leader has arranged to do; in addition, when members make mistakes, they will be punished, which will reduce their work enthusiasm and lead to the disappearance of their creative potential, which is not conducive to the output of innovation performance (Bell et al., 2018). In addition, directive leaders lack effective communication with subordinates and leaders monopolize power, information, and other resources on their own. This can reduce team members' trust in the leader, and members may also feel more unfair in the organizational environment, leading to dissatisfaction with the team and slackening work, which in turn affects team performance (Mutmainnah et al., 2022).

In summary, it can be seen that directive leadership, by establishing a systematic structure and norms, emphasizes control and constraints on employees, limits their innovation and transformation, and will have a negative effect on small and medium-sized medical information enterprises.

Hence, the following hypothesis is proposed:

H1: Empowering leadership style has significant positive effect on innovation performance of employees in small and medium-sized medical informatization enterprises

H2: Transactional leadership style has significant positive effect on innovation performance of employees in small and medium-sized medical informatization enterprises

H3: Shared leadership style has significant positive effect on innovation performance of employees in small and medium-sized medical informatization enterprises

H4: Directive leadership style has significant negative effect on innovation performance of employees in small and medium-sized medical informatization enterprises

3.1.2 Leadership style and innovative self-efficacy

(1) Empowering leadership style and innovative self-efficacy

Empowering leaders provide employees with necessary support and resources to effectively engage in innovative activities. The provision of support and resources can enhance employees' confidence in their ability to innovate in tasks. When leaders adopt an

empowering leadership style, they give employees more autonomy and responsibility, encouraging them to participate in decision-making and innovative activities. This leadership style can enhance employees' sense of innovative self-efficacy and make them believe that they can successfully complete innovative tasks. Therefore, empowering leadership enhances employees' creativity by enhancing their sense of innovative self-efficacy (Alameri et al., 2019). At the same time, empowering leaders provide positive feedback and recognition to employees, encouraging their innovative efforts. This positive feedback and recognition can enhance employees' sense of innovative self-efficacy and enhance their confidence in their innovative abilities. In addition, empowering leaders establish trust relationships, encourage employees to take risks and try new ideas and methods. This trust and encouragement can increase employees' confidence in their abilities in innovative tasks and enhance their sense of innovative self-efficacy.

(2) Transactional leadership style and innovative self-efficacy

Transactional leadership behavior will comprehensively understand the needs of subordinates, adopt various management measures, and help subordinates clarify work tasks, goals, roles, requirements, and other contents (Abbas & Ali, 2021). Transactional leaders will occasionally reward and acknowledge subordinates who perform well, and correct and punish behaviors that do not meet requirements and rules. According to the theory of goal setting, Du et al. (2020) pointed out that there is a high positive correlation between the degree of clarity of goals and the degree of achievable goals. Transactional leadership, through a combination of contingency compensation and exception management, not only ensures that subordinates have clear goals, but also effectively improves their confidence in achieving goals, thereby enhancing employees' sense of innovative self-efficacy. Therefore, it can be seen that transactional leadership style has a positive effect on innovative self-efficacy.

(3) Shared leadership style and innovative self-efficacy

Shared leadership provides a better display platform for employees at the level of power and responsibility sharing, affirms the importance of employees in the organization, and improves their work enthusiasm. Due to each employee being responsible for their expertise, they have a high level of work confidence and sense of efficacy, and have the confidence to solve problems encountered in their work. Shared leadership requires each employee to continuously learn in their work at the team learning level. In addition to their expertise in the field, they also need to learn knowledge related to other areas of work, in order to achieve knowledge integration and make employees more confident when facing sudden problems in their work. The team expects employees to strictly demand themselves, continuously improve

work efficiency, and find new solutions to problems. This requires employees to actively participate in team learning and cooperation, strive to improve their theoretical knowledge and practical experience, and improve their work abilities (Liu et al., 2022). As a result, employees will exhibit a high level of enthusiasm and confidence in their work. Teamwork requires employees to maintain a cooperative attitude in their work and actively interact with other employees in the team. On the one hand, interaction can promote mutual learning among employees, facilitate the integration of their personal knowledge fields, and promote team learning. On the other hand, when facing problems, employees should know that they do not have to overcome them alone. They also have a team behind them, and can solve problems through team cooperation; employees can face difficulties in their work with a more relaxed mindset.

(4) Directive leadership style and innovative self-efficacy

The directive leadership style is characterized by leaders who prioritize authority and control, adopting a directive approach in managing subordinates. This leadership style often hinders the autonomy and freedom of subordinates, thereby restricting their involvement in decision-making processes and innovative activities. Consequently, this controlled and restrictive environment can diminish employees' perception of their own innovative self-efficacy, resulting in a lack of confidence in their ability to perform innovative tasks.

In terms of the specific reasons for the impact, directive leadership style usually does not encourage employees to participate in decision-making and innovative activities, and the opinions and suggestions of subordinates are often ignored. This limits employees' participation in innovative tasks and reduces their confidence in their innovation abilities. At the same time, directive leaders often focus on results while neglecting processes, and place more emphasis on executing and completing tasks. They rarely provide support, encouragement, and feedback, and lack recognition of employees' innovative efforts (Echebiri & Amundsen, 2021). This lack of support and encouragement can reduce employees' sense of innovative self-efficacy. In addition, directive leadership style often carries strict control and pressure, requiring employees to execute tasks according to instructions, lacking autonomy and room for innovation. This kind of control and pressure can lead employees to doubt and uncertainty about their ability to innovate tasks, reducing their sense of innovative self-efficacy.

Hence, the following hypothesis is proposed:

H5: Empowering leadership style has significant positive effect on innovative self-efficacy of employees in small and medium-sized medical informatization enterprises

H6: Transactional leadership style has significant positive effect on innovative self-efficacy of employees in small and medium-sized medical informatization enterprises

H7: Shared leadership style has significant positive effect on innovative self-efficacy of employees in small and medium-sized medical informatization enterprises

H8: Directive leadership style has significant positive effect on innovative self-efficacy of employees in small and medium-sized medical informatization enterprises

3.1.3 Innovative self-efficacy and innovation performance

According to social exchange theory, individuals with a strong sense of innovative self-efficacy are more likely to receive social support from others, which can include the provision of information, resources, and recognition for their innovation efforts. This exchange of social support can enhance individuals' enthusiasm and motivation in engaging with innovation tasks, thus leading to improved innovation performance. Moreover, individuals with a high level of innovative self-efficacy are more adept at acquiring and utilizing various resources necessary for innovation, such as financial support, technological expertise, and human resources. By demonstrating their innovative self-efficacy, individuals can attract resource support from others, thereby further enhancing their innovation performance. Additionally, individuals with a strong sense of innovative self-efficacy are more prone to receiving positive feedback and evaluation from others. This positive feedback can bolster their confidence and motivation, resulting in further improvement in innovation performance. The demonstration of innovative self-efficacy by individuals can attract attention and recognition from others, promoting a reciprocal exchange of feedback.

Bagheri et al. (2022) showed that the higher the level of self-efficacy in individual innovation, the higher the level of innovation. Innovative self-efficacy emphasizes an individual's confidence in their own innovation ability. Zhang et al. (2015) believes that when employees have a higher level of innovative self-efficacy, they are more likely to spend more time and energy identifying and solving innovative problems, and are more likely to propose innovative and practical ideas, which in turn leads to innovation performance. It can be inferred that innovative self-efficacy can encourage employees to generate more creative internal motivation, stimulate their innovative behavior, and provide innovation performance.

Hence, the following hypothesis is proposed:

H9: Innovative self-efficacy has significant positive effect on innovation performance of employees in small and medium-sized medical informatization enterprises

3.1.4 The mediating role of innovative self-efficacy

Drawing from the leader-member exchange theory, a leadership style that fosters high-quality leader-member exchange relationships can have a positive effect on team members' innovative self-efficacy. These relationships can provide support, feedback, and opportunities for learning, which in turn enhance individuals' belief in their ability to engage in innovative tasks. Consequently, individuals with high levels of innovative self-efficacy are more likely to exhibit positive attitudes and behaviors towards innovation, ultimately leading to improved innovation performance.

On this basis, domestic and foreign scholars have begun to study the mediating role of innovative self-efficacy psychological cognitive variables in the mechanism of environmental effect on behavior. Current research has confirmed the mediating role of innovative self-efficacy as a mediator between leadership behavior and employee innovation. Javed et al. (2021) have demonstrated the positive effect of innovative self-efficacy on employee innovation behavior, providing theoretical guidance for the lack of confidence in independent innovation in local enterprises. Santoso et al. (2019) demonstrated through empirical research the mediating role of innovative self-efficacy in leadership style and employee innovation performance. It can be seen that the pre factors that affect employee innovation performance include intrinsic motivation, innovative self-efficacy, and usually the behavior of superiors directly affects this intrinsic motivation. Therefore, this thesis believes that leadership style will have an indirect effect on employees' innovation performance through the mechanism of innovative self-efficacy.

Hence, the following hypothesis is proposed:

H10: Innovative self-efficacy mediates the relationship between empowering leadership style and employees’ innovation performance

H11: Innovative self-efficacy mediates the relationship between transactional leadership style and employees’ innovation performance

H12: Innovative self-efficacy mediates the relationship between shared leadership style and employees’ innovation performance

H13: Innovative self-efficacy mediates the relationship between directive leadership style and employees’ innovation performance

3.1.5 The moderation role of innovation support

Leaders' support for innovation can be perceived as an organizational climate or culture that

communicates organizational values and norms, influencing employees' willingness to take risks associated with innovative behavior. During the course of their work activities, employees primarily respond to cognitive interpretations of the work environment rather than the environment itself.

The organization's endorsement of innovation conveys the notion that innovation is a behavior that the organization both anticipates and values, and engaging in innovative behavior will yield personal benefits. Jia et al. (2022) shows that employees' perception of organizational support for innovation leads them to believe that their innovative behavior is expected and valued by the organization. In addition, employees' perceived innovation support improves their psychological security of trial and error in the process of innovation, and reduces their Assumption of risk behavior in innovative activities. If employees engage in work with strong organizational support, they will consider it valuable and use organizational support as the basic basis for their return to the organization. Therefore, strong innovation support from organizations can make employees believe that their sense of innovative self-efficacy is valuable, thereby enhancing innovation performance.

Hence, the following hypothesis is proposed:

H14: Innovation support can positively moderate the relationship between innovative self-efficacy and employees' innovation performance

Based on the above analysis, summarize the research hypotheses, as shown in Table 3.1:

Table 3.1 Summary of research hypotheses

Hypothesis	Content
H1:	Empowering leadership style has significant positive effect on innovation performance of employees in small and medium-sized medical informatization enterprises
H2:	Transactional leadership style has significant positive effect on innovation performance of employees in small and medium-sized medical informatization enterprises
H3:	Shared leadership style has significant positive effect on innovation performance of employees in small and medium-sized medical informatization enterprises
H4:	Directive leadership style has significant negative effect on innovation performance of employees in small and medium-sized medical informatization enterprises
H5:	Empowering leadership style has significant positive effect on innovative self-efficacy of employees in small and medium-sized medical informatization enterprises
H6:	Transactional leadership style has significant positive effect on innovative self-efficacy of employees in small and medium-sized medical informatization enterprises
H7:	Shared leadership style has significant positive effect on innovative self-efficacy of employees in small and medium-sized medical informatization enterprises
H8:	Directive leadership style has significant negative effect on innovative self-efficacy of employees in small and medium-sized medical informatization enterprises
H9:	Innovative self-efficacy has significant positive effect on innovation performance of employees in small and medium-sized medical informatization enterprises
H10:	Innovative self-efficacy mediates the relationship between empowering leadership style and employees' innovation performance
H11:	Innovative self-efficacy mediates the relationship between transactional leadership style

	and employees' innovation performance
H12:	Innovative self-efficacy mediates the relationship between shared leadership style and employees' innovation performance
H13:	Innovative self-efficacy mediates the relationship between directive leadership style and employees' innovation performance
H14:	Innovation support can positively moderate the relationship between innovative self-efficacy and employees' innovation performance

3.2 Conceptual model

Based on research hypotheses, this section constructs the research model by examining the relationships between four variables: leadership style, Innovative self-efficacy, innovation support, and innovation performance.

3.2.1 Research model

The leadership style adopted within an organization plays a pivotal role in facilitating its ability to foster innovation and dynamic adaptability. By examining several prevalent leadership styles commonly observed in the high-tech service industry or medical information industry, such as empowering leadership style, transactional leadership, directive leadership, and shared leadership, researchers can effectively analyze the mechanisms through which leadership style influences innovation performance within enterprises, ultimately encouraging employees to achieve higher levels of innovation performance.

The generation of innovative ideas and behaviors among employees is often influenced by various factors, including organizational context and self-psychological cognition. One crucial cognitive factor that affects individuals' confidence in innovation is innovative self-efficacy. This factor significantly impacts employee innovation performance. Innovative self-efficacy enhances individuals' confidence and self-assurance in engaging in innovative tasks, thereby motivating them to explore new ideas and approaches. This heightened confidence and motivation, in turn, promote superior performance in innovative tasks. Furthermore, innovative self-efficacy elevates individuals' personal standards and expectations, leading them to prioritize the quality and effectiveness of innovative endeavors. This heightened standard and requirement further enhance performance in innovative tasks. Additionally, innovative self-efficacy enhances an individual's capacity for innovative thinking and problem-solving, equipping them with the necessary skills to overcome challenges and obstacles encountered during innovative tasks. This enhanced innovative thinking and problem-solving ability, consequently, facilitates superior performance in

innovative tasks.

Effective support for innovation directly influences employees' subjective experiences. Leaders who adopt impactful innovation support measures demonstrate respect for employees' creativity, leading to a positive work environment. Employees possessing a certain level of innovative self-efficacy tend to find enjoyment in their work, enabling them to generate innovative ideas and achieve higher levels of innovation performance.

Based on the aforementioned literature review and analysis, this thesis suggests that leadership styles within small and medium-sized medical information technology enterprises exert a certain influence on innovation performance. Specifically, the thesis examines the impact of empowering leadership style, transactional leadership style, shared leadership style, and directive leadership style. Furthermore, it explores the mediating role of innovative self-efficacy between leadership style and innovation performance. Additionally, it posits that innovation support provided by organizational leaders may moderate the relationship between employee self-efficacy and innovation performance.

Consequently, this thesis proposes a theoretical conceptual model illustrating the impact of leadership style on innovation performance within small and medium-sized medical informatization enterprises, as depicted in Figure 3.1.

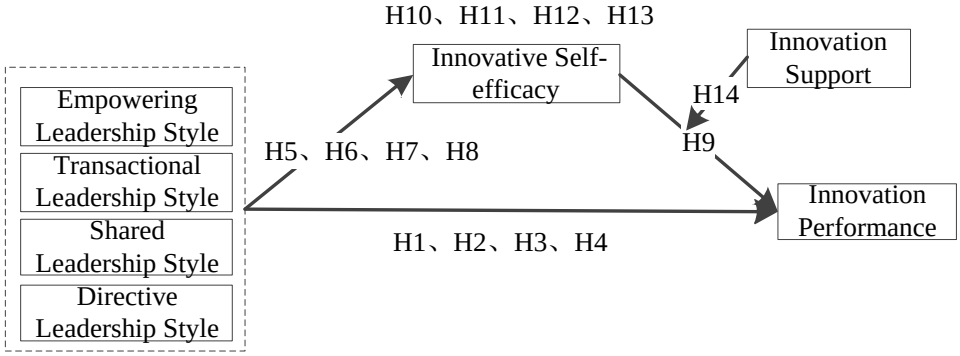

Figure 3.1 Research model

3.2.2 The concept of variables in the model

(1) Empowering leadership style

The concept of empowering leadership style evolved from the concept of self-management proposed by Man et al. in 1980. In recent years, research on delegated leadership has attracted widespread attention from scholars, and its connotation has gradually enriched and deepened. Through sorting out, it was found that scholars in early research either understood the connotation of empowering leadership from the perspective of situational empowerment or psychological empowerment. From the perspective of situational

authorization, attention is paid to the behavior of leadership authorization, emphasizing the process of leadership granting power to subordinates (Alotaibi et al., 2020). It is believed that empowering leadership refers to a series of behaviors in which leaders delegate power downwards, such as forming autonomous work groups, whose purpose is to manage and improve the work performance of subordinates through empowerment, authorization, and other means. For example, some scholars believe that empowering leadership is a leadership style that focuses on delegating authority (Cheong et al., 2019).

Unlike the situational empowerment perspective that focuses on leadership empowerment behavior, the psychological empowerment perspective focuses more on the psychological experience of employees. Under this perspective, leaders aim to improve subordinates' perception of power, enhance employees' internal motivation level and inner feelings, and ultimately improve performance. If some scholars define empowering leadership as improving performance by improving employee self-efficacy (Lin et al., 2020).

With the continuous advancement and deepening of research, more and more scholars have realized that understanding its connotation solely from the perspective of situational authorization or psychological authorization is not rigorous enough. Therefore, in recent years, scholars have integrated these two research perspectives and explored them from an “integrated perspective”: not only focusing on leadership authorization behavior, but also on employees' psychological experiences with being authorized. If some scholars believe that empowering leaders empowers subordinates by granting them certain powers to give them higher work autonomy or enhance their sense of mission, that is, “authorization”; simultaneously enhancing their intrinsic work motivation through authorization (Srivastava et al., 2022).

By comparison, it can be seen that the definition from the perspective of integration is more comprehensive. Currently, the concept of empowering leadership proposed by Srivastava has been widely accepted by scholars. This thesis also adopts Srivastava's perspective to define empowering leadership as a leadership style that enhances subordinates' internal psychological perception level by empowering them, thereby affecting their participation in decision-making, goal achievement, and other organizational activities.

(2) Transactional leadership style

Khanin (2007) pointed out that, transactional leadership was first formally proposed by Burns in his book 'Leadership'. He understood transactional leadership as a trading approach in which leaders reward employees for their contributions (to the organization) in order to stimulate employee morale and serve the achievement of common goals, thereby creating a

win-win situation. Alrowwad et al. (2020) has supplemented and improved this theory on the basis of previous studies, pointing out that in order to fully mobilize employees' work enthusiasm and help them find their work direction, it is necessary for leaders to scientifically plan the work content of their subordinates and reasonably position their roles. When studying transactional leadership, Nurlina (2022) pointed out that it is a kind of leadership based on Barter, and it is a way for superiors and subordinates to follow the prior contract and pay corresponding labor to achieve their goals. Young et al. (2021) pointed out that in order to ensure the smooth achievement of organizational goals, transactional leaders will introduce a series of reward and punishment systems. Aboramadan and Kundi (2020) pointed out that transactional leadership can be understood as a reward and punishment trading process, mainly based on two factors: one is the level of employee work effort, and the other is employee performance. Aboramadan believes that leaders not only need to clarify the roles of subordinates, but also clarify their job requirements, establish goals and find direction based on this, in order to achieve effective motivation for subordinates. Berkovich and Eyal (2021) pointed out that leaders should actively and comprehensively collect information on employee needs in order to develop targeted incentive measures and achieve effective improvement of employee performance. Firstly, clear organizational goals and clear job requirements should be set; secondly, efforts should be made to ensure that employees' material and spiritual needs are met in a dual manner. Cho et al. (2019)'s view is that the process of completing tasks can be seen as a transaction, and leaders should introduce effective reward and punishment systems in advance, combining employee performance or rewards or punishments. Wahyuni et al. (2020) defined transactional leadership as leaders who reward and punish employees based on their performance, and a contractual relationship is constructed and maintained between the leader and the employees.

In summary, this thesis posits that transactional leadership encompasses the comprehensive utilization of strategies such as precise employee role delineation, explicit job specifications, and articulation of organizational vision to motivate subordinates towards the efficient attainment of predetermined work objectives. This leadership approach, predicated on the principles of exchange of interests, is commonly referred to as transactional leadership.

(3) Shared leadership style

There is currently no unified definition of shared leadership. Liang et al. (2021) believe that shared leadership is a form of horizontal influence among team members; Sweeney et al. (2019) advocate that shared leadership is a product of the interaction between team members, and the result of this interaction is to achieve the team's goals.

