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The Impact of Middle Managers' Leadership Style on the Job Performance of Knowledge Workers

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Doctor of Management

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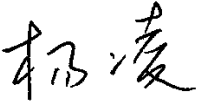
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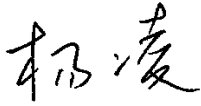
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Abstract

In recent years, the relationship between leadership styles and employee performance has been extensively studied in the field of organizational management. In the era of the knowledge economy, the role of knowledge workers is becoming increasingly important, and their competence and creativity are critical to the success of an organization. As a result, researchers have begun to focus on the impact of leadership styles on knowledge workers in order to find ways to improve employee performance and organizational innovation. Based on the theory of social exchange, this study aims to explore the influence mechanism of two leadership styles, transformational leadership and transactional leadership, on the job performance of knowledge workers.

In this study, a multi-time point data collection method was used to obtain the two-stage time lag questionnaire data of 258 knowledge workers in four Chinese companies. Path analysis method using Mplus to test the research model's hypotheses. This study finds that two both leadership styles, transformational leadership and transactional leadership, have a positive impact on the work performance of knowledge workers. In addition, affective commitment, continuous commitment, and normative commitment play a mediating role between transformational leadership and employee job performance, and between transactional leadership and employee job performance.

This study enriches the relevant research on transformational leadership and transactional leadership, and provides some management enlightenment for promoting the practice of modern organizational management.

Keywords: Transformational leadership; transactional leadership; affective commitment; continuous commitment; normative commitment

JEL: M12; M54

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Resumo

Nos últimos anos, a relação entre o estilo de liderança e o desempenho dos trabalhadores tem sido amplamente estudada no domínio da gestão organizacional. Na era da economia do conhecimento, o papel dos trabalhadores do conhecimento está a tornar-se cada vez mais importante, e a sua competência e criatividade são cruciais para o sucesso das organizações. Assim sendo, os investigadores começaram a concentrar-se no impacto do estilo de liderança nos trabalhadores do conhecimento, a fim de encontrar formas de melhorar o desempenho destes trabalhadores e a capacidade de inovação das organizações. Com base na teoria da troca social, o presente estudo pretende investigar os mecanismos de influência da liderança transformacional e da liderança transacional sobre o desempenho dos trabalhadores do conhecimento.

O presente estudo utilizou um procedimento de recolha de dados com múltiplos pontos temporais para obter dados mediante questionário com duas fases de desfasamento temporal de 258 trabalhadores do conhecimento em quatro empresas chinesas. A abordagem de análise de trajetórias com recurso ao Mplus foi utilizada para testar as hipóteses do modelo de investigação. O estudo concluiu que tanto o estilo de liderança transformacional como o estilo de liderança transacional têm um impacto positivo no desempenho profissional dos trabalhadores do conhecimento, e que o comprometimento afetivo, o comprometimento de continuidade e o comprometimento normativo desempenham todos um papel de mediação tanto na relação entre a liderança transformacional e o desempenho profissional dos trabalhadores como na relação entre a liderança transacional e o desempenho profissional dos trabalhadores.

O presente estudo enriquece a investigação relacionada com as lideranças transformacional e transacional e fornece algumas perspetivas de gestão para promover a prática da gestão organizacional moderna.

Palavras-chave: Liderança transformacional; liderança transacional; empenhamento afetivo; empenhamento contínuo; empenhamento normativo

JEL: M12; M5

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摘要

近年来，组织管理领域对领导风格和员工绩效之间的关系进行了广泛研究。在知识经济的时代，知识型员工的角色越来越重要，他们的能力和创造力对组织的成功至关重要。因此，研究者们开始关注领导风格对知识型员工的影响，以寻找提高员工绩效和组织创新力的方法。本研究从社会交换理论的视角出发，旨在探讨中层管理者的变革型领导和交易型领导两种不同的领导风格对知识型员工工作绩效的影响机制。

本研究采用多时间点的数据收集方法，获取了4家中国企业的258名知识型员工的两阶段时滞问卷数据，并采用Mplus路径分析方法对研究模型的假设进行了检验。研究发现：变革型领导和交易型领导两种领导风格对知识型员工工作绩效具有积极影响；并且，情感性承诺、持续性承诺和规范性承诺均中介了变革型领导、交易型领导与知识型员工工作绩效的直接影响作用。

本研究丰富了变革型领导和交易型领导的相关研究，并对推动现代组织管理的实践提供了一定的管理启示。

关键词：变革型领导；交易型领导；情感性承诺；持续性承诺；规范性承诺

JEL: M12; M54

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Acknowledgements

As my four years of study are coming to an end, I would like to express my sincerest gratitude to all those who have helped me during my studies.