Mayer et al. (2023) advocate that shared leadership is a free team leadership approach, and the team architecture and members are also flexible and full of dynamic uncertainty. Sinha et al. (2021) pointed out that shared leadership is not static, but dynamically changes according to the team's lifecycle. In short, it is led by people with different expertise at different stages of the team, ensuring that team leaders always stay in the right direction.

The widely recognized concept of shared leadership in academia was proposed by Pearce and Conger (2002), who believe that shared leadership refers to the shift of leadership power among members with specialized expertise as the team's lifecycle changes, rather than being concentrated on a single individual. In short, team members share leadership and responsibility.

The concept of shared leadership encompasses two prominent characteristics. Firstly, it emphasizes a high degree of professionalism, whereby individuals with specialized expertise are assigned tasks within their respective fields of expertise. Each team member is primarily responsible for their own area of specialization. Secondly, shared leadership emphasizes a strong sense of openness, wherein team leadership is not fixed to specific individuals, but rather dynamically shifts as work progresses and in response to changes in the external environment. In other words, all team members participate in and share the leadership role. These two characteristics ensure that teams adopting a shared leadership style can effectively accomplish predetermined tasks and fully harness their collective work enthusiasm.

(4) Directive leadership style

Directive leadership "refers to a leader telling subordinates what to do, how to do it, when, and where to complete tasks through commands, instructions, and other means. Compared to the relationship between members outside the circle and leaders, the relationship between members within the circle and leaders is weaker, more inclined towards hard indicators that require completing tasks, and lacks room for maneuver (Lonati, 2020). This situation is also a manifestation of the theory of "leader member exchange".

(5) Innovative self-efficacy

Self-efficacy is a concept related to social cognitive theory, proposed by American psychologist Bandura in 1978. He defined self-efficacy as an individual's belief in the ability to complete a specific behavior, which is an expectation of their own abilities, and this perception can affect the 'individual's' goals and level of effort (Bandura, 1978).

The concept of innovative self-efficacy combines self-efficacy with Bandura's self-efficacy and Amabile's creativity in the field of innovation. And the definition of innovative self-efficacy is an individual's belief in whether they can perform creatively and

achieve creative results in their work. This belief is not only limited to innovative results, but exists in the overall innovation process (Park et al., 2021).

Given the distinctiveness of the innovation domain, the concept of innovative self-efficacy diverges from the general notion of self-efficacy as it specifically pertains to an individual's overall confidence in their ability to innovate within the field. This thesis contends that innovative self-efficacy serves as an intrinsic motivational factor, validating an individual's confidence and competence in engaging in innovative endeavors. From a psychological perspective, innovative self-efficacy underscores one's belief in their personal capacity to innovate and achieve innovative outcomes.

(6) Innovation support

Research on innovation support is mostly applied to Western backgrounds. There has been a considerable amount of research abroad on the perception of organizational innovation support, innovation support from superiors and colleagues, and the relationship between employee innovation behavior (Sönmez et al., 2019). However, there is a lack of empirical research in China, especially in the context of medical information enterprises. Lipych et al. (2018) research shows that when employees perceive organizational support for innovation, they have stronger motivation and initiative to engage in creative activities, actively seek feedback, and exhibit more creative behavior in their work. When employees face difficulties or obstacles in proposing new ideas, colleagues and superiors can help them by sharing their professional knowledge to improve their creative level (Liu et al., 2019). St-Jean and Audet (2012) found through empirical research on entrepreneurial mentor guidance institutions that entrepreneurial mentor guidance, advice, and role models can effectively promote cognitive and emotional learning for entrepreneurs, enhance their entrepreneurial knowledge and skills, opportunity recognition ability, and innovation performance. Innovation incentive policies can systematically promote innovation activities, guide employees to pay attention to and participate in innovation (Wang et al., 2022).

This thesis posits that innovation support pertains to the subjective cognition and experiential perceptions of individuals towards the innovation ecosystem and diverse interventions that bolster innovation behavior.

(7) Innovation performance

Innovation performance refers to the economic benefits that an enterprise or employee brings to the enterprise by adopting new technologies or methods to improve its existing workflow or solve difficulties encountered in work. Employee innovation performance refers to the ability of employees to come up with good ideas or adopt new knowledge or

technology in their work, solve problems encountered in their work, and improve the performance of the enterprise or organization. The development of innovation performance theory has a history of more than 30 years, and its concept was first proposed by foreign scholar Amabile (1983). He believed that the behavior of employees solving problems encountered in their work through the use of new technologies or methods is innovation performance. Janssen and Van Yperen (2004) define innovation performance as the result of purposeful generation, promotion, and implementation of novel ideas that benefit role performance, group, or organization within a work role, group, or organization. Baer (2012) has improved the concept of innovation performance on the basis of previous studies and supplemented the concept of proficiency, which refers to the level of employee proficiency in innovative behavior. Hameed et al. (2021) pointed out that employee innovation performance is not only about innovative ideas that employees have about their work, but also the act of implementing such ideas and ensuring that such behavior can bring value to the organization. Broadstock et al. (2020) believes that employee innovation performance is not a single behavior of employees, but runs through the entire work life cycle of employees. At different stages of the life cycle, employees adopt different innovative behaviors to help the enterprise create value, which is a continuously changing dynamic process.

This thesis adheres to Janssen and Yperen's conceptualization of employee innovation performance, which encompasses the deliberate generation, promotion, and realization of innovative ideas that enhance role performance, team dynamics, and organizational outcomes within the context of the work role, group, or organization.

Chapter 4: Research Design

4.1 Determination of scales

(1) Scale of Empowering Leadership Style

The measurement of the empowering leadership style was conducted utilizing the empowering leadership style scale developed by Ahern et al. (2005). This scale has been extensively utilized and endorsed by a plethora of Chinese academic research studies. As an illustration, the scale's high reliability and validity within Chinese contexts were confirmed by Chinese scholar Wang (2018), demonstrating its applicability in China. As shown in Table 4.1.

Table 4.1 Scale of empowering leadership style

Dimension	Question items
Empowering Leadership Style	My leader will help me understand the correlation between personal goals and company goals
	My leader will help me understand the importance of my work to the overall performance of the company
	My leader will help me establish a global perspective on my work
	My leader often makes decisions with me
	My leader will ask for my opinions on some decisions that may have an impact on me
	My leader believes that I can handle difficult tasks
	Even if I make mistakes, my leaders still believe that I can make progress and improve
	My leader encourages me to do things in a way that I am familiar with and good at
	My leader will try to simplify the rules and regulations as much as possible, so that I can carry out my work efficiently
	My leader agrees that I can make important decisions quickly to solve problems

Source: Ahearne (2005)

(2) Scale of Transactional Leadership Style

The measurement of the transactional leadership style primarily employs the scale formulated by Podsakoff et al. (1990), which encompasses 8 items. As shown in Table 4.2.

Table 4.2 Scale of transactional leadership style

Dimension	Question items
Transactional Leadership Style	When I perform well, the leader will publicly praise or reward me
	The leader will make it clear to me that there will be rewards and benefits for any performance
	If my work performance is not good, the leader will express his dissatisfaction and make corrections
	Leaders will often inquire about my handling of affairs to prevent errors from occurring
	When the leader punishes me, he will let me know where the mistake is
	As long as I can achieve my goals, the leader will be willing to promise something

	As long as everything is okay, leaders will try their best not to change the status quo
	Whether my performance is good or bad, the leader will praise me the same

Source: Podsakoff et al., (1990)

(3) Scale of Shared Leadership Style

The measurement of the shared leadership style mainly refers to the shared leadership scale developed by Liu (2009) in the context of Chinese culture, which encompasses of 18 items. As shown in Table 4.3.

Table 4.3 Scale of shared leadership style

Dimension	Question items
Shared Leadership Style	Our company often improves its intelligence through collective discussions
	Our company's employees are good at actively learning new knowledge and skills
	Our company's employees often train their respective expertise
	Our company's employees view the work process as a learning process
	Our company's employees learn to identify opportunities in problems
	Our company's employees view their leaders as colleagues
	Our company's employees and leaders can share leadership power
	Our company's employees and leaders share leadership responsibilities
	Our company's employees have a platform to showcase their leadership skills within the company
	In different situations, the leadership functions of our company are performed by different employees
	Our company's employees hope that each employee strictly demands their work according to performance standards
	Our company's employees hope that each employee emphasizes efficiency and quality in their work
	Our company's employees hope that each employee can continuously find new ways to improve work performance
	Our company's employees have a sense of cooperation and a spirit of cooperation
	Our company's employees are good at collaborating with others in their work
	Our company's employees trust each other and cooperate harmoniously
	Our company's employees have both clear division of labor and mutual cooperation
	Our company's employees actively eliminate conflicts with each other to facilitate company collaboration

Source: Liu (2009)

(4) Scale of Directive Leadership Style

The measurement of directive leadership style was conducted using a scale developed by Zheng et al. (2000) and Zhang (2001), which encompasses 12 items. The five point scoring method was used for scoring. As shown in Table 4.4.

Table 4.4 Scale of directive leadership style

Dimension	Question items
Directive Leadership Style	In the company, daily matters are decided solely by the leader
	During meetings, the final decision is made according to the leader's wishes
	A capable subordinate in the eyes of a leader must obey his words
	When working with a leader, he puts a lot of pressure on me
	Leaders adopt strict management methods and means
	When the task cannot be achieved, I may be scolded by the leader
	Leaders emphasize that employees' work performance must surpass that of other departments/units

	The leader has set strict goals to achieve During the work process, the leader follows up on the work of each link in detail The leader has put forward strict orders and requirements for the work When communicating with me, the leader is meticulous and puts pressure on me Leaders require completing tasks according to prescribed principles and cannot tolerate deviations

Source: Zheng et al., (2000) and Zhang (2011)

(5) Scale of Innovative Self-efficacy

The innovative self-efficacy was measured using a unidimensional scale developed by Carmeli and Schaubroeck (2007), which encompasses 8 items. As shown in Table 4.5.

Table 4.5 Scale of innovative self-efficacy

No.	Question items
1	I am able to achieve most of the goals I have set through innovative work methods
2	Faced with difficult tasks, I am quite certain that I can creatively complete them
3	Overall, I believe that I can achieve important results through innovative methods
4	Most of the time, I am able to innovate ideas and turn them into reality
5	I am able to creatively tackle multiple challenges
6	I am confident in creatively completing various tasks
7	Compared to others, I am highly innovative
8	Even if things are difficult, I can still creatively do them well

Source: Carmeli and Schaubroeck (2007)

(6) Scale of Innovation Support

The measurement of organizational innovation support was conducted using a four-item scale developed by Zhou and George (2001). As shown in Table 4.6.

Table 4.6 Scale of innovation support

No.	Question items
1	The company encourages innovation
2	The leadership respects our ability to innovate our work
3	The company's reward system encourages innovation
4	The company publicly recognizes employees who innovate

Source: Zhou and George (2001)

(7) Scale of Innovation Performance

The innovation performance scale suitable for the Chinese context was developed by Chinese scholar Han (2007), building upon Janssen et al.'s research on innovation performance. This thesis incorporates Han's findings, which measure innovation performance in a unidimensional fashion and utilize a five-point scoring system. As shown in Table 4.7.

Table 4.7 Scale of innovation performance

No.	Question items
1	In my work, I provide new ideas to improve the existing situation
2	I will actively support innovative ideas
3	I will search for new work methods, skills, or tools through learning
4	I can systematically introduce innovative ideas in my work
5	I can make important organizational members of the enterprise focus on innovative thinking
6	I have received praise from superiors for my innovative ideas
7	I have transformed innovative ideas into practical applications
8	I have proposed some innovative problem-solving solutions through my studies

Source: Han (2007)

4.2 Questionnaire design

In pursuit of the research objectives, this study employs empowering leadership scales validated by numerous global researchers. These designed scales enjoy a relatively high level of recognition. Leadership style serves as the independent variable, innovative self-efficacy as the mediating variable, innovation support as the moderating variable, and innovation performance as the dependent variable. Data collection was conducted via electronic questionnaires and the questionnaire survey method.

The survey instrument devised for this investigation primarily consists of two sections:

(1) Questionnaire introduction: This portion delineates the content and objective of the survey while reassuring respondents about their anonymity, ensuring that there is no requirement for real name registration or concerns regarding privacy issues. This approach aims to alleviate any apprehensions and garner the most authentic data possible.

(2) Part 1 of the questionnaire: Demographic information, including gender, age, and educational background.

(3) Part 2 of the questionnaire: The substantive survey section. Measures include leadership style, innovative self-efficacy, innovation support, and innovation performance, employing the Likert five-point scoring system. For the measurement of leadership style, scores from 1-5 denote 'very inconsistent,' 'somewhat inconsistent,' 'average,' 'somewhat consistent,' and 'very consistent,' respectively. For the measurements of innovative self-efficacy, innovation support, and innovation performance, scores from 1-5 signify 'strongly disagree,' 'somewhat disagree,' 'neutral,' 'somewhat agree,' and 'strongly agree,' respectively.

4.3 Research object

This study was disseminated to employees of small and medium-sized medical information enterprises via the Questionnaire Star platform. In 2021, the Ministry of Industry and Information Technology led the revision of the "Provisions on the Criteria for Classification of Small and Medium-sized Enterprises." This document defines the standards for small and medium-sized enterprises. In the software and information technology services industry, businesses with fewer than 300 employees or less than 100 million yuan in revenue are

considered small and micro enterprises. Specifically, those with 100 or more employees and 10 million yuan or more in revenue are classified as medium-sized enterprises; those with 10 or more employees and 1 million yuan or more in revenue are classified as small enterprises. Therefore, in this thesis, small and medium-sized healthcare informatization enterprises refer to those with more than 10 but fewer than 300 employees, or with revenues exceeding 500,000 yuan but less than 100 million yuan.

The focus of this research is to examine the impact of leadership style, innovative self-efficacy, and innovation support on the innovation performance of employees in small and medium-sized medical information enterprises. To gather data, an electronic questionnaire survey was conducted.

Why were electronic questionnaires selected as the data collection method? They offer several substantial benefits. Primarily, they can be conveniently and swiftly distributed to a vast number of respondents, who may then complete them at their convenience. Additionally, electronic questionnaires can automate data collection and organization, significantly reducing the time spent on manual data processing. Furthermore, compared to traditional thesis questionnaires, electronic versions are more eco-friendly.

Next, random sampling was employed for this survey. As a widely-used and effective data collection method, random sampling ensures that every potential respondent has an equal chance of selection, enhancing the representativeness and reliability of the research findings. Moreover, random sampling can minimize bias and errors, contributing to more scientifically sound results.

Questionnaires were distributed to employees of small and medium-sized medical information enterprises through the Wenjuanxing (Questionnaire Star) platform. This online tool facilitates the easy creation, publication, and management of surveys while effectively collecting and analyzing data.

The questionnaire predominantly comprises assessments of leadership style, innovative self-efficacy, innovation support, and innovation performance. In its design phase, reference was made to relevant theories and studies to ensure each item's scientific validity. The study also aimed to ensure clarity, conciseness, and comprehensibility of questions to improve response quality.

In summary, a wealth of data on leadership style, innovative self-efficacy, innovation support, and innovation performance was obtained through random sampling surveys in the form of electronic questionnaires. These data lay a robust foundation for subsequent analysis, enabling this study to explore the relationships between these variables more deeply and

accurately. This approach not only bolsters the reliability and validity of this research but also enhances the practicality and applicability of its findings.

4.4 Questionnaire pre-survey

Pre-survey serves as an essential prerequisite and foundation for formal research activities, playing an indispensable role in ensuring the effectiveness and accuracy of the entire research process. Through preliminary investigations, researchers can gain a more profound understanding of the research topic, delineate research objectives, and identify potential issues and challenges in practical operations, thus enabling timely modifications and optimizations to the research design.

4.4.1 Distribution method of survey questionnaire

This thesis aims to investigate the impact of leadership style, innovative self-efficacy, and innovation support within small and medium-sized medical information enterprises on employee innovation performance. To gather reliable data, we devised a comprehensive questionnaire and executed a pre-survey prior to the large-scale distribution and data collection.

The pre-survey is pivotal as it aids in validating and optimizing the questionnaire design, enhancing its effectiveness. By administering questionnaires to a small target audience, we can garner their feedback, test our hypotheses, and make any necessary modifications to the questionnaire.

During the pre-survey phase, questionnaires were distributed to employees of small and medium-sized medical information enterprises, yielding a total of 236 responses. However, not all questionnaires met our criteria. After meticulous screening, we discarded questionnaires with short response times or patterned answers, resulting in a pool of 53 responses. The remaining 183 questionnaires were deemed valid, producing a valid questionnaire response rate of 77.54%.

Subsequently, we conducted a statistical analysis of these data. We verified whether the dimensions of each variable in the survey questionnaire aligned with the predetermined dimensions, and whether certain items required modification or removal. After repeated trials and revisions, we finally obtained a survey questionnaire that meets our requirements and demonstrates high reliability.

During the formal survey, electronic questionnaires were not distributed to companies

that had participated in the preliminary survey. This approach was taken to ensure the representativeness and reliability of the sample, thereby making the research results more credible.

Through pre-survey, not only did we verify and optimize the questionnaire design, but we also laid the groundwork for formal research. Our goal is to procure broader and more authentic feedback in the formal research phase, necessitating the exclusion of employees who have already seen the questionnaire.

Overall, pre-survey is indispensable. It allows us to collect high-quality data, thereby enhancing the accuracy and effectiveness of our study. Through pre-survey, we can deepen our understanding of the research subject, and also validate and optimize the methodologies used in our study. Therefore, pre-survey is a vital research tool with extensive applications in both academic research and practical endeavors.

After feedback and revisions from the pre-survey, we have developed the final questionnaire and are preparing for large-scale data collection. We believe that through this approach, we will be able to gather ample data to substantiate our hypotheses and derive reliable conclusions.

Following the statistical analysis of demographic variables in the returned sample data, the results are displayed in Table 4.8.

Table 4.8 Statistical table of frequency of demographic variables in pre-survey (n=183)

Category	Classification	Frequency	Proportion
Gender	Male	132	72.13%
	Female	51	27.87%
Age	Under 30 years old	64	34.97%
	31-40 years old	78	42.62%
	41-50 years old	34	18.58%
	50 years old and above	7	3.83%
Education	Junior college or below	38	20.77%
	Undergraduate course	131	71.58%
	Graduate student	12	6.56%
	Doctor	2	1.09%

Table 4.8 provides the distribution of gender, age, and educational background of the survey samples.

In terms of gender, males accounted for the majority of the sample, with a frequency of 132, accounting for 72.13%. In contrast, there are only 51 women, accounting for 27.87%.

In terms of age distribution, the largest group is between 31 and 40 years old, with a frequency of 78, accounting for 42.62%. Next is the population under 30 years old, with a frequency of 64, accounting for 34.97%. The frequency of the population aged 41 to 50 is 34, accounting for 18.58%, while the population aged 50 and above is the least, with only 7

people, accounting for 3.83%.

At the educational level, the number of people with a bachelor's degree is the highest, with a frequency of 131, accounting for as high as 71.58%. The number of people with a diploma or below is 38, accounting for 20.77%. The number of people with a graduate degree is relatively small, only 12 people, accounting for 6.56%. The number of people with a doctoral degree is the lowest, only 2 people, accounting for 1.09%.

Overall, the sample of this survey is mainly male, aged between 31 and 40, and has a bachelor's degree.

4.4.2 Reliability and validity analysis

(1) Reliability analysis

In this thesis, the Cronbach's α coefficient, a measure of internal consistency, was utilized to analyze the reliability of the questionnaire. Reliability analysis represents a vital component of measurement, as it verifies the internal consistency and reliability of questionnaire measurement results. Ensuring the reliability of measurement tools is of paramount importance in any scientific research due to its direct implications on the accuracy and credibility of the findings.

The Cronbach's α coefficient is a widely adopted statistical metric for evaluating the internal consistency of measurement instruments, such as questionnaires. This coefficient typically ranges between 0 and 1; the closer it approaches 1, the greater the consistency among different parts (or items) of the measurement tool. This implies higher reliability in the measurement outcomes. Generally, if the Cronbach's α coefficient surpasses 0.6, the reliability of the measuring tool is deemed acceptable. However, only when the Cronbach's α coefficient exceeds 0.8 can the measurement tool be considered to possess high internal consistency. Conversely, if the Cronbach's α coefficient falls below 0.5, it necessitates improvement in the measurement tool to enhance its reliability.

Thus, the Cronbach's α coefficient serves as a significant benchmark for assessing the reliability level of questionnaire survey outcomes. By calculating this coefficient, one can evaluate whether all items in the questionnaire measure the same concept or trait and whether they exhibit a high degree of consistency. If the results are satisfactory, it signifies that the questionnaire is an effective and reliable measurement instrument capable of collecting accurate and reliable data. Otherwise, a revision of the questionnaire becomes necessary to improve its design and boost its reliability.

Overall, Cronbach's α coefficients represent a highly valuable tool that can aid researchers

in ensuring that their measurement tools are reliable and efficacious. Utilizing this coefficient, this study can guarantee a high degree of internal consistency and reliability in the collected data, thereby enhancing the accuracy and credibility of the research findings.

The reliability analysis of the pre-survey (refer to Annex B Table b.1) reveals that the reliability coefficients for the dimensions of empowering leadership, transactional leadership, shared leadership, and directive leadership within the leadership style scale are 0.964, 0.898, 0.974, and 0.941, respectively. As all values exceed 0.8, they indicate a high degree of achievement. This suggests that the scale possesses strong internal consistency, meaning there is a high correlation among the measured items, effectively reflecting employees' perceptions of leadership style.

In the scales of innovative self-efficacy, innovation support, and innovation performance, the reliability coefficients of each variable are 0.965, 0.952, and 0.957, respectively. With all values above 0.9, this signifies an extremely high level of consistency. This implies that in the measurements of these three scales, each scale demonstrated good internal consistency.

The aforementioned analysis results indicate that the four scales exhibit high reliability both in their respective dimensions and overall, suggesting that these scales can serve as effective tools for measuring employees' attitudes towards leadership style, innovative self-efficacy, innovation support, and innovation performance.

(2) Validity analysis

The assessment of questionnaire validity pertains to the meticulous investigation and analysis of a questionnaire's validity. This evaluation process primarily encompasses two facets: structural validity and content validity. Structural validity, originally emerging from psychological counseling procedures in the United States, focuses on scrutinizing key test data. Furthermore, by analyzing the distinctive features of these tests along with their corresponding theoretical foundations, effective data can be observed to identify factors influencing survey results. Content validity, conversely, seeks to gauge the consistency between the object of the survey and its content. During the survey phase, this study collates and organizes pertinent classical questionnaire instances, integrating them with personal perspectives to design questionnaire content optimally suited for the survey purpose. This ensures the reliability of the questionnaire's validity and substantiates the validity of the questionnaire content.

KMO (Kaiser-Meyer-Olkin) measure and Bartlett's test are employed to examine the interrelationship among variables. Broadly speaking, a higher KMO value implies a stronger correlation among variables. For instance, a KMO value exceeding 0.8 suggests that the

variables are closely related, warranting a factor analysis. Conversely, a KMO value below 0.5 signifies an inadequate correlation among variables for a factor analysis. The KMO values between 0.5 and 0.8 denote that the accuracy of validity testing diminishes as KMO decreases.

① Leadership Style

Initially, in the KMO and Bartlett tests for leadership style (refer to Annex B Table b.2), the KMO value for leadership style achieved 0.970, substantially surpassing 0.6. This indicates high commonality across various measurement items of leadership style, making it highly conducive for factor analysis.

Secondly, Bartlett's test of sphericity is predominantly utilized to verify if all variables are entirely uncorrelated, i.e., whether the covariance matrix is an identity matrix. If the significance level (Sig.) is less than 0.05, the null hypothesis can be refuted, asserting that the covariance matrix isn't an identity matrix, and hence, the data is apt for factor analysis. In this study, Bartlett's sphericity test yielded an approximate chi-square value of 27821.588 for leadership style, with degrees of freedom (Df) equating to 1128 and a significance level of 0.000, markedly below 0.05. This signifies a sufficient correlation among various measurement items of leadership style, thereby rendering it suitable for factor analysis.

From the elucidation of total variance of leadership style (refer to Annex B Table b.3), it is evident that all 48 questions can be segmented into four principal components. The explanation rate of all questions by these four principal components amounts to 71.340%, exceeding 60%, indicating a high explanatory rate.The load coefficients of all factors surpass 0.6 (refer to Annex B Table b.4), and the principal components allocated to all factors align with the questionnaire design.

② Innovative Self-Efficacy

Initially, the Kaiser-Meyer-Olkin (KMO) and Bartlett tests of innovative self-efficacy were conducted (refer to Annex B Table b.5). The KMO value for innovative self-efficacy achieved a score of 0.945, significantly surpassing the threshold of 0.6. This suggests a high degree of commonality among the various measures of innovative self-efficacy, rendering it highly suitable for factor analysis.

Subsequently, Bartlett's sphericity test was employed, primarily to verify whether all variables are completely uncorrelated - that is, whether the covariance matrix is an identity matrix. If the significance level (Sig.) is below 0.05, the null hypothesis can be refuted, implying that the covariance matrix is not the identity matrix and that the data is fit for factor

analysis. In this study, Bartlett's sphericity test yielded an approximate chi-square value of 4726.115 for innovative self-efficacy, with degrees of freedom (Df) standing at 28 and a significance level of 0.000, considerably below the threshold of 0.05. This implies adequate correlation among the various measures of innovative self-efficacy, indicating its suitability for factor analysis.

An examination of the total variance explanation for innovative self-efficacy (see Annex B Table b.6) revealed that all eight questions could be categorized into one principal component. Moreover, the explanatory rate of one principal component for all questions was found to be 80.360%, exceeding the threshold of 60% and indicating a high explanatory rate. An assessment of the innovative self-efficacy factor load (refer to Annex B Table b.7) showed that the factor load coefficients and principal component classification categories align well with the original questionnaire design.

③ Innovation Support

Initially, the KMO and Bartlett tests were conducted for innovation support (refer to Annex B Table b.8). The KMO value for innovation support achieved a score of 0.830, significantly exceeding the threshold of 0.6. This indicates a high degree of commonality among the various measures of innovation support, rendering it highly suitable for factor analysis.

Subsequently, Bartlett's sphericity test was employed, primarily to verify whether all variables are completely uncorrelated - that is, whether the covariance matrix is an identity matrix. If the significance level (Sig.) is below 0.05, the null hypothesis can be refuted, implying that the covariance matrix is not the identity matrix and that the data is fit for factor analysis. In this study, Bartlett's sphericity test yielded an approximate chi-square value of 2249.723 for innovation support, with degrees of freedom (Df) standing at 6 and a significance level of 0.000, considerably below the threshold of 0.05. This implies adequate correlation among the various measures of innovation support, indicating its suitability for factor analysis.

An examination of the total variance explanation for innovation support (refer to Annex B Table b.9) revealed that all four questions could be categorized into one principal component. Moreover, the explanatory rate of one principal component for all questions was found to be 87.622%, exceeding the threshold of 60% and indicating a satisfactory explanatory rate. An assessment of the innovation support factor load (refer to Annex B Table b.10) showed that the factor load coefficients and principal component classification categories align well with the original questionnaire design.

④ Assessment of Innovation Performance

Initially, in the evaluation of innovation performance using Kaiser-Meyer-Olkin (KMO) and Bartlett's test (refer to Annex B Table b.11), the KMO value for innovation performance reached 0.926, significantly exceeding the threshold of 0.6. This indicates a substantial commonality among diverse measurement items related to innovation performance, thereby making it highly suitable for factor analysis.

Subsequently, Bartlett's sphericity test primarily serves to ascertain whether all variables are completely uncorrelated; in other words, if the covariance matrix represents an identity matrix. If the significance level (Sig.) is less than 0.05, the null hypothesis can be rejected, confirming that the covariance matrix is not the identity matrix, and thus, the data is suitable for factor analysis. In this particular study, the approximate chi-square value of Bartlett's sphericity test for innovation performance was recorded as 4406.991, with degrees of freedom (Df) equal to 28, and a significance level of 0.000, which is substantially less than 0.05. This suggests that there exists a considerable correlation among the various measurement items of innovation performance, hence affirming its suitability for factor analysis.

According to the interpretation of the total variance of innovation performance (refer to Annex B Table b.12), it can be inferred that all eight questions can be classified into one principal component, and the explanation rate of this single principal component for all questions is 76.964%, which surpasses the 60% threshold, indicating that the explanation rate is acceptable. The innovation performance factor load statistics (refer to Annex B Table b.13) shows that the factor load coefficients and principal component classification categories of all questions are basically consistent with the original questionnaire design.

4.5 Distribution and collection of formal questionnaires

The scope of this study encompasses a survey conducted amongst employees of small to medium-sized medical information enterprises between November and December 2023. This specific timeframe was chosen to gain a more precise understanding of the actual circumstances of enterprise employees during the year-end review period, as well as to accumulate sufficient valid data within a certain time frame.

In order to facilitate this investigation, the study adopted a convenience sampling methodology, targeting employees from small to medium-sized medical information enterprises as the primary survey respondents. Questionnaires were disseminated via the "Questionnaire Star" platform to gather pertinent data. Throughout the investigation, the

research strictly adhered to the standards and procedures of scientific research, ensuring the objectivity and authenticity of the data collected.

During the process of validating the data from the formal questionnaire, electronic questionnaires were not distributed to companies that had participated in the pre-survey. The main purpose of this approach was to prevent respondents who had participated in the pre-survey from making biased selections due to familiarity with the questionnaire when answering it again, which could lead to potential biases and thus affect the results of the formal survey. This measure was taken to ensure the quality and accuracy of the data.

In total, 741 questionnaires were collected during this survey. However, to maintain data accuracy and validity, 223 questionnaires that were incomplete, showed entirely consistent responses, or exhibited regular patterns in answers were eliminated. Consequently, the count of valid questionnaires culminated at 518. This implies that the response rate for the effective questionnaires reached 70.04%, indicating a commendable overall response status. This data underscores the rigor and professionalism maintained during the survey process, and reaffirms the strict approach adopted by this study in data collection and processing.

For the valid questionnaires collected, this study utilized SPSS 21.0 for data analysis. Through a systematic examination of the data, the actual circumstances of employees in small to medium-sized medical information enterprises were elucidated, providing substantial support for subsequent investigations.

In summary, the questionnaire survey implemented in this study pertains to employees of small to medium-sized medical information enterprises from November to December 2023. Questionnaires were distributed and data collected through a convenience sampling methodology. In processing the data, this study rigorously excluded questionnaires that failed to meet the set criteria, thereby ensuring both the quantity and quality of valid questionnaires. Ultimately, a comprehensive data analysis was performed on the effective questionnaires using SPSS 21.0.

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Chapter 5: Empirical Analysis

5.1 Descriptive statistical analysis

By collecting and summarizing demographic variables from the collected data, the statistical results are shown in Table 5.1:

Table 5.1 Statistical table of frequency of demographic variables in formal survey(n=518)

Category	Classification	Frequency	Proportion
Gender	Male	375	72.39%
	Female	143	27.61%
Age	Under 30 years old	180	34.75%
	31-40 years old	222	42.86%
	41-50 years old	96	18.53%
	50 years old and above	20	3.86%
Education	Junior college or below	108	20.85%
	Undergraduate course	372	71.81%
	Graduate student	35	6.76%
	Doctor	3	0.58%

Table 5.1 presents the distribution of gender, age, and educational background among the survey respondents.

In terms of gender, male employees significantly outnumber their female counterparts, with a total of 375 males, constituting 72.39% of the sample. Female employees number 143, making up 27.61% of the population. This suggests a preponderance of male employees within the small to medium-sized medical information industry, indicative of potential gender imbalance in this sector.

With regard to age distribution, there are 180 employees aged below 30, accounting for 34.75%, suggesting that the industry attracts a considerable number of young talents. The majority of employees fall within the 31 to 40 age bracket, numbering 222 and representing 42.86% of the sample. This underscores that mid-level management and technical experts predominantly belong to this age group. There is a marked decline in the number of employees aged 41 to 50, with only 96 individuals, constituting 18.53%, implying a gradual decrease in employee numbers with advancing age. Employees aged over 50 are few, with just 20 individuals, amounting to 3.86%, which reflects the industry's demand for newer talent and turnover rates prompted by high work intensity.

Concerning education levels, there are 108 employees possessing a college degree or lower, comprising 20.85% of the sample, occupying positions such as technical support and

administration. The largest segment comprises individuals holding bachelor's degrees, totalling 372 and accounting for 71.81%, indicating that a bachelor's degree is the mainstream educational qualification in the industry. There are relatively fewer employees with postgraduate and doctoral degrees, numbering 35 and 3 respectively, representing 6.76% and 0.58% of the population. Although scarce, these highly educated individuals play pivotal roles in areas like research and development and senior management.

In summary, the data elucidate certain characteristics of small to medium-sized medical information enterprises: Firstly, a notable gender imbalance exists, with male employees significantly outnumbering females. Secondly, employees are primarily clustered within the 30 to 40 age bracket, indicating an industry trend favouring younger individuals. Thirdly, in terms of educational qualifications, those holding a bachelor's degree predominate, while individuals with higher education (postgraduate or above) are relatively scarce, suggesting that the industry values professional skills and practical experience over theoretical research.

5.2 Reliability analysis

This thesis adopts Cronbach's α the consistency coefficient is used to analyze reliability, and reliability analysis in measurement refers to checking whether the questionnaire measurement results have internal consistency and reliability. In general, Cronbach α A coefficient above 0.7 is acceptable. From Table 5.2, it can be seen that the reliability coefficients of each factor variable are all greater than 0.7, indicating good reliability of the scale.

Table 5.2 Reliability analysis of formal survey

Scale	Dimension	Number of questions	Cronbach's Alpha
Leadership style (LS)	Empowering Leadership Style (ELS)	10	0.931
	Transactional Leadership Style (TLS)	8	0.875
	Shared Leadership Style (SLS)	18	0.916
	Directive Leadership Style (DLS)	12	0.922
Innovative self-efficacy (ISE)	-	8	0.943
Innovation support (IS)	-	4	0.918
Innovation performance (IP)	-	8	0.905

A comprehensive reliability analysis of the survey was conducted on small and medium-sized medical information enterprises, as illustrated in Table 5.2. This table meticulously delineates the dimensions, number of questions, and Cronbach's alpha values for each scale.

The Leadership Style (LS) scale is bifurcated into four dimensions: Empowered Leadership Style (ELS), Transactional Leadership Style (TLS), Shared Leadership Style (SLS), and Directive Leadership Style (DLS). These four leadership styles exert significant influence on enterprise operations and development. Specifically, the ELS dimension, which pertains to empowered leadership, comprises 10 items, yielding a Cronbach's alpha value of 0.931, indicating exceptional internal consistency. Following this, the TLS dimension associated with transactional leadership encompasses eight items, with a Cronbach's alpha value of 0.875, demonstrating high reliability. The SLS dimension of shared leadership includes 18 items, with a Cronbach's alpha value of 0.916, reflecting strong stability and reliability. Lastly, the DLS dimension related to commanding leadership consists of 12 items, resulting in a Cronbach's alpha value of 0.922, thereby demonstrating excellent reliability.

The Innovative self-efficacy (ISE) scale contains eight items, and its Cronbach's alpha value stands at 0.943, indicative of an exceptionally high level of internal consistency within this dimension, thereby affirming its reliability for this study.

Despite the Innovation Support (IS) scale only comprising four items, it exhibits a Cronbach's alpha value of 0.918, thereby illustrating the internal consistency and stability of this dimension.

The Innovation Performance (IP) scale encompasses eight items, producing a Cronbach's alpha value of 0.905, further attesting to the robustness of this dimension in terms of reliability testing.

All the aforementioned scales yielded Cronbach's alpha values exceeding 0.8, clearly denoting excellent performance in terms of internal consistency and stability. Consequently, it can be affirmed that this study successfully obtained precise and reliable data through thorough and detailed measurements across various dimensions, thereby laying a robust foundation for further research on small and medium-sized medical information enterprises.

5.3 Confirmatory factor analysis

Table 5.3 offers a confirmatory factor analysis of the research model tailored for small and medium-sized medical information enterprises. This analysis proficiently assesses the suitability of the theoretical construction model by appraising a series of fit indices.

According to the fit indices presented in Table 5.3, it can be observed that the chi-square degree of freedom for this study's model is 2.627, less than 3, thereby meeting the accepted standard. Concurrently, the values of RMR, RMSEA, AGFI, NFI, TLI, and CFI all fall within

the prescribed range, while the GFI value is 0.887, slightly less than 0.90. According to Hu and Bentler (1999), a GFI marginally below 0.9 is still deemed acceptable.

Table 5.3 Model goodness of fit index

Fit indices	CMIN/DF	RMSEA	RMR	AGFI	GFI	TLI	NFI	CFI
Fit criteria	＜3	＜0.08	＜0.05	＞0.90	＞0.90	＞0.90	＞0.90	＞0.90
result	2.627	0.065	0.034	0.912	0.887	0.921	0.923	0.925

From the aforementioned data, it is evident that the various fit indices of the model examined in this thesis have reached an acceptable range. This suggests that the theoretical construction model exhibits satisfactory adaptability, and the overall model fit is commendable, obviating the need for further corrections.

(1) Convergent validity analysis

In terms of the convergent validity of the scale, factor loading and average variance extracted (AVE) serve as two reliable indicators for testing the convergent validity. The analysis outcomes are delineated in Table 5.4- Table 5.7.

Table 5.4 Aggregation validity of leadership style

Dimension	Question items	Factor load	AVE	C.R.
Empowering Leadership Style (ELS)	ELS 1	0.813	0.567	0.929
	ELS 2	0.678		
	ELS 3	0.758		
	ELS 4	0.679		
	ELS 5	0.757		
	ELS 6	0.809		
	ELS 7	0.727		
	ELS 8	0.834		
	ELS 9	0.693		
	ELS 10	0.759		
Transactional Leadership Style (TLS)	TLS 1	0.853	0.605	0.924
	TLS 2	0.672		
	TLS 3	0.844		
	TLS 4	0.771		
	TLS 5	0.722		
	TLS 6	0.860		
	TLS 7	0.797		
	TLS 8	0.679		
Shared Leadership Style (SLS)	TLS 1	0.686	0.620	0.967
	TLS 2	0.772		
	TLS 3	0.824		
	TLS 4	0.858		
	TLS 5	0.757		
	TLS 6	0.719		
	TLS 7	0.848		
	TLS 8	0.783		
	TLS 9	0.850		
	TLS 10	0.815		
	TLS 11	0.709		
	TLS 12	0.771		
	TLS 13	0.762		

Directive Leadership Style (DLS)	TLS 14	0.776	0.566	0.940
	TLS 15	0.769		
	TLS 16	0.688		
	TLS 17	0.935		
	TLS 18	0.802		
	DLS 1	0.754		
	DLS 2	0.728		
	DLS 3	0.709		
	DLS 4	0.713		
	DLS 5	0.749		
	DLS 6	0.718		
	DLS 7	0.806		
	DLS 8	0.687		
	DLS 9	0.816		
	DLS 10	0.846		
	DLS 11	0.790		
	DLS 12	0.691		

The convergent validity of leadership style, as indicated in Table 5.4, demonstrates a strong correlation between each item and dimension. The AVE values all surpass the standard threshold of 0.5 (Fornell & Larcker, 1981), suggesting that the measurement outcomes of each dimension possess commendable content validity. Additionally, the Composite Reliability (CR) values all exceed the benchmark of 0.7 (Hair, 1997), indicating a high level of internal consistency.

Table 5.5 Aggregation validity of innovative self-efficacy

Dimension	Question items	Factor load	AVE	C.R.
Innovative self-efficacy (ISE)	ISE 1	0.821	0.589	0.919
	ISE 2	0.759		
	ISE 3	0.722		
	ISE 4	0.684		
	ISE 5	0.747		
	ISE 6	0.698		
	ISE 7	0.872		
	ISE 8	0.816		

The convergent validity of innovative self-efficacy, as illustrated in Table 5.5, reveals that all eight items exhibit a strong correlation with each respective dimension. The AVE values uniformly surpass the standard threshold of 0.5, indicating that the measurement outcomes for each dimension demonstrate satisfactory content validity. Moreover, the Composite Reliability (CR) values exceed the benchmark of 0.7, signifying a high degree of internal consistency.