Sincere thanks to my supervisor, Prof. Ana Patrícia Duarte of ISCTE-IUL. For her dedication in the process of writing my dissertation, from choosing the topic to the framework of the dissertation, from designing the questionnaire to collecting the data, and from analyzing the data to completing the final dissertation. I was greatly benefited and touched by her professional guidance and item-by-item corrections, and it was due to her meticulous and timely guidance that my dissertation was constantly improved. Her rigorous attitude and spirit of striving for perfection have left a deep impression on me and become a role model on my academic path.

Sincere thanks to my Chinese supervisor, Prof. Chen Lu of UESTC. Despite her busy teaching schedule, she always gave me support and help when I needed it. Especially in the questionnaire design and data analysis, she gave me patient and meticulous guidance, I admire and respect her humility, elegance, and professionalism.

Sincere thanks to all the teachers from ISCTE and UESTC, for their profound knowledge and rigorous style of study, which brought us a spiritual feast time and time again. Sincere thanks to Prof. Xiao Wen and all the teachers of DOM program team, who gave us a lot of support and help during the study. Thank my classmates in the 2020 PhD class, the years I spent with you will be a valuable life experience for me.

Finally, special thanks to my family, my parents, my husband and my son, whose support and encouragement have enabled me to focus on my research and study, and whose love is the driving force for me to keep moving forward.

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致谢

转眼间，四年的学习生涯即将划上句号，在此向所有在求学过程中帮助过我的人致以最诚挚的谢意。

感谢我的导师里斯本大学学院 Ana Patrícia Duarte教授。在我的论文写作过程中，从选题到论文框架，从问卷设计到数据收集，从数据分析到最后论文的完成，无不倾注了她的心血。她每次的专业指导和逐项批注修改都令我受益匪浅和感动，正是由于她细致而及时的指导，才使得我的论文不断完善。她严谨的治学态度、力求完美的精神给我留下了深刻的印象，也成为我学术路上的榜样。

感谢我的中方导师电子科技大学陈璐教授。尽管她的教学任务繁重，但是总在我需要的时候给予我及时的支持和帮助，尤其是在问卷设计和数据分析环节，给予了我耐心和细致的指导，她的谦逊优雅和专业素养令我敬佩和尊重。

感谢里斯本大学学院和电子科技大学的全体授课老师，他们学识渊博、学风严谨，给我们带来了一次次精神的盛宴！感谢肖文教授和DOM项目团队的全体老师，在学习过程中给予了我们很多无私的支持和帮助！感谢2020博士班的同学们，和大家同窗的岁月将是我宝贵的人生经历。

最后，特别感谢我的家人，正是我的父母、先生、儿子的支持和鼓励，使得我能够专注于研究和学习，他们的爱是我不断前行的动力。

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Chapter 1: Introduction

Based on the presentation of both the theoretical background and the practical background, this chapter puts forward the research objectives and research questions, expounds the research significance, clarifies the research methods, and introduces the research process and content structure.

1.1 Research background

1.1.1 Realistic background

The concept of high and new technology emerged in the 1960s. From the perspective of global high-tech industry, many countries have taken the industry as a new engine to drive economic growth and promote industrial transformation and upgrading. As a result, the development level of high and new technology is not only related to a country's position in the world pattern, but also an important symbol to measure the comprehensive competitiveness of the region (Iazzolino et al., 2017).

Although China's high-tech enterprises started late, in recent decades, the national and local governments have actively guided the development of high-tech industries, giving high-tech enterprises a wide range of preferential policies. Local governments also focus on building high-tech industrial parks, promoting the rapid development of high-tech enterprises. In 1991, the first national high-tech industrial development zones were approved. At that time, there were only 2,587 high-tech enterprises and 138,200 employees. Since 2010, the number of high-tech enterprises has been increasing, and the annual growth rate is basically maintained at more than 15%. In 2020, the number of high-tech enterprises reached 275,000 and the number of employees reached 37.84 million, as shown in Figure 1.1.