The convergent validity of innovation support, as represented in Table 5.6, indicates that all four items are strongly correlated with each respective dimension. The AVE values consistently surpass the standard threshold of 0.5, suggesting that the measurement outcomes of each dimension exhibit satisfactory content validity. Furthermore, the Composite Reliability (CR) values exceed the benchmark of 0.7, denoting a high degree of internal

consistency.

Table 5.6 Aggregation validity of innovation support

Dimension	Question items	Factor load	AVE	C.R.
Innovation support (IS)	IS 1	0.828	0.606	0.860
	IS 2	0.736		
	IS 3	0.765		
	IS 4	0.781		

The convergent validity of innovation performance, as delineated in Table 5.7, demonstrates that all ten items bear a strong correlation with each respective dimension. The AVE values consistently exceed the standard threshold of 0.5, suggesting that the measurement outcomes of each dimension exhibit satisfactory content validity. Additionally, the Composite Reliability (CR) values surpass the benchmark of 0.7, indicating a high degree of internal consistency.

Table 5.7 Aggregation validity of innovation performance

Dimension	Question items	Factor load	AVE	C.R.
Innovation performance(IP)	IP 1	0.782	0.606	0.932
	IP 2	0.752		
	IP 3	0.863		
	IP 4	0.803		
	IP 5	0.753		
	IP 6	0.802		
	IP 7	0.714		
	IP 9	0.725		

(2) Discriminant validity analysis

Regarding the discriminant validity of each variable, the square root of the AVE and the value of each variable's correlation coefficient are employed for assessment. If a variable's AVE value surpasses its correlation coefficient, it can be inferred that there is good discriminant validity between the variables, as depicted in Table 5.8.

Table 5.8 Discriminant validity

Dimension/Variable	ELS	TLS	SLS	DLS	ISE	IS	IP
ELS	1						
TLS	.428**	1					
SLS	.315**	.415**	1				
DLS	.445**	.332**	.331**	1			
ISE	.318**	.219**	.328**	.363**	1		
IS	.322**	.297**	.218**	.336**	.275**	1	
IP	.278**	.219**	.324**	.224**	.325**	.211**	1

Note: **. Significant correlation at 0.01 level (bilateral)

Table 5.8 reveals a significant positive correlation across all dimensions. The correlation coefficient between empowering leadership style (ELS) and all other dimensions is positively significant at the 0.01 level. Likewise, dimensions such as transactional leadership style (TLS), shared leadership style (SLS), and directive leadership style (DLS) exhibit significant positive correlations with all other dimensions.

Furthermore, dimensions related to innovative self-efficacy (ISE), innovation support (IS), and innovation performance (IP)-also display a significant positive correlation with all other dimensions. This suggests that within small to medium-sized medical information enterprises, leadership style positively influences employee innovative self-efficacy, innovation support, and innovation performance.

Overall, there exists a significantly positive correlation between leadership style and innovation-related dimensions in small to medium-sized medical information enterprises. These findings not only bolster the validity of the theoretical construct but also provide valuable insights for enhancing leadership style and augmenting employee innovation capacity in practice.

Discriminant validity in this study was ascertained by calculating the square root of AVE for each variable and their respective correlation coefficients. The results indicated that the AVE values for all variables were higher than the correlation coefficients of each variable, demonstrating good discriminant validity among the variables. This outcome further verifies the efficacy and precision of the model utilized in this study, laying a solid foundation for subsequent research.

5.4 Regressive analysis

(1)The Relationship between Leadership Style and Innovation Performance

A multiple regression analysis was conducted to examine the relationship between leadership style (empowering leadership style, transactional leadership style, shared leadership style, and directive leadership style) and innovation performance, as delineated in Table 5.9. Innovation performance was utilized as the dependent variable, while leadership style (empowering leadership style, transactional leadership style, shared leadership style, and directive leadership style) served as the independent variable in the regression analysis.

Table 5.9 Regression analysis of leadership style and innovation performance

Model	Non standardized		Standard	t	Sig.	Adj. R^2	F
	B	Std. Error	Beta				
(Constant)	0.532	0.284		6.463	.000		
Empowering Leadership Style	0.285	0.058	0.274	4.572	.000		
Transactional Leadership Style	0.317	0.804	0.238	5.164	.000	.553	153.572**
Shared Leadership Style	0.361	0.033	0.555	2.432	.000		
Directive Leadership Style	-0.302	0.071	-0.316	-4.351	.000		

Note: *** is significantly correlated at the. 001 level (bilateral)

As per the data presented in Table 5.9:

In this regression model test, F=153.572 and P<0.01, signifying a high level of significance. The regression analysis proved significant with standard regression coefficients of 0.274, 0.238, and 0.555 for empowering leadership style, transactional leadership style, and shared leadership style respectively. These values suggest a significant positive impact of empowering leadership style, transactional leadership style, and shared leadership style on innovation performance. However, the standard regression coefficient between directive leadership style and innovation performance is -0.316, indicating a significant negative impact of Directive Leadership style on innovation performance. Based on the aforementioned analysis, it can be posited that hypotheses H1, H2, H3, and H4 are substantiated.

(2) The relationship between leadership style and innovative self-efficacy

A multiple regression analysis was undertaken to explore the relationship between leadership style (empowering leadership style, transactional leadership style, shared leadership style, and directive leadership style) and innovative self-efficacy, as illustrated in Table 5.10. Innovative self-efficacy was employed as the dependent variable, while leadership style (empowering leadership style, transactional leadership style, shared leadership style, and Directive Leadership style) functioned as the independent variable in the regression analysis.

Table 5.10 Regression analysis of leadership style and innovative self-efficacy

Model	Non standardized		Standard	t	Sig.	Adj. R^2	F
	B	Std. Error	Beta				
(Constant)	0.347	0.054		6.534	.000		
Empowering Leadership Style	0.254	0.042	0.521	3.142	.000		
Transactional Leadership Style	0.419	0.058	0.414	2.963	.000	.472	176.129**
Shared Leadership Style	0.293	0.029	0.366	4.192	.000		
Directive Leadership Style	-0.347	0.054	-0.418	-6.534	.000		

Note: *** is significantly correlated at the. 001 level (bilateral)

According to the data delineated in Table 5.10:

In this regression model test, F=176.129 and P<0.01, denoting a high level of significance. The regression analysis was noteworthy, with standard regression coefficients between empowering leadership style, transactional leadership style, shared leadership style, and innovative self-efficacy registering at 0.521, 0.414, and 0.366 respectively. This indicates a significant positive influence of empowering leadership style, transactional leadership style, and shared leadership style on innovative self-efficacy. Conversely, the standard regression coefficient between Directive Leadership style and innovative self-efficacy is -0.418, suggesting a substantial negative impact of Directive Leadership style on innovative

self-efficacy. Based on the aforementioned analysis, hypotheses H5, H6, H7, and H8 are posited as valid.

(3) The relationship between innovative self-efficacy and innovation performance

A multiple regression analysis was carried out to examine the relationship between innovative self-efficacy and innovation performance, as depicted in Table 5.11. In this model, innovation performance served as the dependent variable, while innovative self-efficacy functioned as the independent variable.

Table 5.11 Regression analysis of innovative self-efficacy and innovation performance

Model	Non standardized		Standard	t	Sig.	Adj. R^2	F
	B	Std. Error	Beta				
(Constant)	0.122	0.035		4.664	.000	.419	113.039**
Innovative Self-efficacy	0.436	0.034	0.462	2.918	.014		

Note: *** is significantly correlated at the. 001 level (bilateral)

As per the data outlined in Table 5.11:

In this regression model test, F=113.039 and P<0.01, signifying a high level of significance. The regression analysis was noteworthy, with a standard regression coefficient of 0.462 between innovative self-efficacy and innovation performance. This indicates a substantial positive influence of innovative self-efficacy on innovation performance. Based on the aforementioned analysis, hypothesis H9 can be posited as substantiated.

(4) The mediating role of innovative self-efficacy between leadership style and innovation performance

In order to assess the mediating role, Baron et al. (1986) proposed that four conditions must be satisfied: Firstly, the relationship between the independent and dependent variables should be confirmed as significant; secondly, the correlation between the independent variable and the mediating variable should be verified as substantial; thirdly, the connection between the mediating variable and the dependent variable needs to be affirmed as significant; finally, prior to analyzing the impact of the independent variable on the mediating variable, the mediating variables should be incorporated into the analysis of the relationship between the independent and dependent variables. There are two forms of mediating roles. The first is a partial mediating role, where the influence of the independent variable on the dependent variable diminishes but remains significant after accounting for the mediating variable. Conversely, a complete mediating role occurs when the influence of the independent variable on the dependent variable becomes insignificant after controlling for the mediating variable.

In the preceding chapter's research, it was corroborated that there exists a significant

positive correlation between leadership style and innovation performance. In formulating the hypothesis, it was proposed that innovative self-efficacy serves as a mediating factor between inclusive leadership and innovation performance. Thus, to validate this hypothesis, it is imperative to incorporate innovative self-efficacy as a variable into the regression equation encompassing empowering leadership style, transactional leadership style, shared leadership style, directive leadership style, and innovation performance. The results of this regression analysis are illustrated in Tables 5.12 through 5.15:

Table 5.12 Regression analysis of the mediating role of innovative self-efficacy (Empowering leadership style as independent variable)

Variable	Innovation performance		
	Model 1	Model 2	Model 3
Gender	0.034	-0.026	-0.025
Age	0.013	0.014	-0.009
Education	-0.058	-0.051	0.012
Empowering leadership style		0.716***	0.703***
Innovative self-efficacy			0.436***
R^2	0.027	0.805	0.758
Adjusted R^2	0.024	0.717	0.674
F	0.485	446.035***	417.146***

Note: *** is significantly correlated at the. 001 level (bilateral)

Table 5.13 Regression analysis of the mediating role of innovative self-efficacy (Transactional leadership style as independent variable)

Variable	Innovation performance		
	Model 1	Model 2	Model 3
Gender	-0.039	-0.023	0.023
Age	0.014	-0.012	0.006
Education	-0.058	0.052	-0.021
Transactional leadership style		0.624***	0.612***
Innovative self-efficacy			0.463***
R^2	0.031	0.768	0.805
Adjusted R^2	0.027	0.694	0.684
F	0.417	446.763***	426.674***

Note: *** is significantly correlated at the. 001 level (bilateral)

Table 5.14 Regression analysis of the mediating role of innovative self-efficacy (Shared leadership style as independent variable)

Variable	Innovation performance		
	Model 1	Model 2	Model 3
Gender	-0.035	0.028	-0.036
Age	-0.023	-0.010	0.013
Education	0.053	0.034	-0.025
Shared leadership style		0.641***	0.637***
Innovative self-efficacy			0.512***
R^2	0.017	0.769	0.806
Adjusted R^2	0.019	0.703	0.675
F	0.428	446.773***	417.464***

Note: *** is significantly correlated at the. 001 level (bilateral)

Table 5.15 Regression analysis of the mediating role of innovative self-efficacy (Directive leadership style as independent variable)

Variable	Innovation performance		
	Model 1	Model 2	Model 3
Gender	-0.038	0.031	-0.014
Age	0.012	-0.012	0.010
Education	0.059	-0.049	-0.012
Directive leadership style		-0.795***	-0.764***
Innovative self-efficacy			-0.563***
R^2	0.027	0.769	0.804
Adjusted R^2	0.018	0.631	0.679
F	0.466	439.664***	457.451***

Note: *** is significantly correlated at the. 001 level (bilateral)

The analysis results reveal that upon the inclusion of innovative self-efficacy, the regression coefficients between empowering leadership style, transactional leadership style, shared leadership style, Directive Leadership style, and innovation performance all somewhat decrease. This implies that the introduction of innovative self-efficacy significantly attenuates the correlation between these variables. The respective β values are 0.703, 0.612, 0.637, and 0.764, each being significant at the 0.001 level, though these coefficients are smaller than those in the preceding step. The regression coefficient between innovative self-efficacy and innovation performance yields β values of 0.436, 0.463, 0.512, and 0.563 respectively. These remain significant, indicating that innovative self-efficacy acts as a partial mediator between leadership style and innovation performance. Consequently, it can be posited that hypotheses H10, H11, H12, and H13 are valid.

(5) The moderating role of innovation support on the relationship between innovative self-efficacy and innovation performance

Wen Zhonglin et al. (2005) posit that when the independent variable, dependent variable, and moderating variable are all continuous variables, the moderating role can be examined through a regression model with a product term for hierarchical regression analysis: (1) Conducting regression analysis of the dependent variable Y on the independent variables X and M yields a coefficient of determination $R1^2$; (2) Performing regression analysis of the dependent variable Y in relation to the independent variables X, M, and the product term XM results in $R2^2$. If the value of $R2^2$ is significantly larger than $R1^2$, then the moderating role is deemed significant. In this study, the moderating role of innovation support on innovation performance was scrutinized using hierarchical regression, with innovative self-efficacy serving as the independent variable.

In conducting an analysis of the moderating role, it is generally required to carry out a central transformation between the independent variable and the moderating variable.

Furthermore, if the independent variable is a non-continuous variable, each variable should initially be transformed to create a dummy variable. Given that demographic variables such as gender, age, and education are categorical variables and not continuous, this study adopted the forced entry method to incorporate them into the regression model. The group exhibiting the most significant variance in each demographic category was utilized as the reference group, and virtual transformations were conducted sequentially. After undergoing centralization and virtualization processes, the independent and moderating variables are incrementally inputted into the equation. Ultimately, the moderating role of innovation support on innovative self-efficacy and innovation performance is examined via the interaction effect terms of the independent and moderating variables.

Table 5.16 The moderating role of innovation support on innovative self-efficacy and innovation performance

	Innovation performance			
Predictive variables	Model1	Model2	Model3	Model4
Gender	0.242	0.153	0.522	0.064
Age	0.032*	0.017*	0.043*	0.022*
Education	0.005**	0.025*	0.026*	0.031*
Innovative self-efficacy		0.273***	0.142***	0.134***
Innovation support			0.845***	0.873***
Innovative self-efficacy * Innovation support				0.103*
R^2	0.008	0.106	0.274	0.285
Adjusted R^2	0.009	0.079	0.265	0.261
F	0.482	21.043	74.026	76.114
△F		20.561	52.983	2.088
△R^2		0.098	0.168	0.011

Note: * represents p<0.05, ** represents p<0.01, *** p<0.001

Table 5.16 reveals that the moderating role of innovation support was tested with innovation performance as the dependent variable. In the first model, gender, age, and education were incorporated as control variables using the forced entry method (Enter). The test results, as shown in the table, indicate that gender, age, and education all positively influence innovation performance. The R^2 value for this model is 0.008, signifying that gender, age, and education can account for 0.8% of the variance in innovation performance. Building upon the baseline model, Model 2 incorporated innovative self-efficacy as an independent variable, yielding an F-value of 21.043 for the regression equation, which is significant. The R^2 value for Model 2 stands at 0.106. Compared to the baseline Model 1, R^2 increased by 0.098, suggesting that innovative self-efficacy accounts for a 9.8% variation in innovation performance. Model 3 introduces innovation support variables to Model 2. The results reveal that after the addition of innovation support, its impact on innovation performance becomes significant (β=-0.845, p=0.000), thereby elevating the significance level of the model.

Expanding on Model 3, Model 4 introduces an interaction variable between innovative self-efficacy and innovation support to the independent variables. Model 4 shows a substantial improvement over Model 3 (△F=2.088), yielding an F-value of 76.114 in the regression equation and an increase of 0.011 in R^2. This suggests that innovation support moderates the relationship between innovative self-efficacy and innovation performance, supporting hypothesis H14.

Based on the aforementioned analysis, the research hypotheses are summarized in Table 5.17:

Table 5.17 Research hypothesis verification results

Hypothesis	Hypothesis Content	result
H1:	Empowering leadership style has significant positive effect on innovation performance of employees in small and medium-sized medical informatization enterprises	Support
H2:	Transactional leadership style has significant positive effect on innovation performance of employees in small and medium-sized medical informatization enterprises	Support
H3:	Shared leadership style has significant positive effect on innovation performance of employees in small and medium-sized medical informatization enterprises	Support
H4:	Directive leadership style has significant negative effect on innovation performance of employees in small and medium-sized medical informatization enterprises	Support
H5:	Empowering leadership style has significant positive effect on innovative self-efficacy of employees in small and medium-sized medical informatization enterprises	Support
H6:	Transactional leadership style has significant positive effect on innovative self-efficacy of employees in small and medium-sized medical informatization enterprises	Support
H7:	Shared leadership style has significant positive effect on innovative self-efficacy of employees in small and medium-sized medical informatization enterprises	Support
H8:	Directive leadership style has significant negative effect on innovative self-efficacy of employees in small and medium-sized medical informatization enterprises	Support
H9:	Innovative self-efficacy has significant positive effect on innovation performance of employees in small and medium-sized medical informatization enterprises	Support
H10:	Innovative self-efficacy mediates the relationship between empowering leadership style and employees' innovation performance	Partly Verified
H11:	Innovative self-efficacy mediates the relationship between transactional leadership style and employees' innovation performance	Partly Verified
H12:	Innovative self-efficacy mediates the relationship between shared leadership style and employees' innovation performance	Partly Verified
H13:	Innovative self-efficacy mediates the relationship between directive leadership style and employees' innovation performance	Partly Verified
H14:	Innovation support can positively moderate the relationship between innovative self-efficacy and employees' innovation performance	Support

Table 5.17 provides a detailed presentation of the hypothesis verification results

pertaining to various studies conducted on small and medium-sized medical information enterprises within this thesis.

Firstly, hypotheses H1 to H4 individually examine the influence of diverse leadership styles on the innovation performance of employees in small and medium-sized medical information enterprises. Authorization, transactional, and shared leadership styles have been empirically demonstrated to positively affect innovation performance, while Directive Leadership styles exert a negative impact. These outcomes underscore the critical role of leadership style in shaping enterprise innovation performance.

Secondly, hypotheses H5 to H8 scrutinize the effect of assorted leadership styles on employee innovative self-efficacy. The research findings reveal that empowering, transactional, and shared leadership styles positively influence innovative self-efficacy, while directive leadership styles have a negative impact. These insights further corroborate the pivotal role of leadership style in fostering employee innovative self-efficacy.

Moreover, hypothesis H9 affirms that innovative self-efficacy positively impacts employee innovation performance, thereby indicating its significant role in boosting corporate innovation performance.

Hypotheses H10 to H13 explore the mediating role of innovative self-efficacy between different leadership styles and employee innovation performance. The results suggest that this mediating role is partially evident across all leadership styles and innovation performance, underscoring the central role of innovative self-efficacy in the process whereby leadership style influences innovation performance.

Lastly, hypothesis H14 asserts that innovation support exerts a positive moderating role on the relationship between innovative self-efficacy and employee innovation performance. This implies that innovation support can effectively amplify the impact of innovative self-efficacy on innovation performance.

The validation results for all research hypotheses offer valuable theoretical and practical insights for small and medium-sized medical information enterprises, thereby facilitating a deeper understanding and enhancement of their operations and development.

Chapter 6: Discussion of Results

6.1 Leadership style and innovation performance

Based on the data analysis results in the previous section, this section discusses the relationship between empowering leadership style, transactional leadership style, shared leadership style, and directive leadership style and innovation performance.

6.1.1 Empowering leadership style and innovation performance

In today's intensely competitive business landscape, innovation performance has emerged as a crucial determinant for enterprises to secure a competitive edge. The empowering leadership style, known for its considerable influence on enhancing innovation performance, is garnering increasing attention. This style accentuates the importance of empowering employees and inspiring them to assume a more substantial role in decision-making processes, thereby stimulating their innovative capacities.

Within small and medium-sized medical information enterprises, the call for innovation is especially pronounced due to their distinct industry backdrop and market milieu (Cheng et al., 2023). Nonetheless, how to effectively stimulate and harness the innovative potential of employees remains a significant challenge for such enterprises. In this context, an empowering leadership style offers an effective resolution.

This study elucidates that an empowering leadership style exerts a significant positive influence on the innovation performance of small and medium-sized medical information enterprises, aligning with the research findings of Ren et al. (2018). When leaders bestow greater autonomy, support, and trust upon employees, their innovative behaviors are substantially enhanced. This can primarily be attributed to the fact that an empowering leadership style invigorates employees' intrinsic motivation and bolsters their sense of participation and belonging.

More specifically, the empowering leadership style endows employees with decision-making power, affording them more autonomy in their work. This can not only heighten job satisfaction but also incite them to proactively seek novel solutions, thus boosting innovation efficiency. Concurrently, the support and trust emanating from leaders

can also amplify employees' self-efficacy, rendering them more inclined to embrace challenges and further enhance innovation performance.

Hence, for business leaders, it is vital to consider implementing more empowerment initiatives to furnish employees with an open and unrestricted working environment. This involves both reshaping the organizational structure to render it flatter, reducing unnecessary managerial levels, and vesting as much decision-making power in employees as possible in daily management, thereby encouraging them to propose and implement innovative ideas.

However, it is worth noting that an empowering leadership style may not be universally applicable. In certain instances, excessive empowerment can lead to issues such as blurred responsibility and diminished execution. Therefore, the ability to strike a balance between empowerment and control, and to adeptly apply different leadership styles based on specific situations, are also important considerations that business leaders need to ponder and learn from.

The Empowering Leadership style plays a significant role in augmenting the innovation performance of small and medium-sized medical information enterprises. A judicious application of this leadership style can stimulate employees' innovative capabilities and bolster the competitiveness of the enterprise.

6.1.2 Transactional leadership style and innovation performance

The beneficial influence of a transactional leadership style on innovation performance indicates that leaders, through the establishment of explicit objectives and reward mechanisms, can efficaciously inspire employees to strive for innovative outcomes. These findings are congruous with the research conducted by Miao (2019). A transactional leadership style underscores the attainment of objectives and equitable distribution of rewards and punishments, thereby stimulating employees to explore innovative solutions while securing task completion. Nonetheless, it is noteworthy that an overreliance on transactional leadership may curtail employees' creative thinking. Thus, finding an optimal equilibrium between motivation and the freedom for innovation is imperative.

The transactional leadership style, as a leadership style driven by goals and rewards and punishments, has received much attention for its impact on innovation performance. In this leadership model, the relationship between leaders and employees is mainly based on achieving goals and corresponding rewards or punishments. This style can enable employees to have a clear understanding of their task requirements and the rewards they will receive from completing these tasks, effectively motivating them to pursue innovative results.

Firstly, transactional leadership style allows employees to clearly understand what results they need to achieve by setting clear goals. This clarity is conducive to concentrating the attention and energy of employees, and better carrying out innovative activities. Meanwhile, by establishing a fair reward mechanism, employees can be further motivated to actively seek and implement innovative solutions in order to obtain greater rewards.

Secondly, transactional leadership style emphasizes the fairness of rewards and punishments. When employees see that their efforts and efforts can receive fair rewards, their satisfaction and motivation will significantly increase. At the same time, this can also stimulate their competitiveness and encourage them to seek better solutions while ensuring task completion, thereby improving innovation performance.

However, transactional leadership style is not without limitations. Overreliance on this leadership style can limit employees' creative thinking. Due to its emphasis on results and rewards and punishments, it can lead employees to overly focus on established goals and overlook the search for and exploration of new possibilities in practice. This will hinder the emergence of innovation, as innovation often requires exploration and experimentation in an open and free environment.

Therefore, when using transactional leadership style, business leaders need to find an appropriate balance between motivation and innovation freedom. On the one hand, they need to set clear goals and establish a fair reward and punishment mechanism to motivate employees to actively pursue innovative results. On the other hand, they also need to give employees a certain degree of freedom, encourage them to be creative in practice, and seek and try new solutions.

Transactional leadership style has a significant positive impact on innovation performance. However, business leaders need to flexibly apply this leadership style, effectively motivating employees to pursue innovative results while also encouraging them to engage in creative exploration. Through this approach, enterprises can achieve an improvement in innovation performance and gain an advantage in competition.

6.1.3 Shared leadership style and innovation performance

The corroboration of the shared leadership style demonstrates that this approach positively influences employee innovation performance by fostering team collaboration and knowledge dissemination. These findings align with the research conducted by Wang and Wan (2020). Within a shared leadership framework, employees are more predisposed to collaborate, share creative ideas and resources, thereby providing a fertile ground for innovation. Consequently,

small and medium-sized medical information enterprises should nurture a team culture that encourages interaction and cooperation between leaders and employees to facilitate innovation.

In today's knowledge economy era, improving innovation performance is seen as the key to sustained development and maintaining competitiveness of enterprises. More and more research is paying attention to the impact of leadership style on innovation performance, among which shared leadership style has been widely recognized. This leadership style can effectively promote innovative behavior among employees by encouraging teamwork and knowledge sharing.

Firstly, it is essential to comprehend the concept of a shared leadership style. Shared leadership underscores the dispersion and decentralization of authority, moving away from the traditional “command-and-control” approach, and instead promotes team member participation in decision-making processes, information and knowledge sharing, thereby facilitating optimal resource allocation. In this leadership paradigm, the role of leaders transitions from dictating and regulating to guiding and motivating. Their focus intensifies on cultivating an open, inclusive, and innovative environment for the team.

The research results of this thesis indicate that in small and medium-sized medical information enterprises, shared leadership style has a positive impact on employee innovation performance. Specifically, this leadership style can encourage collaboration among employees, making them more willing to share creativity and resources. This collective wisdom gathering provides a rich soil for innovation.

The shared leadership style can first enhance the overall innovation ability of the team. By encouraging employees to participate in decision-making, they can not only come up with constructive ideas from their respective professional perspectives, but also learn from each other within the team, broaden their knowledge horizons, and stimulate innovative thinking. In addition, sharing knowledge and information can help team members gain a more comprehensive understanding of problems, identify new opportunities and challenges, and propose more effective solutions.

Secondly, a shared leadership style can enhance employees' innovation motivation. When employees feel that their opinions are valued and their work is valuable to the team, their satisfaction and motivation will significantly increase. This work environment can stimulate employees' intrinsic motivation and make them more willing to engage in innovative activities.

However, implementing a shared leadership style is not an easy task. This requires

companies to build a culture that supports innovation and collaboration, cultivate employee teamwork and collaboration skills. Leaders need to have good communication and coordination skills in order to effectively guide team members to share knowledge and promote cooperation. In addition, leaders also need to establish an open and fair image to win the trust of employees and make them more willing to share their ideas and information.

The shared leadership style has a positive impact on employee innovation performance by encouraging teamwork and knowledge sharing. Therefore, small and medium-sized medical information enterprises should strive to cultivate this leadership style, build a culture that supports innovation and cooperation, and thereby improve overall innovation performance. However, implementing this leadership style requires leaders to have good communication and coordination skills, and establish a fair and open image. Only in this way can we truly stimulate the innovation potential of the team and promote the sustainable development of the enterprise.

6.1.4 Directive leadership style and innovation performance

The detrimental effects of a directive leadership style on innovation performance highlight the potential risks associated with this particular approach. Within this framework, excessive control and instruction stifle employees' innovative spirit and motivation, thereby constraining their liberty to explore novel ideas. Su et al. (2021) also underscored that the repercussions of a directive leadership style are relatively intricate and generally impose a negative influence on innovation performance. Consequently, leaders of small and medium-sized medical information enterprises should circumvent an excessive reliance on a directive leadership model, and instead strive to cultivate a more open and inclusive environment for innovation through guidance and support.

In the study of leadership style and innovation performance, Directive Leadership style is often seen as a way to have a negative impact on innovation performance. This leadership style is mainly manifested in strict control and guidance of employees by leaders, who make decisions and require employees to follow, usually giving them less freedom. Although in some cases, this leadership style can lead to certain efficiency improvements, it can also inhibit employees' innovative spirit and motivation, limiting their freedom to explore new ideas.

Firstly, directive leadership style can hinder the occurrence of innovation. Excessive control and instructions put employees in a passive state of acceptance, rather than a state of active participation and thinking. In this situation, employees will rely more on the guidance

of their leaders and lack the motivation for self exploration and learning. In addition, strict rules and processes can also limit employees' innovation space, preventing them from fully unleashing their imagination and creativity.

Secondly, a directive leadership style can reduce employee job satisfaction and motivation. When employees feel that their ideas and opinions are being ignored, or that their work is only being done according to the leader's requirements without their initiative and creativity, they will feel frustrated and lose motivation. In this situation, even if employees have innovative ideas, they may be unwilling to implement them due to a lack of motivation and confidence.

Therefore, for leaders of small and medium-sized medical information enterprises, it is very important to avoid excessive reliance on directive leadership. On the contrary, they should adopt a more open and inclusive leadership style as much as possible, provide guidance and support, encourage employees to participate in decision-making, share ideas and knowledge, and cultivate their innovative spirit and motivation.

Leaders can create an environment conducive to innovation by respecting and appreciating the ideas and contributions of their employees, making them feel that their work is valuable. Secondly, leaders need to provide sufficient learning and development opportunities to help employees improve their skills and knowledge, thereby enhancing their innovation capabilities. Finally, leaders need to establish a culture that encourages experimentation and acceptance of failure, so that employees are not afraid to make mistakes and dare to try new methods and ideas.

Although directive leadership style can have a negative impact on innovation performance, through appropriate leadership styles and management strategies, enterprises can effectively stimulate employees' innovative spirit and motivation, and improve overall innovation performance. This requires leaders to have an open and inclusive mindset, as well as good communication and coordination skills. Only in this way can we truly promote the innovation and development of enterprises.

6.2 Leadership style and innovative self-efficacy

Based on the data analysis results in the previous section, this section discusses the relationship between empowering leadership style, transactional leadership style, shared leadership style, and directive leadership style and innovative self performance.

6.2.1 Empowering leadership style and innovative self-efficacy

The validation outcomes reveal that an empowering leadership style markedly augments the innovative self-efficacy of employees within small and medium-sized medical information enterprises. This enhancement occurs as leaders provide employees with increased autonomy, trust, and support, leading to employees feeling more respected and valued. Such positive feelings bolster their confidence in task completion and problem-solving abilities. Consequently, an empowering leadership style not only fosters employee motivation and engagement but also catalyzes their innate innovation potential (Bai and Wang, 2020).

Firstly, from a theoretical perspective, an empowering leadership style involves leaders granting employees more autonomy, trust, and support. This leadership style encourages employees to participate in the decision-making process, encourages them to express opinions and suggestions, and drives the improvement and development of the company. At the same time, the empowering leadership style also emphasizes attention to the personal growth and development of employees, providing them with necessary resources and opportunities to help them improve their skills and achieve career goals.

Secondly, from an empirical research perspective, this thesis has collected a large amount of data and evidence to analyze and compare the relationship between empowering leadership style and employee innovative self-efficacy. Research has found that when leaders adopt an empowering leadership style, employees' innovative self-efficacy is significantly improved. Specifically, employees feel more respected and valued, which gives them greater confidence in their ability to complete tasks and solve problems.

In addition, this thesis also delves into how the empowering leadership style affects employees' innovative self-efficacy. Research has found that the empowering behavior of leaders can create an open, inclusive, and positive work atmosphere, making employees willing to share knowledge, express ideas, and pursue innovation. At the same time, the support and encouragement of leaders also give employees confidence to accept challenges, try new methods, and achieve innovation.

Nevertheless, mere authorization from leaders is insufficient; an adaptive organizational environment is imperative to support employee innovation activities. In small and medium-sized medical information enterprises, employees encounter heightened pressure and challenges owing to resource and technological constraints. Consequently, establishing a culture that encourages innovation, embraces failure, and values learning becomes paramount in augmenting employee innovative self-efficacy.

The empowering leadership style has played an important role in enhancing the innovative self-efficacy of employees in small and medium-sized medical information enterprises. It not only enhances the enthusiasm and participation of employees, but also stimulates their inherent innovation potential. Therefore, this thesis suggests that small and medium-sized medical information enterprises should advocate and practice an empowering leadership style to enhance employee innovative self-efficacy, thereby promoting innovation and development of the enterprise.

6.2.2 Transactional leadership style and innovative self-efficacy

The favorable influence of a transactional leadership style on innovative self-efficacy suggests that apt goal-setting and reward-and-punishment mechanisms can effectively incentivize employees to pursue innovative outcomes. This leadership style assists employees in clarifying their objectives via a lucid feedback and reward system, thereby boosting their confidence in their own innovative capabilities. These findings are in alignment with the research of Zheng and Yu (2021), who propose that both transactional and transformational leadership styles in educational institutions can positively impact teachers' self-efficacy in innovation. However, it is worth noting that an excessive dependence on external incentives could undermine employees' intrinsic motivation, necessitating the identification of an appropriate equilibrium.

Transactional leadership primarily encompasses two facets: goal setting and reward-and-punishment mechanisms. Firstly, explicit and specific goal-setting provides employees with clear guidance regarding expected behaviors and outcomes, enabling them to understand what actions to undertake and which standards constitute success. Secondly, a sensible reward-and-punishment mechanism effectively motivates employees to attain set goals. Employees receive corresponding rewards for achieving or surpassing set goals, and this positive reinforcement enhances their drive to persist in their efforts. Conversely, failure to meet the objective results in a certain degree of punishment, and this negative feedback prompts them to identify issues and rectify errors.

Through this approach, a transactional leadership style can effectively enhance employees' innovative self-efficacy. Under a transparent feedback and reward system, employees can clearly comprehend the value of their efforts, bolstering their faith in their capacity to achieve innovative results. This self-assuredness, specifically in terms of innovative self-efficacy, acts as a significant propellant for employees to engage in innovative activities.

Nevertheless, despite the positive impact of a transactional leadership style on innovative self-efficacy, an over-reliance on external incentives can diminish employees' intrinsic motivation.When rewards become the primary catalyst for innovation, the absence or reduction of such rewards can lead to a decline in innovative behavior. Consequently, in practice, it is crucial to strike an appropriate balance: stimulating employees' intrinsic motivation while ensuring sufficient external incentives.

The transactional leadership style exerts a positive impact on innovative self-efficacy via goal-setting and reward-and-punishment mechanisms. However, pinpointing the appropriate balance to stimulate employees' intrinsic motivation is pivotal when implementing a transactional leadership style. This necessitates leaders to exhibit a high degree of sensitivity and flexibility, adjusting their leadership style in accordance with the characteristics and circumstances of different employees.

6.2.3 Shared leadership style and innovative self-efficacy

The findings of this study indicate a positive correlation between the shared leadership style and innovative self-efficacy, echoing the research conducted by Yu et al. (2021). They argue that within teams adopting a shared leadership model, members have access to vital resources, including self-efficacy and autonomy. The advantageous effects of shared leadership underscore the significance of teamwork and knowledge sharing in boosting employees' innovative self-efficacy. In such a leadership paradigm, employees are prone to harness collective intelligence for problem-solving, thereby broadening their personal perspective and enhancing their capacity to address complex issues. This ultimately fortifies their innovative self-efficacy. Encouraging open communication and cross-team collaboration is instrumental in augmenting employee innovative self-efficacy.

Shared leadership, an increasingly appreciated approach in contemporary enterprises, fosters greater employee participation and decision-making autonomy in their work. The favorable influence of such leadership styles on innovative self-efficacy underlines the pivotal role of teamwork and knowledge sharing in fostering employees' innovative consciousness.

Emphasizing the collective strength and wisdom of a team, shared leadership encourages collaborative participation in problem-solving and decision-making processes. This leadership model cultivates an open environment, where everyone is afforded the opportunity to contribute their ideas and perspectives. Such a collaborative model can significantly broaden employees' thought horizons, enabling them not only to view problems from their individual perspectives but also incorporate experiences and insights from others. Solving problems

through collective intelligence not only bolsters the ability to tackle complex problems but also heightens employees' innovative self-efficacy, engendering belief in their innovative capabilities.

Moreover, knowledge sharing characterizes shared leadership. In this style, knowledge is no longer an individual's exclusive possession but a resource necessitating team-wide distribution. Knowledge sharing fuels innovative thinking and provides opportunities for employees to acquire new skills and experiences, consequently enhancing their innovative abilities. Concurrently, it fosters open communication and cross-team collaboration, vital for stimulating innovative thought and boosting innovation efficiency.

In small to medium-sized medical information enterprises, shared leadership proves an effective strategy. In such entities, employees often confront substantial information and complex problems. Through team cooperation and knowledge sharing, these issues can be efficiently addressed, and employees' innovative self-efficacy can be enhanced.

In conclusion, the shared leadership style has a significant positive impact on fortifying employees' innovative self-efficacy. It prioritizes teamwork and knowledge sharing, thereby not only expanding employees' perspectives and bolstering their problem-solving capabilities but also strengthening their confidence in their own innovative abilities. Hence, fostering open communication and cross-team collaboration is pivotal to enhancing employee innovative self-efficacy.

6.2.4 Directive leadership style and innovative self-efficacy

The detrimental effect of a directive leadership style on innovative self-efficacy accentuates the unfavorable consequences of excessive control and diminished trust towards employees. Luo (2016) elucidated that while a directive leadership approach embodies a relatively centralized attribute, overbearing command and control can sap members' vitality. Under such a leadership paradigm, employees might perceive their opinions and innovations as overlooked, thereby diminishing their confidence in their inherent innovative capacities. Hence, minimizing the deployment of directive leadership and fostering employee innovative self-efficacy through nurturing greater trust and respect emerges as a pivotal strategy to boost organizational innovation performance.

Typically, a directive leadership style gravitates towards stringent instructions and control, consequently curtailing employees' autonomy and stifling their innovative spirit. This proves to be highly counterproductive for fostering innovation and enhancing organizational innovation performance. Additionally, hyper-control and trust deficit can also engender

negative impacts. Overregulation can cause employees to feel restricted, leaving them with inadequate room to explore and experiment with new ideas and methodologies. Trust deficiency can lead employees to question their competencies, eroding their motivation and initiative. These factors serve to undermine employees' sense of innovative self-efficacy, obstructing the organization's innovation progression.

Thus, curbing the usage of a directive leadership style surfaces as a key strategy to bolster employee innovative self-efficacy and elevate organizational innovation performance. This does not imply entirely discrediting directive leadership, but rather temperate application in situations necessitating clear instructions and strict adherence to rules. Concurrently, it is crucial to foster a trusting and respectful environment for employees, encouraging them to generate ideas and suggestions, and providing them with a certain degree of freedom to explore and innovate. Such an approach allows employees to strengthen their sense of innovative self-efficacy, invigorate their innovative spirit, and ultimately enhance the organization's innovation performance.

In summary, for small and medium-sized medical information enterprises, the appropriate leadership style is a decisive element in catalyzing innovation and augmenting innovation performance. Therefore, comprehending and selecting suitable leadership styles, particularly reducing the application of directive leadership styles, is vital for amplifying employee innovative self-efficacy and elevating organizational innovation performance.

6.3 Innovative self-efficacy and innovation performance

This study corroborates the hypothesis that innovative self-efficacy positively influences the innovation performance of employees within small and medium-sized medical information enterprises. Innovative self-efficacy pertains to an individual's confidence in their capability to undertake innovative tasks and resolve innovation-related issues. The research outcomes detailed herein suggest that when employees possess high confidence in their ability to engage in innovative activities and solve complex problems, they are more prone to exhibit elevated levels of innovative behavior, subsequently enhancing overall innovation performance. This is attributed to the fact that employees with high innovative self-efficacy are more inclined to embrace risks, experiment with novel methods, and persistently pursue innovative solutions. Huang et al. (2023) also underscored that employees exhibiting robust innovative self-efficacy typically display heightened creativity and stand out in terms of innovation performance.

The research results of this thesis indicate that when employees harbor high confidence in their ability to participate in innovative activities and tackle complex problems, they tend to manifest a higher degree of innovative behavior. This is because employees endowed with substantial innovative self-efficacy often exhibit greater willingness to undertake risks, dare to venture into new methodologies, and persist in pursuing innovative solutions. These attributes equip them with the resilience needed to overcome challenges and difficulties, eventually realizing innovation objectives.

Therefore, innovative self-efficacy plays a significant role in augmenting the innovation performance of small and medium-sized medical information enterprises. To enhance innovation performance, companies need to bolster employee innovative self-efficacy through various means, such as providing ample resources and support, training and directing employees in innovative activities, granting employees sufficient freedom and authorization, and establishing a cultural environment that encourages experimentation and embraces failure. By implementing these methods, employees can construct confidence in their innovative abilities, stimulate their innovative spirit, and thereby elevate the innovation performance of the enterprise.