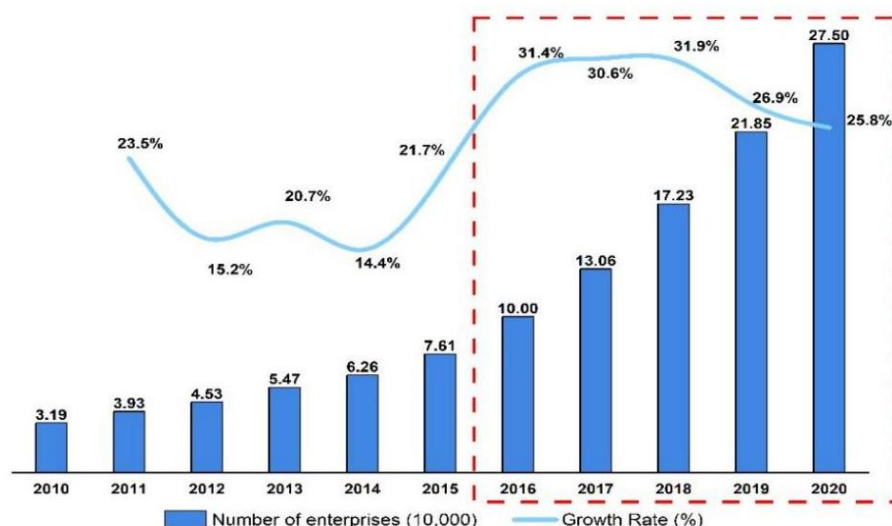


Figure 1.1 Growth trend of the number of high-tech enterprises in China from 2010 to 2020

Source: Torch High Technology Industry Development Center, Ministry of Science & Technology, China

At the same time of the rapid growth in the number of enterprises, the business indicators of high-tech enterprises in China have also been growing. In 2020, the national high-tech enterprises achieved a total of 51.3 trillion yuan of business income to achieve business income, an increase of 13.8%; to achieve a total industrial output value of 37.8 trillion yuan, an increase of 16.6%; to achieve a net profit of 3.8 trillion yuan, an increase of 20.1%. At present, the development of high-tech enterprises has become a new growth point to promote China's sustained economic development as shown in Figure 1.2.

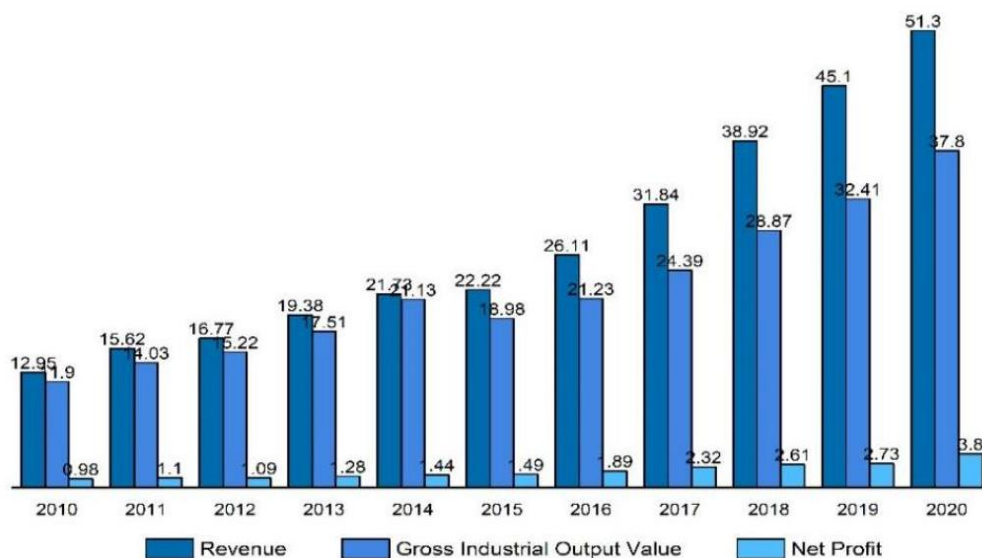


Figure 1.2 Growth of business indicators of China's high-tech enterprises from 2010 to 2020

Source: Torch High Technology Industry Development Center, Ministry of Science & Technology, China

The development of high technology is characteristic of the times, and there are representative high technologies in different generations. 1940s, the gradual emergence of high

technology along with the development of nuclear technology, computer technology, space communication technology; 1970s, microelectronics technology led to promote technological change; 1990s, with the development of information technology and network technology, high-tech industry knowledge and specialization has been strengthened; into the 21st century, the development of mobile Internet has led to the emergence of new business models (Lin et al., 2020).

In the last decade, the technological revolution represented by big data and artificial intelligence technologies has impacted our lives. The social environment has changed dramatically, and the market competition has become more intense. This uncertainty and rapid changes have driven the current pace of digital transformation of society and enterprises. In the era of artificial intelligence and digital transformation, as knowledge-intensive and technology-intensive emerging economic entities, high-tech enterprises face a rapidly changing market environment and unprecedented business challenges (Lin et al., 2020). These phenomena have attracted the attention and research of scholars.