6.4 The mediating role of innovative self-efficacy

The research validation results presented in this thesis demonstrate that innovative self-efficacy serves as a partial mediator across all leadership styles, whether they are empowering, transactional, shared, or directive. This implies that leadership style influences employee innovation performance not only directly, but also indirectly by affecting employee innovative self-efficacy. Leadership style can either enhance or diminish employees' confidence in executing innovative tasks, thereby influencing their innovative behavior and outcomes.

Firstly, the empowering leadership style encompasses the delegation of decision-making authority to employees coupled with necessary support, offering them ample freedom to engage in innovative activities. This leadership approach stimulates employees to think independently and creatively, fueling their intrinsic motivation. When employees feel trusted and sufficiently supported, their confidence in accomplishing innovative tasks is considerably amplified, in other words, their sense of innovative self-efficacy significantly increases. This heightened sense of innovative self-efficacy encourages employees to actively participate in innovative activities, consequently enhancing the organization's innovation performance.

Secondly, the transactional leadership style can boost employees' innovative self-efficacy to some extent through clear goal setting and reward mechanisms. However, this enhancement hinges on external incentives, necessitating an optimal balance point to prevent over-reliance on extrinsic rewards and weakening employees' intrinsic innovative motivation. Although reward and punishment mechanisms can stimulate employee motivation, excessive application may lead to employees focusing solely on short-term rewards and neglecting long-term innovation objectives, thereby negatively impacting innovation performance.

Lastly, the directive leadership style can alleviate certain uncertainties through stringent guidance and control, thereby enhancing employee self-efficacy to some extent. However, excessive control and lack of autonomy often stifle the spirit of innovation, thus its mediating role can be manifested negatively or more complexly. While the directive leadership style may foster efficiency and consistency under certain circumstances, an excessive application can potentially stifle employees' innovative thinking and diminish the innovation capacity of the organization.

Whether it is an empowering, transactional, shared, or directive leadership style, innovative self-efficacy serves as a partial mediator. This signifies that leadership style influences employee innovation performance not only directly but also indirectly by affecting employee innovative self-efficacy. Therefore, comprehending and leveraging the mediating role of innovative self-efficacy emerges as a key strategy to enhance employee innovation performance and organizational innovation capability.

6.5 The moderation role of innovation support

The data analysis presented in this thesis suggests that innovation support exerts a positive moderating influence on the correlation between innovative self-efficacy and employee innovation performance. Innovation support encompasses a range of factors including, but not limited to, the provision of requisite resources, fostering a conducive innovation culture, and formulating lucid innovation strategies. The results demonstrate that heightened innovation support correlates with a more pronounced impact of innovative self-efficacy on innovation performance. Organizational backing for innovation bolsters employees' confidence in their innovative abilities and further stimulates engagement in innovative behaviors, thereby enhancing overall innovation performance. This outcome is predicated on the understanding that when employees perceive recognition and support for their innovative efforts from the organization, they exhibit increased willingness to take risks, confront challenges, and

participate in innovative activities. Simultaneously, innovation support provides the necessary resources and environment, enabling employees to realize their innovation objectives more effectively.

To begin with, innovative resources serve as the bedrock for executing innovative activities. Such resources span human, financial, and material assets, as well as intangible commodities such as information, knowledge, and technology. An abundance of these resources boosts employees' confidence in their capability to accomplish innovative tasks, thus enhancing their sense of innovative self-efficacy. Additionally, sufficient resources enable employees to fulfill their innovation targets, thereby improving innovation performance.

Secondly, an innovative culture serves as a critical stimulant for employees' innovative spirit. A supportive innovation culture encourages employees to experiment with new ideas and methods, unafraid of failure, and willingly accept challenges. Within such a cultural milieu, employees are more inclined to engage in innovative activities, subsequently improving their sense of innovative self-efficacy and innovation performance.

Furthermore, a precise innovation strategy is a pivotal tool for directing employees towards innovative activities. Clear innovation strategies help organizations communicate which forms of innovation are encouraged and align with organizational goals, thereby enabling employees to better understand how to undertake innovation activities. This enhances their sense of innovative self-efficacy and boosts innovation performance.

The aforementioned analysis underscores that heightened innovation support amplifies the impact of innovative self-efficacy on innovation performance. This is primarily because employees, cognizant of the organization's recognition and support for their innovative endeavors, exhibit increased confidence in taking risks and facing challenges, thereby showing a greater willingness to engage in innovative activities. Concurrently, innovation support offers the necessary resources and environment for employees to achieve their innovation objectives more effectively.

Therefore, the provision of robust innovation support is crucial for medical information enterprises, regardless of their size. Organizations must offer innovation support by providing necessary resources, nurturing a positive innovation culture, and devising clear innovation strategies. These measures will enhance employee innovative self-efficacy, stimulate engagement in innovation activities, and ultimately bolster overall innovation performance.

Chapter 7: Research Conclusions and Prospects

7.1 Research conclusions

In light of technological advancements and escalating market competition, the innovation capabilities of small and medium-sized enterprises (SMEs) in the medical information sector have become pivotal determinants of their competitive edge, survival, and growth. Leadership style, as an internal driving force, assumes a crucial role in shaping innovation performance. Consequently, this thesis delves into the influence mechanism of leadership styles on innovation performance within these SMEs. Predicated upon an extensive corpus of empirical data, this study unravels the intricate relationship between leadership style and organizational innovation performance, proposing a mediation model with a moderation component to enhance our comprehension of this relationship. The findings indicate that distinct leadership styles exert divergent impacts on an enterprise's innovation performance, a relationship further nuanced by the mediating role of employee innovative self-efficacy and the moderating role of innovation support.

(1) The results of the data analysis suggest that leadership style can substantially influence employee innovation performance positively. Among these, an empowering leadership style markedly enhances employee innovation performance by stimulating employees' intrinsic motivation, fostering a sense of participation and belonging, and bolstering their willingness and efficiency to innovate. A transactional leadership style motivates employees to strive for innovative outcomes through clear objectives and reward-punishment mechanisms; however, an over-reliance on this style could stifle creative thinking. A shared leadership style exerts a positive influence on employee innovation performance by promoting teamwork and knowledge sharing. Conversely, a directive leadership style may suppress employees' innovative spirit and motivation, thereby negatively impacting innovation performance.

In the realm of small and medium-sized medical information enterprises, this study's findings underscore the substantial impact of leadership style on employee innovation performance. This conclusion offers insight into comprehending and improving internal innovation activities within organizations more profoundly.

Initially, it was found that an empowering leadership style significantly augments employee innovation performance. This style is primarily characterized by leaders granting greater autonomy, support, and trust to their employees, encouraging active participation in decision-making and respecting their professional knowledge and unique insights. This environment stimulates employees' intrinsic motivation, making them more willing to undertake risks and explore new solutions. Concurrently, this style enhances employees' sense of participation and belonging, thereby improving their willingness and efficiency to innovate. Consequently, an empowering leadership style is perceived as an effective method to foster corporate innovation.

Subsequently, a transactional leadership style motivates employees to aim for innovative results via explicit goals and reward-punishment mechanisms. This style concentrates on goal setting and achievement, as well as corresponding rewards or punishments, allowing employees to understand how their behavior and performance will influence their returns. However, an excessive dependence on a transactional leadership style can negatively affect innovation, as it might restrict creative thinking and cause an undue focus on short-term objectives while neglecting long-term exploration and learning.

Moreover, a shared leadership style can positively impact employee innovation performance by encouraging teamwork and knowledge sharing. This style highlights the importance of teamwork and open information exchange, motivating employees to share ideas and experiences to foster collective innovation. In such an environment, employees can acquire new knowledge and skills from their peers, gain more inspiration and perspectives, thereby enhancing innovation performance.

Lastly, it was observed that an directive leadership style negatively impacts innovation performance. This style emphasizes the leader's authority and control, usually offering less freedom and choice to employees. Under such circumstances, employees may feel suppressed, and their innovative spirit and motivation could be inhibited. Therefore, organizations should exercise caution when applying a directive leadership style and strive to offer employees as much freedom and support as possible.

This study underscores the significant influence of leadership style on employee innovation performance. Practically, enterprises should apply different leadership styles flexibly, according to their unique situations and needs, to maximize innovation. Simultaneously, organizations need to establish an open, inclusive, and innovative culture, providing a conducive environment for employee innovation.

(2) In the context of innovative self-efficacy, it is evident that an empowering leadership

style significantly enhances employees' confidence in their innovative capacities. This is achieved by granting them increased autonomy, instilling trust, and offering support, all of which contribute to a sense of respect and value. In contrast, transactional leadership clarifies employee goals via a transparent feedback and reward system, consequently bolstering their confidence in their ability to innovate. A shared leadership approach augments employees' innovative self-efficacy through fostering teamwork and facilitating knowledge sharing. However, directive leadership may undermine employees' innovative self-efficacy.

Within small and medium-sized medical information enterprises, the research findings presented herein highlight that leadership style significantly impacts employees' innovative self-efficacy. Self-efficacy pertains to an individual's belief in their capability to successfully perform a task. More specifically, innovative self-efficacy relates to an individual's conviction in their ability to successfully participate in innovative endeavours. Employees possessing a heightened sense of innovative self-efficacy are typically more amenable to experimenting with new ideas and methodologies, and exhibit greater resilience in confronting challenges and adversities.

Initially, an empowering leadership style significantly augments employees' innovative self-efficacy. Manifested primarily through leaders' trust, respect, and support towards their employees, this style of leadership grants employees greater autonomy, encourages participation in decision-making, and acknowledges their contributions. In such an environment, employees experience a sense of respect and validation, thereby enhancing their confidence in their innovative capabilities.

Subsequently, transactional leadership helps employees delineate their objectives via a lucid feedback and reward mechanism, thus boosting their innovative self-efficacy. Emphasizing goal-setting and achievement, alongside corresponding rewards or penalties, this leadership style, through clear feedback and rewards, enables employees to comprehend how their performance influences their gains, subsequently reinforcing their confidence in their capacity to innovate.

Additionally, shared leadership enhances employees' innovative self-efficacy through fostering teamwork and promoting knowledge sharing. In this leadership paradigm, leaders stimulate employee interaction and the exchange of ideas and experiences. This collaborative environment aids employees in broadening their perspectives, acquiring additional knowledge and inspiration, and consequently bolstering their innovative self-efficacy.

However, a directive leadership style may undermine employees' innovative self-efficacy. Characterized by an emphasis on authority and control, this leadership style typically affords

employees less freedom and choice. Such an environment may engender feelings of suppression and deprivation of autonomy, leading to diminished confidence in their ability to innovate.

In summary, leadership style significantly influences employees' innovative self-efficacy. Practically, enterprises must judiciously employ different leadership styles based on their unique circumstances and requirements to optimize employees' innovative self-efficacy. Simultaneously, enterprises should cultivate an open, inclusive, and innovative culture, thereby fostering a conducive environment for employee innovation. Only then will employees possess the confidence and willingness to engage in innovative activities, thus promoting the sustainable development and success of the enterprise.

(3) The research validates the positive influence of innovative self-efficacy on the innovation performance of employees within small and medium-sized medical information enterprises. This is attributed to the premise that employees with ample confidence in their innovation capabilities are more inclined towards attempting innovation, thereby enhancing innovation performance.

In the contemporary knowledge economy, innovation is deemed a crucial determinant of sustainable enterprise development and maintenance of competitive edge. The findings of this study underscore that, within the context of small and medium-sized medical information enterprises, innovative self-efficacy significantly boosts employee innovation performance.

Self-efficacy, fundamentally, refers to an individual's conviction in their proficiency to accomplish a task or attain a specific goal. Accordingly, innovative self-efficacy signifies an individual's conviction in their competence to successfully engage in innovative endeavours, encompassing the generation of novel and valuable ideas, converting these into viable solutions, and implementing these solutions to effectuate change.

This study suggests that when employees harbor ample confidence in their innovation abilities, they exhibit increased willingness towards embracing innovation. Employees with high innovative self-efficacy typically display greater confidence in confronting difficulties and challenges during the innovation process. They maintain faith in their capacity to devise novel problem-solving strategies. Furthermore, their readiness to undertake risks stems from their belief in their ability to control and manage such risks. Consequently, they actively participate in innovation activities, thus elevating overall innovation performance.

However, augmenting employee innovative self-efficacy is not an effortless endeavor. It necessitates companies to foster an organizational culture endorsing innovation and learning, equip employees with adequate resources and support, and also offer them the liberty to

experiment with new ideas and methodologies. Within such an environment, employees can amplify their knowledge and skills through continuous learning and practice, hence boosting their innovative self-efficacy.

More precisely, companies can elevate their employees' innovative self-efficacy by providing ongoing training and development opportunities, thereby enabling them to enrich their professional knowledge and skills. Furthermore, by encouraging employee participation in decision-making processes, companies can make their employees feel valued and appreciated for their contributions. Finally, the creation of a secure environment where employees are unafraid of failure and are encouraged to experiment with new ideas and methods is essential.

In conclusion, the research findings underscore the profound impact of innovative self-efficacy on the innovation performance of employees within small and medium-sized medical information enterprises. This suggests an efficacious strategy for enterprises seeking to enhance innovation performance: by bolstering employees' innovative self-efficacy, thereby fostering their innovative spirit and motivation, overall innovation performance can be improved. However, the realization of this goal mandates business leaders to exhibit supportive behavior towards innovation, foster a culture promoting learning and experimentation, and provide ample resources and support to employees.

(4) The findings of this study suggest that innovative self-efficacy serves as a partial mediator in the relationship between various leadership styles - such as authorization, transactional, shared, and command styles - and innovation performance. This indicates that innovative self-efficacy is influenced not only by leadership style but also by employees' innovation performance.

Primarily, innovative self-efficacy refers to an individual's confidence in successfully engaging in innovative activities. Employees possessing a high degree of innovative self-efficacy are often more inclined to propose and implement novel ideas. They exhibit greater resilience and perseverance in overcoming innovative challenges.

Among diverse leadership styles, empowering leadership can significantly augment employees' innovative self-efficacy. When leaders bestow more decision-making authority, trust, and support onto employees, they often feel valued, thus enhancing their confidence in their innovative capabilities. The transactional leadership style, with clear objectives and reward systems, enables employees to comprehend how their performance impacts their benefits, and also aids in boosting their innovative self-efficacy. Shared leadership fosters employees' innovative self-efficacy by promoting teamwork and knowledge sharing.

Conversely, directive leadership style might diminish employees' innovative self-efficacy, as it may cause them to feel controlled and devoid of autonomy.

Simultaneously, this thesis's findings reveal that innovative self-efficacy can influence employees' innovation performance. When employees possess ample confidence in their innovative ability, they show greater willingness to experiment with new ideas and are more prone to transform these ideas into action, thereby enhancing overall innovation performance. Hence, bolstering employees' innovative self-efficacy can be deemed an effective strategy to improve an enterprise's innovation performance.

In summary, this study underscores the mediating role of innovative self-efficacy between leadership style and innovation performance. It posits that altering leadership style can directly impact employee innovation performance and indirectly affect it by improving employee innovative self-efficacy. Consequently, in fostering innovation, enterprises should not only consider their choice of leadership style but also focus on enhancing the innovative self-efficacy of employees. By doing so, enterprises can genuinely enhance their innovation performance and sustain a competitive edge.

(5) The research confirms the positive moderating role of innovation support in the relationship between innovative self-efficacy and innovation performance. When employees perceive a high level of innovation support, it enhances the impact of innovative self-efficacy on innovation performance.

In many scenarios, innovative self-efficacy and innovation support interact reciprocally. When employees feel they possess adequate capability to attempt new ideas and methods, they experience satisfaction and pride, which in turn reinforces their innovative self-efficacy. Simultaneously, when organizations provide sufficient innovation support, employees are more willing to try out new ideas and approaches, knowing there is a safety net even in case of failure. Therefore, innovation support can indirectly boost their innovation performance by enhancing employees' innovative self-efficacy.

The results of this study suggest that the influence of innovative self-efficacy on innovation performance is amplified when employees perceive high levels of innovation support. This is because innovation support can mitigate innovation risks, encourage employees to attempt new ideas and methods, and help them access necessary resources and information, thereby bolstering their confidence in their innovative abilities.

Therefore, to enhance employees' innovation performance, enterprises need to not only uplift employees' innovative self-efficacy but also provide ample innovation support. Specifically, enterprises can offer innovation support in the following ways: Firstly, by

providing necessary resources and information such as technology, funding, and time required for innovation; secondly, by fostering an open and inclusive culture that encourages employees to share their ideas and knowledge, and permits them to make mistakes and learn from them; finally, by implementing effective incentive systems to reward those actively participating in innovation activities.

In conclusion, this study's findings reveal the positive moderating role of innovation support in the relationship between innovative self-efficacy and innovation performance, emphasizing the significance of providing innovation support in augmenting employees' innovation performance. This provides an effective strategy for small and medium-sized healthcare informatics enterprises: by offering innovation support, they can enhance employees' innovative self-efficacy and thereby improve overall innovation performance.

The analysis summarized above allows us to answer the research questions posed in the first chapter of this thesis:

Question 1: How do different leadership styles (empowering leadership style, transactional leadership style, shared leadership style, and directive leadership style) influence employee innovation performance?

Answer: Empowering leadership style can enhance employees' innovation performance by granting them greater autonomy, support, and trust, encouraging active participation in decision-making, and respecting their professional expertise and unique insights. Transactional leadership style, with clear goals and reward-punishment mechanisms, can motivate employees to pursue innovative outcomes. Shared leadership style positively affects innovation performance by encouraging teamwork and knowledge sharing. Directive leadership style, which emphasizes the authority and control of the leader, typically offers less freedom and choice to employees, suppressing their innovative spirit and motivation.

Question 2: What is the mediating role of innovative self-efficacy in the relationship between leadership style and innovation performance?

Answer: When employees have sufficient confidence in their innovative capabilities, they are more willing to attempt innovation. This is because employees with high innovative self-efficacy are usually more confident in facing the difficulties and challenges in the innovation process, believing in their ability to find new solutions. Therefore, leadership styles such as empowering, transactional, and shared can give employees enough confidence to dare to try new ideas and methods, thereby improving innovation performance. Directive leadership style can lower innovative self-efficacy because it makes employees feel controlled and lacks autonomy, which in turn reduces innovation performance.

Question 3: How does innovation support moderate the relationship between innovative self-efficacy and innovation performance?

Answer: When employees perceive support for innovation, their sense of innovative self-efficacy is enhanced, which in turn strengthens their impact on innovation performance. This suggests that high levels of innovation support can further amplify the effect of innovative self-efficacy on innovation performance.

7.2 Research contribution

The primary theoretical contribution of this study lies in deepening our understanding of the relationship between leadership styles and innovation performance. By constructing and validating a theoretical model that encompasses the influence of empowering, transactional, shared, and directive leadership styles on innovation performance, it augments the body of research in this domain. Specifically, the introduction of innovative self-efficacy as a mediating variable and the moderating role of innovation support not only extends the investigation into the mechanisms through which leadership style impacts innovation performance but also provides a novel theoretical perspective and analytical framework. These findings transcend the limitations of previous studies focused on singular leadership styles, offering a more comprehensive viewpoint for understanding the complexity of leadership behavior.

In terms of practical implications, the research findings furnish strategies for small and medium-sized healthcare informatics enterprises to select leadership styles conducive to enhancing employee innovation performance, emphasize the significance of boosting employee innovative self-efficacy, and underscore the necessity of establishing an effective innovation support system. Furthermore, this study provides policy makers with a reference for promoting overall societal innovation capacity, such as supporting enterprises to adopt efficacious leadership methods and measures to enhance employee innovation capability. In summary, this study delivers not only new theoretical insights but also valuable references and guidance for management practice, thus fostering enterprise development and facilitating the promotion of societal innovation activities.

7.3 Research Innovations

(1) Innovation in Research Content

This thesis focuses on small and medium-sized medical IT enterprises, a field relatively less covered in existing literature. Small and medium-sized enterprises play a unique and critical role in the medcial informatization sector, especially in driving technological innovation and meeting rapidly changing market demands. By exploring how the leadership style of small and medium-sized enterprises influences innovation performance, the thesis enriches the existing theoretical research framework and provides deep insights for this specific group of enterprises.

(2) Innovation in Research Perspective

This thesis not only examines the direct relationship between leadership style and innovation performance but also introduces innovative self-efficacy as a mediating variable and innovation support as a moderating variable. The research model constructed in this thesis delves deeper into the dynamic relationships between variables, particularly how enhancing employees' innovative self-efficacy can strengthen the impact of leadership style on innovation performance. Moreover, by exploring the moderating role of innovation support, it adds to the understanding of how the organizational environment of enterprises can optimize the influence of leadership style on innovation performance.

7.4 Implications for management

7.4.1 Applying leadership styles from multiple perspectives

To improve the innovation performance of small and medium-sized medical information enterprises, it is necessary to use leadership styles from multiple perspectives in a reasonable manner.

(1) Recommend implementing an empowering leadership style

The distinctiveness of empowering leadership resides in fostering a trust-based corporate culture, endowing employees with greater autonomy, and supplying them with the necessary support and resources. In such a work environment, employees can fully realize their innovative potential; heighten their sense of participation and belonging, thereby amplifying their willingness and efficiency to innovate.

The empowering leadership style holds significant allure, particularly for enterprises seeking innovation. This is due to its ability to generate an optimal working environment for employees, enabling them to freely harness their talents rather than being constrained by rigid rules and procedures. Concurrently, this leadership style also advocates for an open and

egalitarian working milieu, which is pivotal in catalyzing the innovative potential of employees. Conversely, a trust-based corporate culture forms the cornerstone of an empowering leadership style. Trust can not only curtail management costs but also enhance communication efficiency within an organization. As employees feel trusted and esteemed, they also cultivate a sense of organizational belonging, which unequivocally incentivizes them to be more actively engaged in their work and exhibit superior innovative capability. However, trust and empowerment alone are insufficient; organizations also need to provide the necessary support and resources for employees to accomplish their innovation objectives. This includes providing appropriate technology, equipment, training, and other supportive resources. Additionally, enterprises also need to institute mechanisms to encourage and reward innovation, motivating employees to venture into new areas and challenge established norms.

For small and medium-sized healthcare informatics enterprises, implementing an empowering leadership style constitutes an effective choice if they aim to enhance innovation performance. Under the auspices of this leadership style, enterprises can afford employees an open, unconstrained, and egalitarian work environment, stimulate their innovative potential, and consequently improve overall innovation efficiency. Simultaneously, a trust-based corporate culture and the provision of support and resources to employees will also encourage them to actively engage in their work, enhance their sense of belonging, and further augment innovation performance.

(2) Reasonably utilizing transactional leadership style

Establish a lucid and equitable reward and sanction mechanism, collaborate with employees to set attainable objectives, and encourage them to undertake moderate risks. Through this methodology, employees can be incentivized to pursue innovative outcomes while seeking inventive solutions and ensuring task completion.

In the current business environment, innovation has emerged as a crucial impetus for the survival and development of enterprises. For small and medium-sized healthcare informatics enterprises, augmenting innovation performance is integral to their success. However, realizing this objective is no trivial feat. One efficacious strategy is to adeptly employ a transactional leadership style. Specifically, this includes constructing a clear and equitable reward and sanction mechanism, collaboratively setting achievable goals with employees, and fostering a culture of moderate risk-taking. Primarily, a transparent and fair reward and sanction mechanism lays the groundwork for motivating employees to strive for innovative results. This mechanism enables employees to comprehend how their work performance will

influence their bonuses, promotions, and other benefits. When employees recognize that their efforts can yield corresponding rewards, they will engage more actively in their work and concurrently seek and experiment with new work methods and processes. Furthermore, an equitable reward and sanction mechanism can also mitigate dissatisfaction and conflicts among employees, thereby fostering an environment conducive to innovation. Secondly, the collaborative formulation of attainable objectives with employees constitutes another crucial determinant in the amplification of innovation performance. During this process, leaders and employees can engage in thorough communication and discussion to jointly determine innovation objectives and formulate implementation plans. This not only assures the feasibility of the goals but also enables employees to gain a deeper understanding and sense of identification with these objectives. As employees perceive themselves as integral to the goal-setting process, their motivation and sense of responsibility are markedly amplified. Nonetheless, goal-setting alone cannot stimulate employees' innovative potential; encouraging them to undertake moderate risks is equally imperative. Innovation often comes paired with certain uncertainties and risks. If an organization's tolerance for failure is excessively low, employees may eschew risks due to fear of failure, which can significantly curtail the organization's innovation capacity. Hence, leaders should encourage employees to be audacious enough to attempt new things, even if the results do not meet expectations. When employees perceive that their venturesome and innovative spirit is supported and acknowledged by leaders, they are more inclined to challenge established norms and seek and realize innovation.

Through the aforementioned methods, organizations can motivate employees to strive for innovative outcomes while seeking creative solutions and ensuring task completion. This strategy can not only enhance employee motivation and satisfaction but also assist companies in discovering and leveraging new business opportunities, thereby improving their innovation performance. For small and medium-sized healthcare informatics enterprises, the judicious utilization of a transactional leadership style is an efficacious means of augmenting innovation performance. By instituting clear and fair reward and sanction mechanisms, co-setting achievable goals with employees, and encouraging them to undertake moderate risks, enterprises can stimulate their innovative potential, improve their willingness and efficiency to innovate, and achieve sustained business growth and development.

(3) Strengthening the application of shared leadership style

Promoting collaboration and knowledge sharing among teams, establishing open communication channels, and designing reward mechanisms to recognize team collaboration

and knowledge sharing behaviors can effectively promote innovation. Under this leadership style, employees are more inclined to collaborate with each other and work together to achieve innovation goals.

Small and medium-sized medical information enterprises can try to strengthen the application of shared leadership style in the process of seeking to improve innovation performance. This leadership style encourages collaboration and knowledge sharing among teams, effectively promoting innovation by establishing open communication channels and designing reward mechanisms to recognize team collaboration and knowledge sharing behaviors. Under this leadership style, employees are more inclined to collaborate with each other and work together to achieve innovation goals. The shared leadership style is first and foremost a leadership style that advocates teamwork. Under this style of guidance, each team member is considered an important resource, and their knowledge, skills, and experience are fully utilized to drive the overall progress of the team. In this environment, team members are more willing to share their knowledge and ideas, and also more willing to accept feedback and suggestions from others. This not only helps to improve the quality of team decision-making, but also stimulates the team's innovation potential. Secondly, open communication channels are key to achieving team collaboration and knowledge sharing. An open communication environment can reduce information barriers and provide everyone with the opportunity to express their opinions and opinions. This not only improves the transparency of decision-making, but also makes team members feel that their voices are heard, thereby enhancing their sense of belonging and satisfaction. Furthermore, designing reward mechanisms to recognize team collaboration and knowledge sharing behaviors is also an effective way to promote innovation. The reward mechanism can motivate employees to actively participate in team activities and share their knowledge and skills. When employees see that their contributions are recognized and rewarded, they become more actively involved in the team's work and are also more willing to try new methods and technologies.

Under the guidance of a shared leadership style, employees are more inclined to collaborate with each other and work together to achieve innovation goals. They no longer just fight alone, but view the success of their team as their own success. This team spirit and collaborative atmosphere are very beneficial for innovation, as innovation often requires diverse knowledge and skills, and requires close collaboration among team members. The shared leadership style can effectively promote innovation by promoting team collaboration and knowledge sharing, establishing open communication channels, and designing reward mechanisms to recognize team collaboration and knowledge sharing behaviors. Under this

leadership style, employees are more willing to collaborate with each other and work together to achieve innovation goals, thereby improving the innovation performance of the enterprise.

(4) Reduce the negative impact of directive leadership style

By enhancing the emotional intelligence of leaders, providing guidance rather than simple commands, and emphasizing the importance of company vision and goals, the negative effects of excessive control can be alleviated. This not only promotes employee innovation activities, but also enhances the cohesion and centripetal force of the entire organization. By comprehensively applying the above management strategies, small and medium-sized medical information enterprises can effectively improve their innovation performance and stand out in the fiercely competitive market.

Reducing the negative impact of directive leadership style is considered an effective means to improve innovation performance in the management process of small and medium-sized medical information enterprises. By enhancing the emotional intelligence of leaders, providing guidance rather than simple commands, and emphasizing the importance of company vision and goals, these strategies can not only promote employee innovation activities, but also enhance the cohesion and centripetal force of the entire organization. Firstly, enhancing a leader's emotional intelligence is a key change strategy. Leaders with high emotional intelligence are usually better at understanding and managing their own emotions, as well as better at understanding and meeting the needs of their employees. They can better establish trust and respect relationships with employees, thereby improving their satisfaction and loyalty. In addition, leaders with high emotional intelligence are more likely to create a positive work environment, which is crucial for stimulating employees' innovative potential. Secondly, providing guidance rather than simple commands is also an effective way to improve innovation performance. When leaders provide specific and practical guidance, employees can have a clearer understanding of their work goals and expected outcomes. This can not only improve work efficiency, but also stimulate employees' innovative thinking. On the contrary, simple commands often make employees feel stressed and confused, which is very detrimental to innovation. Furthermore, emphasizing the importance of the company's vision and goals is also a key factor in improving innovation performance. A clear vision and goals can provide a clear direction, guiding employees to know what they should do and why. When employees understand and agree with the company's vision and goals, their work enthusiasm and satisfaction will be significantly improved. At the same time, shared vision and goals can also enhance the cohesion and centripetal force of the entire organization, which is very beneficial for promoting innovation activities in the organization.

Through the above management strategies, small and medium-sized medical information enterprises can effectively reduce the negative impact of Directive Leadership style, thereby improving their innovation performance. These strategies not only promote employee innovation activities, but also enhance the cohesion and centripetal force of the entire organization. Therefore, this change can not only enhance the innovation capability of enterprises, but also help them stand out in the fiercely competitive market.

7.4.2 Improve employee innovative self-efficacy

Improving the innovative self-efficacy of employees is an important link in enhancing the innovation performance of small and medium-sized medical information enterprises. To achieve this goal:

(1) Create an environment that supports innovation

Create an environment that supports innovation, allowing for experimentation and tolerating failure, and ensuring that employees have sufficient time and resources to implement their innovative ideas. This includes providing necessary technical support, training, and setting up a dedicated budget for innovation. Meanwhile, by setting challenging yet achievable innovation goals, employees can be motivated to actively participate in innovation activities, and achieving small goals every time will enhance their sense of innovative self-efficacy.

Employees with a high sense of innovative self-efficacy are usually more willing to try new things and are more likely to generate and implement innovative ideas. Therefore, enhancing employee innovative self-efficacy plays a crucial role in promoting corporate innovation. Firstly, establishing an environment that supports innovation is crucial for enhancing employee innovative self-efficacy. This environment should encourage employees to express and implement their innovative ideas, rather than limiting their thinking. In addition, leaders should provide employees with sufficient time and resources to focus on innovative activities, rather than being constrained by daily operational tasks. Secondly, allowing experimentation and tolerating failure is another key factor in enhancing innovative self-efficacy. Innovation often comes with certain risks and uncertainties. If a company's tolerance for failure is too low, employees will choose to avoid risks due to fear of failure, which will seriously limit the company's innovation ability. On the contrary, when a company allows and accepts failure, employees will have more confidence to try new ideas and methods. Furthermore, providing necessary technical support, training, and establishing a budget for innovation are also effective strategies to enhance innovative self-efficacy. These

resources can help employees acquire new knowledge and skills, while also providing them with the conditions and guarantees to implement innovation. Finally, setting challenging yet achievable innovation goals can motivate employees to actively participate in innovation activities. Every time a small goal is achieved, it enhances employees' sense of success, thereby enhancing their sense of innovative self-efficacy.

Through the above strategies, small and medium-sized medical information enterprises can effectively enhance their employees' sense of innovative self-efficacy, thereby improving their innovation performance. This not only helps companies stand out in the fiercely competitive market, but also enhances employee job satisfaction and loyalty, further enhancing the core competitiveness of the enterprise.

(2) Conduct innovative skills training

Helping employees improve their problem-solving and innovative task execution abilities, such as enhancing critical thinking, problem-solving skills, or knowledge in specific fields, can enhance their confidence in their own innovative abilities. Meanwhile, implementing effective feedback mechanisms and providing timely, specific, and constructive feedback can help employees understand where they have done well and where improvements are needed, thereby enhancing their sense of innovative self-efficacy.

Training in innovative skills serves as a crucial instrument to amplify the self-efficacy of employees within the realm of innovation. Such training encompasses the enhancement of critical thinking, problem-solving abilities, and expertise in specific domains. Through such focused training programs, employees are empowered with an expanded knowledge base and skill set. This not only augments their work efficiency but also elevates the caliber of their work. For instance, training in critical thinking enables employees to rationally analyze and evaluate diverse situations, consequently facilitating more judicious decision-making. Similarly, problem-solving skill development allows them to identify the root causes of issues and implement effective strategies for resolution. Furthermore, domain-specific knowledge training keeps employees abreast of the latest industry trends and technological advancements, thereby fostering a conducive environment for innovation within the organization. In parallel, the establishment of an effective feedback mechanism is integral to boosting employee self-efficacy in innovation. Such a mechanism assists employees in identifying their strengths and areas for improvement. Consequently, they can pursue targeted learning and refinement based on this feedback, leading to enhanced professional competencies. Concurrently, timely, specific, and constructive feedback instills a sense of recognition in employees, playing a pivotal role in bolstering their confidence and job satisfaction.

Through innovative skills training and effective feedback mechanisms, small and medium-sized medical information enterprises can effectively enhance their employees' sense of innovative self-efficacy. This is not only beneficial for improving employee work enthusiasm and satisfaction, but also helps to promote innovation and development of the enterprise. Therefore, enterprises should incorporate these two strategies into their management practices to promote the improvement of innovation performance.

(3) Establish a fair reward system

The establishment of an equitable reward system serves as a vital tool for augmenting employees' innovative self-efficacy. When employees observe that their innovative actions and accomplishments are aptly rewarded, they are more inclined to experiment with novel ideas and methodologies. Material rewards cater directly to the financial needs of employees, while non-material rewards such as public recognition and opportunities for advancement address their psychological necessities like respect and a sense of achievement. Hence, enterprises should construct a fair and effective reward system, tailored to the unique circumstances and requirements of their employees.

Simultaneously, fostering teamwork and communication is a principal strategy to bolster innovative self-efficacy amongst employees. Collaboration enables employees to draw from the experiences and knowledge of others, thereby amplifying their capabilities and confidence. Effective communication, on the other hand, facilitates understanding of different perspectives and ideas, igniting fresh inspiration and creativity. Consequently, corporations should cultivate an open and amiable work environment that advocates for collaboration and communication amongst employees.

Additionally, encouraging cross-departmental and cross-team collaboration proves to be a potent method for enhancing employees' innovative self-efficacy. Such collaborative models provide employees access to a broader spectrum of knowledge and viewpoints, immensely beneficial for driving innovation. Furthermore, cross-departmental and cross-team collaborations serve to dismantle internal barriers within an organization, thereby elevating overall efficiency and effectiveness.

By instituting a fair reward system, stimulating team cooperation and communication, and advocating cross-departmental and cross-team collaboration, small to medium-sized medical information enterprises can effectively amplify the innovative self-efficacy of their employees. This, in turn, augments the organization's innovation performance. These strategies not only unlock the innovation potential of employees but also boost their satisfaction and loyalty, thereby strengthening the core competitiveness of the enterprise.

7.4.3 Enhancing Innovation Support for Medical Informatization Enterprises

This thesis points out that innovation support can enhance the positive impact of employee innovative self-efficacy on innovation performance. Therefore, enhancing enterprise innovation support for employees is an important content to improve the innovation performance of small and medium-sized medical information enterprises.

(1) Create an innovative and friendly environment

Enterprises must foster a culture that advocates for experimentation and embraces failure, thereby making employees more amenable to devising and implementing innovative ideas. Concurrently, equipping employees with requisite resources for innovation such as time, funds, equipment, or software can diminish the challenges of executing innovation, thereby bolstering their confidence.

An environment conducive to innovation is integral to enhancing employees' sense of innovative self-efficacy. Such an environment should embody two fundamental elements: liberty and security. Liberty implies that employees are permitted to explore, experiment with, and implement their ideas, unhindered by stringent rules and procedures. Security signifies that employees need not fear retribution or criticism when venturing into new territories, even if their endeavors eventually fail. This atmosphere of freedom and safety can invigorate employees' innovative spirit, making them more predisposed to take risks in pursuit of fresh ideas. Cultivating a culture that promotes experimentation and accommodates failure is also a potent strategy for augmenting employee innovative self-efficacy. Failure is an inherent component of the innovation process. If an organization cannot tolerate failure, employees may become apprehensive about proposing and testing novel ideas due to fear of failure. Conversely, if companies encourage learning and growth from failures, employees will be emboldened to experiment with and execute innovative ideas, thereby enhancing their innovative self-efficacy. Additionally, furnishing employees with the necessary resources for innovation constitutes another vital tactic to optimize innovation performance. These resources may encompass time, funds, equipment, or software. When employees have ample resources to actualize their innovative ideas, the difficulties associated with innovation are lessened, and their confidence correspondingly increases.

By engendering an innovation-friendly environment, nurturing a culture that encourages experimentation and tolerates failure, and supplying employees with necessary resources for innovation, small to medium-sized medical information enterprises can effectively amplify their employees' innovative self-efficacy, thereby boosting their overall innovation

performance. These strategies not only stimulate the innovative potential of employees but also enhance their satisfaction and loyalty, thereby fortifying the enterprise's competitive advantage.

(2) Provide regular training on professional skills and innovative thinking to help employees enhance their innovation abilities

In small and medium-sized medical information enterprises, innovation support is seen as an important factor in enhancing the positive impact of employee innovative self-efficacy on innovation performance. The methods to achieve this goal include providing regular training in professional skills and innovative thinking, motivating employees to innovate through internal promotion and career development opportunities, and establishing good communication channels.

Regular training on professional skills and innovative thinking is an effective means to enhance employees' innovation ability. This type of training can help employees update their knowledge, learn new technologies and methods, and adapt to constantly changing environments and needs. In addition, training in innovative thinking can teach employees how to break out of established thinking patterns, discover and utilize new opportunities, thereby promoting innovation. At the same time, motivating employees to innovate through internal promotion and career development opportunities is also a key strategy to improve the innovation performance of enterprises. When employees see that their innovative behavior and achievements can be recognized and rewarded, they will be more motivated to try new ideas and methods. This positive feedback mechanism can enhance employees' self-efficacy, making them more confident in accepting and responding to challenges. In addition, establishing good communication channels is an important step in enhancing employees' sense of innovative self-efficacy. Leaders should encourage employees to share their innovative ideas, fully listen to and value their feedback. This open communication environment can make employees feel that their opinions are respected and appreciated, thereby enhancing their satisfaction and sense of belonging. Meanwhile, good communication can also help leaders understand the needs and expectations of employees, thereby formulating strategies and plans that are more in line with the actual situation.

By providing training in professional skills and innovative thinking, offering internal promotion and career development opportunities, and establishing good communication channels, small and medium-sized medical information enterprises can effectively enhance their employees' innovative self-efficacy and further improve their innovation performance. These strategies not only stimulate the innovation potential of employees, but also enhance

their satisfaction and loyalty, thereby enhancing the competitive advantage of the enterprise.

(3) Establish an innovation reward system

Motivate employees to engage in innovative behavior through both material and non-material rewards. At the same time, implementing an innovation evaluation mechanism, regularly evaluating and providing feedback on the innovation effectiveness of employees, can not only let employees know where they have done well, but also help them identify areas for improvement. Through the above management strategies, small and medium-sized medical information enterprises can effectively enhance their innovation support for employees, thereby encouraging them to actively participate in innovation activities and ultimately improving the organization's innovation performance.

Establishing an innovation reward system is an important means to stimulate employee innovation behavior. This reward system can include both material and non-material rewards. Material rewards such as bonuses and stock options can meet the economic needs of employees, while non material rewards such as public recognition and more career development opportunities can meet the spiritual needs of employees. When employees see that their innovative achievements can receive clear and fair rewards, their sense of innovative self-efficacy will be significantly improved. Meanwhile, implementing an innovation evaluation mechanism is also an effective strategy to enhance employees' self-efficacy in innovation. Regularly evaluating and providing feedback on the innovation effectiveness of employees can not only let them know where they have done well, but also help them identify areas for improvement. Through this evaluation mechanism, employees can understand the value and importance of their innovative behavior in the enterprise, thereby becoming more motivated to participate in innovation activities. In addition, publicly praising employees for their innovative achievements can not only make them feel recognized for their efforts, but also stimulate the competitive awareness of other employees, thereby enhancing the overall innovation atmosphere of the enterprise. At the same time, providing employees with more career development opportunities, such as involving them in more important projects or giving them more decision-making power, can make them feel that their abilities are fully utilized and trusted, thereby enhancing their sense of innovative self-efficacy.

By establishing an innovation reward system and implementing an innovation evaluation mechanism, small and medium-sized medical information enterprises can effectively enhance their innovation support for employees, further encourage employees to actively participate in innovation activities, and ultimately improve the organization's innovation performance. These strategies not only stimulate the innovation potential of employees, but also improve

their satisfaction and loyalty, thereby enhancing the competitive advantage of the enterprise.

7.5 Research limitations and prospects

Drawing on prior studies, this thesis employs an empirical research approach to investigate the correlation between leadership style, innovative self-efficacy, innovation support, and innovation performance within small and medium-sized medical information enterprises, subsequently deriving pertinent conclusions. While choosing the research theme and amassing data, it became evident that a multitude of research angles persist pertaining to this issue. Owing to constraints in research proficiency and capacity, this study may not encapsulate the topic's full depth and breadth. The primary limitations are as follows:

(1) This thesis delves into the interconnection between leadership style and innovation performance, focusing on the roles of innovative self-efficacy and innovation support. These two elements are posited as significant conduits through which leadership style impacts innovation performance. In essence, leadership style shapes employees' innovative self-efficacy and the extent of innovation support, consequently influencing their innovation outcomes. Innovative self-efficacy encapsulates the confidence employees' harbor in undertaking innovative endeavors, while innovation support signifies the degree of organizational backing for such activities. However, beyond innovative self-efficacy and innovation support, additional variables exist in practical scenarios that could potentially mediate or moderate the association between leadership style and innovation performance. Factors like employee motivation, team ambiance, and organizational culture can all sway this relationship. These prospective mediatory or moderatory variables necessitate further examination to elucidate their functions. Additionally, these variables do not merely act as mediators or moderators between leadership style and innovation performance but also exert a direct influence on innovation performance. This suggests that these variables not only serve as avenues through which leadership style impacts innovation performance, but they can also directly dictate the level of innovation performance. Hence, future studies should contemplate both the direct and indirect effects of these variables, constructing a more comprehensive theoretical model to depict the intricate relationship between leadership style, innovative self-efficacy, innovation support, and innovation performance.

This thesis introduces the correlation between leadership style, innovative self-efficacy, innovation support, and innovation performance, highlighting the need for further refinement of the measurement tools for these variables. Concurrently, it proposes other potential

mediatory or moderatory variables that might exist in the connection between leadership style and innovation performance. These insights pave the way for future research, namely the enhancement of existing measurement tools, development of new ones, deeper exploration of potential mediatory or moderatory variables, and the establishment of more exhaustive theoretical models. Through such endeavors, we can achieve a more profound understanding of how leadership style influences the innovation performance of medical information enterprises, thereby furnishing guidance for their operational strategies.

(2) The primary aim of this study is to scrutinize the relationship between key variables, such as leadership style, innovative self-efficacy, innovation support, and innovation performance in small medical information enterprises. During this research process, we primarily utilized employees' subjective evaluations to gather data. However, such methodology harbors a clear issue of common method bias, which refers to the introduction of error due to all data emanating from the same source (i.e., employees), thereby engendering doubts about the accuracy and credibility of the research findings.

Common method bias is a prevalent issue in social science research, particularly when researchers employ a singular data source to collect multi-variable information. As all data is derived from the same source, distinguishing between true factors affecting the results and those exhibiting correlation due to originating from the same data source becomes challenging. For instance, employees' perception of leadership style is influenced by their job satisfaction, and reciprocally, their assessment of job satisfaction is affected by their perception of leadership style. This creates a common method bias, rendering it difficult to determine whether leadership style influences job satisfaction or vice versa.

To mitigate this issue, this thesis proposes that future research should incorporate both employee and leader evaluations for data collection. Specifically, employees and leaders can independently evaluate variables such as leadership style, innovative self-efficacy, innovation support, and innovation performance, followed by comparing their evaluation outcomes to identify disparities and similarities. This approach can capture research variables from multiple perspectives, thereby minimizing the impact of common method bias.

Regarding leadership style, employees will assess their leaders' behavior and traits based on their work experience and observations, while leaders will evaluate their leadership style rooted in their own convictions and objectives. By juxtaposing the assessments of employees and leaders, one can more accurately characterize leadership style and further investigate its relationship with innovation performance.

In terms of innovative self-efficacy, employees appraise their innovative potential

grounded in their capabilities and confidence, while leaders assess innovative self-efficacy based on performance and accomplishments. By comparing the assessments of employees and leaders, we can garner a deeper understanding of innovative self-efficacy and further delve into its relationship with innovation performance.

For innovation support, employees will evaluate the company's level of innovation support based on its policies and environment, while leaders will gauge the company's level of innovation support rooted in its strategy and resources. By juxtaposing the evaluations of employees and leaders, we can attain a more comprehensive understanding of innovation support and further probe into its relationship with innovation performance.

This thesis highlights the issue of common method bias in the data collection method based on employee subjective evaluation and suggests a solution to gather data by amalgamating evaluations from both employees and leaders. This solution can curtail the impact of common method bias, thereby enhancing the accuracy and credibility of research findings. Concurrently, this also offers fresh insights and directions for future research, that is, gathering data from multiple perspectives and sources to more accurately capture research variables and gain an in-depth understanding of their inherent relationships.

(3) This thesis embarks on an in-depth investigation into small medical information enterprises, aiming to uncover the inherent relationships between critical variables such as leadership style, innovative self-efficacy, innovation support, and innovation performance. However, due to constraints in research duration and scope, the empirical study's sample size remains relatively modest. Although these samples fulfill the application requirements for the questionnaire survey and all models and hypotheses have been duly validated, the need for additional data to further bolster this research topic persists.

The efficacy and credibility of empirical studies often hinge on both the quantity and quality of the samples utilized. In this study, despite the sample size's limitation, the findings lent support to all theoretical models and hypotheses. This suggests that while the sample size might be small, its quality is sufficiently high to mirror the genuine circumstances of the research subject accurately. Nonetheless, to render the research outcomes more compelling and universally applicable, it is indispensable to augment the sample size to gather more comprehensive and profound data.

However, due to restrictions in research capacity, this study could not exhaustively probe and exploit the existing data. Future research can leverage more sophisticated statistical methods and analytical tools, such as structural equation models, hierarchical linear models, etc., to deeply scrutinize data and explore its inherent complex interrelationships.

Moreover, due to the research timeframe constraint, this thesis could only amass data within a specified period, thus failing to fully capture the dynamic evolution of the research object. To rectify this shortcoming, future studies can adopt a longitudinal research approach, routinely collecting data to observe and analyze the patterns of changes in research subjects over time.

Although the sample size of this empirical study is circumscribed by research timeframe and scope, all models and hypotheses have been effectively substantiated. Future research needs to expand the sample size, employ more advanced analytical methodologies, and conduct longitudinal studies to maximize data utilization, deepen the understanding of small medical information enterprises, and offer more valuable research outcomes for related fields.

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Annex A: A survey questionnaire on the impact of leadership style on innovation performance in small and medium-sized medical IT enterprises

Dear Sir/Madam,

Greetings. I am a doctoral student conducting research for my upcoming thesis. I greatly appreciate your willingness to participate in this survey, despite your undoubtedly busy schedule.

This academic survey seeks to examine the relationship between medical information leadership style, innovative self-efficacy, innovation support, and innovation performance. Our objective is to gain insight into the interconnections between these four variables. Please note that this questionnaire is conducted anonymously, and there are no correct or incorrect answers to the questions. We are merely interested in capturing your authentic responses; hence, please respond based on your initial reactions. I assure you that all your responses will be used strictly for academic research purposes and will not be disclosed to any third party. Your participation is highly valuable to this study, and I encourage you to complete the survey with utmost confidence.

Thank you once again for your participation and support. I wish you good health and success in all your endeavours!

Part 1: Personal Information

1. Gender:

☐Male ☐Female

2. Age:

☐Under 30 years old ☐31-40 years old ☐41-50 years old ☐50 years old and above

3. Education:

☐Junior college or below ☐Undergraduate degree ☐Graduate degree ☐Doctoral degree

Part 2: Formal Investigation Section

(1) Scale of Leadership Style

Please mark a " √ " on the corresponding five levels of completely disagree, somewhat disagree, neutral, somewhat agree, completely agree. The corresponding scores are 5-1 points, and the specific measurement items are shown in the table.

Dimension	Question items	1	2	3	4	5
Empowering Leadership Style	My leader will help me understand the correlation between personal goals and company goals	1	2	3	4	5
	My leader will help me understand the importance of my work to the overall performance of the company	1	2	3	4	5
	My leader will help me establish a global perspective on my work	1	2	3	4	5
	My leader often makes decisions with me	1	2	3	4	5
	My leader will ask for my opinions on some decisions that may have an impact on me	1	2	3	4	5
	My leader believes that I can handle difficult tasks	1	2	3	4	5
	Even if I make mistakes, my leaders still believe that I can make progress and improve	1	2	3	4	5
	My leader encourages me to do things in a way that I am familiar with and good at	1	2	3	4	5
	My leader will try to simplify the rules and regulations as much as possible, so that I can carry out my work efficiently	1	2	3	4	5
	My leader agrees that I can make important decisions quickly to solve problems	1	2	3	4	5
Transactional Leadership Style	When I perform well, the leader will publicly praise or reward me	1	2	3	4	5
	The leader will make it clear to me that there will be rewards and benefits for any performance	1	2	3	4	5
	If my work performance is not good, the leader will express his dissatisfaction and make corrections	1	2	3	4	5
	Leaders will often inquire about my handling of affairs to prevent errors from occurring	1	2	3	4	5
	When the leader punishes me, he will let me know where the mistake is	1	2	3	4	5
	As long as I can achieve my goals, the leader will be willing to promise something	1	2	3	4	5
	As long as everything is okay, leaders will try their best not to	1	2	3	4	5

	change the status quo					
	Whether my performance is good or bad, the leader will praise me the same	1	2	3	4	5
Shared Leadership Style	Our company often improves its intelligence through collective discussions	1	2	3	4	5
	Our company's employees are good at actively learning new knowledge and skills	1	2	3	4	5
	Our company's employees often train their respective expertise	1	2	3	4	5
	Our company's employees view the work process as a learning process	1	2	3	4	5
	Our company's employees learn to identify opportunities in problems	1	2	3	4	5
	Our company's employees view their leaders as colleagues	1	2	3	4	5
	Our company's employees and leaders can share leadership power	1	2	3	4	5
	Our company's employees and leaders share leadership responsibilities	1	2	3	4	5
	Our company's employees have a platform to showcase their leadership skills within the company	1	2	3	4	5
	In different situations, the leadership functions of our company are performed by different employees	1	2	3	4	5
	Our company's employees hope that each employee strictly demands their work according to performance standards	1	2	3	4	5
	Our company's employees hope that each employee emphasizes efficiency and quality in their work	1	2	3	4	5
	Our company's employees hope that each employee can continuously find new ways to improve work performance	1	2	3	4	5
	Our company's employees have a sense of cooperation and a spirit of cooperation	1	2	3	4	5
	Our company's employees are good at collaborating with others in their work	1	2	3	4	5
	Our company's employees trust each other and cooperate harmoniously	1	2	3	4	5
	Our company's employees have both clear division of labor and mutual cooperation	1	2	3	4	5

	Our company's employees actively eliminate conflicts with each other to facilitate company collaboration	1	2	3	4	5
Directive Leadership Style	In the company, daily matters are decided solely by the leader	1	2	3	4	5
	During meetings, the final decision is made according to the leader's wishes	1	2	3	4	5
	A capable subordinate in the eyes of a leader must obey his words	1	2	3	4	5
	When working with a leader, he puts a lot of pressure on me	1	2	3	4	5
	Leaders adopt strict management methods and means	1	2	3	4	5
	When the task cannot be achieved, I may be scolded by the leader	1	2	3	4	5
	Leaders emphasize that employees' work performance must surpass that of other departments/units	1	2	3	4	5
	The leader has set strict goals to achieve	1	2	3	4	5
	During the work process, the leader follows up on the work of each link in detail	1	2	3	4	5
	The leader has put forward strict orders and requirements for the work	1	2	3	4	5
	When communicating with me, the leader is meticulous and puts pressure on me	1	2	3	4	5
	Leaders require completing tasks according to prescribed principles and cannot tolerate deviations	1	2	3	4	5

(5) Scale of Innovative Self-efficacy

Please mark " √ " on the corresponding five levels of strongly agree, somewhat agree, neutral, somewhat disagree, strongly disagree. The corresponding scores are 5-1 points, and the specific measurement items are shown in the table.

No.	Question items	1	2	3	4	5
1	I am able to achieve most of the goals I have set through innovative work methods	1	2	3	4	5
2	Faced with difficult tasks, I am quite certain that I can creatively complete them	1	2	3	4	5
3	Overall, I believe that I can achieve important results through innovative methods	1	2	3	4	5
4	Most of the time, I am able to innovate ideas and turn them into reality	1	2	3	4	5
5	I am able to creatively tackle multiple challenges	1	2	3	4	5

6	I am confident in creatively completing various tasks	1	2	3	4	5
7	Compared to others, I am highly innovative	1	2	3	4	5
8	Even if things are difficult, I can still creatively do them well	1	2	3	4	5

(6) Scale of Innovation Support

Please mark " √ " on the corresponding five levels of strongly agree, somewhat agree, neutral, somewhat disagree, strongly disagree. The corresponding scores are 5-1 points, and the specific measurement items are shown in the table.

No.	Question items	1	2	3	4	5
1	The company encourages innovation	1	2	3	4	5
2	The leadership respects our ability to innovate our work	1	2	3	4	5
3	The company's reward system encourages innovation	1	2	3	4	5
4	The company publicly recognizes employees who innovate	1	2	3	4	5

(7) Scale of Innovation Performance

Please mark " √ " on the corresponding five levels of strongly agree, somewhat agree, neutral, somewhat disagree, strongly disagree. The corresponding scores are 5-1 points, and the specific measurement items are shown in the table.

No.	Question items	1	2	3	4	5
1	In my work, I provide new ideas to improve the existing situation	1	2	3	4	5
2	I will actively support innovative ideas	1	2	3	4	5
3	I will search for new work methods, skills, or tools through learning	1	2	3	4	5
4	I can systematically introduce innovative ideas in my work	1	2	3	4	5
5	I can make important organizational members of the enterprise focus on innovative thinking	1	2	3	4	5
6	I have received praise from superiors for my innovative ideas	1	2	3	4	5
7	I have transformed innovative ideas into practical applications	1	2	3	4	5
8	I have proposed some innovative problem-solving solutions through my studies	1	2	3	4	5

Thank you for your cooperation!

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Annex B: The reliability and validity analysis of the pre-survey

Table b.1 Reliability analysis of pre-survey

Scale	Dimension	Number of questions	Cronbach's Alpha
Leadership style	Empowering Leadership Style	10	0.964
	Transactional Leadership Style	8	0.898
	Shared Leadership Style	18	0.974
	Directive Leadership Style	12	0.941
Innovative self-efficacy	-	8	0.965
Innovation support	-	4	0.952
Innovation performance	-	8	0.957

Table b.2 Testing of leadership style KMO and Bartlett

Kaiser-Meyer-Olkin		.970
Bartlett's sphericity test	Chi-square	27821.588
	Df	1128
	Sig.	.000

Table b.3 Explanation of total variance of leadership style

Co-mp one -nt	Explanation of Total Variance								
	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotational sums of squared loadings		
	Totle	% of variance	Cumul -ative %	Totle	% of varian ce	Cumul -ative %	Totle	% of variance	Cumulati -ve %
1	23.433	48.819	48.819	23.433	48.819	48.819	23.299	48.539	48.539
2	7.051	14.690	63.509	7.051	14.690	63.509	7.341	15.293	63.832
3	1.935	4.032	67.541	1.935	4.032	67.541	1.804	3.758	67.590
4	1.824	3.799	71.340	1.824	3.799	71.340	1.800	3.750	71.340

Extraction method: Principal Component Analysis

Table b.4 Statistical table of leadership style factor load

Question items	Component			
	1	2	3	4
1			.806	
2			.808	
3			.846	
4			.822	
5			.803	
6			.803	
7			.854	
8			.856	
9			.821	
10			.826	
11				.832
12				.807

	Component			
Question items	1	2	3	4
13				.748
14				.790
15				.828
16				.726
17				.669
18				.663
19	.722			
20	.802			
21	.820			
22	.805			
23	.843			
24	.767			
25	.659			
26	.710			
27	.825			
28	.752			
29	.786			
30	.812			
31	.823			
32	.817			
33	.835			
34	.851			
35	.845			
36	.847			
37		.786		
38		.752		
39		.801		
40		.809		
41		.833		
42		.815		
43		.862		
44		.752		
45		.667		
46		.695		
47		.807		
48		.771		

Extraction method: Principal Component Analysis
Rotation method: A quarter rotation method with Kaiser Standardization.
a. The rotation converges after 6 iterations.

Table b.5 Testing of KMO and Bartlett's sense of innovative self-efficacy

Kaiser-Meyer-Olkin		0.945
Bartlett's sphericity test	Chi-square	4726.115
	Df	28
	Sig.	.000

Table b.6 Explanation of the total variance of innovative self-efficacy

Explanation of Total Variance						
	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Totle	% of variance	Cumulative %	Totle	% of variance	Cumulative %
1	6.429	80.360	80.360	6.429	80.360	80.360
2	.438	5.472	85.832			
3	.283	3.543	89.375			

Explanation of Total Variance						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Totle	% of variance	Cumulative %	Totle	% of variance	Cumulative %
4	.218	2.727	92.101			
5	.195	2.439	94.540			
6	.180	2.245	96.784			
7	.134	1.673	98.457			
8	.123	1.543	100.000			

Extraction method: Principal Component Analysis

Table b.7 Statistical table of the load of innovative self-efficacy factors

Component	
Question items	1
1	.885
2	.905
3	.896
4	.889
5	.922
6	.895
7	.875
8	.903

Extraction method: Principal Component Analysis

a. One component has been extracted.

Table b.8 Innovation support KMO and Bartlett's Test

Kaiser-Meyer-Olkin		0.830
Bartlett's sphericity test	Chi-square	2249.723
	Df	6
	Sig.	.000

Table b.9 Explanation of total variance in innovation support

Explanation of Total Variance						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Totle	% of variance	Cumulative %	Totle	% of variance	Cumulative %
1	3.505	87.622	87.622	3.505	87.622	87.622
2	.258	6.451	94.073			
3	.126	3.159	97.232			
4	.111	2.768	100.000			

Extraction method: Principal Component Analysis

Table b.10 Statistical table of innovation support factor load

Component	
Question items	1
1	.934
2	.938
3	.931
4	.942

Extraction method: Principal Component Analysis

a. One component has been extracted.

Table b.11 Innovation performance KMO and Bartlett's test

Kaiser-Meyer-Olkin		0.926
Bartlett's sphericity test	Chi-square	4406.991
	Df	28
	Sig.	.000

Table b.12 Explanation of total variance of innovation performance

Explanation of Total Variance						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Totle	% of variance	Cumulative %	Totle	% of variance	Cumulative %
1	6.157	76.964	76.964	6.157	76.964	76.964
2	.637	7.966	84.929			
3	.299	3.738	88.668			
4	.284	3.555	92.223			
5	.190	2.371	94.594			
6	.161	2.011	96.605			
7	.142	1.778	98.383			
8	.129	1.617	100.000			

Extraction method: Principal Component Analysis

Table b.13 Statistical table of innovation performance factor load

	Component
Question items	1
1	.870
2	.883
3	.847
4	.896
5	.885
6	.844
7	.898
8	.893

Extraction method: Principal Component Analysis

a. One component has been extracted.