From the perspective of business operation, it is very important for enterprises to keep competitive advantages and improve innovation performance in big data environment. Along with organizational learning ability and the use of advanced technology, the corporate governance also plays an important role in the process of enterprise's innovation practice (Lin et al., 2020). L. Li (2022) examined the relationships between digital transformation and sustainable performance and found digital transformation fosters economic performance at an accelerating rate. Novikov and Sazonov (2022) discussed the approaches to the development of a strategic program for the development of high-tech enterprise in the context of digital transformation in order to increase the level of digital maturity of the enterprise.

From a business leadership perspective, the complex and changeable environment calls for entrepreneurs to adopt ambidextrous leadership strategies to balance the different demands within the organization in order to enhance enterprise technological innovation performance (H. Yang et al., 2023). From the perspective of employees in high-tech enterprises, the renewal of technology has also had a profound impact on their work. The importance of artificial intelligence (AI)-enabled systems has been at the forefront of innovation research for the past ten years and the effects of AI-enabled systems on human workforce replacement have been a highly debated topic. Verma and Singh (2022) found that AI-enabled task characteristics (job autonomy and skill variety) and knowledge characteristics (job complexity, specialization, and information processing) impact the innovative work behavior of employees in high-tech enterprises. L. Wang and Chen (2022) found that experience-based high-performing work

systems have a significant positive impact on job performance when the intrinsic career goal is high or the extrinsic career goal is low. In summary, the emergence of new technologies has driven the world's progress and social change, which all require high-tech enterprises' business strategies and leadership to have the ability to dynamically adjust. The ability to develop excellent leaders and high-performing employees is the key to sustainable development and strategy implementation for high-tech enterprises.

High-tech enterprises are knowledge-intensive economic entities that need to keep up with the times and innovate in order to maintain a competitive advantage. Knowledge work is the sort of intellectual and cognitive work in which new knowledge is created and applied (Iazzolino et al., 2017). As the main body of innovation, knowledge workers are the source of innovation and the key to competitive advantage of high-tech enterprises, whose key function is to generate knowledge, which is the backbone of innovation (Turriago-Hoyos et al., 2016). Knowledge workers are more independent and innovative. They need intellectual virtues (e.g., prudence, effectiveness, excellence, integrity, and truthfulness) and moral character (e.g., practical wisdom, responsibility, cooperation, and courage) in order to make a lasting contribution to a functioning knowledge society (Turriago-Hoyos et al., 2016). Compared with general employees, the special features of knowledge workers are independence, creativity, difficulty in monitoring the work process, strong motivation, professionalism, disdain for authority, and high mobility. Knowledge workers are also characterized by being a scarce resource, strong self-values, and relatively low loyalty to the company. But when they get more satisfaction in their work, they are more willing to try their best to achieve organizational goals (Iazzolino et al., 2017).

For the group of knowledge workers, scholars have pointed out that due to the tasks of knowledge workers being widely unstructured and intellectual, the most striking challenge for practitioners is to increase the productivity of knowledge workers (Iazzolino et al., 2017). Work design prioritizes motivation and support for employees, as the organization's motivation and support for employees is tied to the quality of their work (Moussa et al., 2017). L. Wang and Chen (2022) showed that employee experience-based high-performance work systems significantly improve employee job performance. In addition, existing studies have shown that in an organizational environment, maintaining knowledge workers' autonomy, control and discourse power is important for cultivating their creativity, and creativity can be maximized when external motivators are used to amplify or encourage individuals' intrinsic motivation to create (Helzer & Kim, 2019).

To sum up, the ability of knowledge workers to generate, develop and implement creative

outcomes helps the organization respond to opportunities and threats, leading to innovation, adaptability and competitiveness (Shujahat et al., 2019). When faced with knowledge workers, middle managers who adopt an effective leadership style can effectively manage knowledge workers to improve their work performance. This is a key issue that high-tech enterprises should focus on.

1.1.2 Theoretical background

1.1.2.1 High-tech enterprises

With the advent of the mobile Internet era and the development of the digital economy, high-tech enterprises, which are knowledge-intensive and technology-intensive, are increasingly showing a driving role in leading economic growth. In the previous decade, high-tech innovations are advocated by many national governments to accelerate economic development and to maintain global competitiveness. The U.S. government proposed “National Strategic Plan for Advanced Manufacturing” and “Small Business Technology Innovation Research Program”, the German government proposed a project of “Industry 4.0”, and the Chinese government launched “Chinese High-tech Research and Development (863) Program”, “China Torch Program” and “China Spark Program” to facilitate high-tech innovations of companies (A. Yu et al., 2021). Related research around high-tech enterprises are receiving increasingly high attention from academics and enterprises in China and abroad.

1. Definition of a high-tech enterprise.

There is no unified concept of what is a high-tech enterprise at home and abroad. In the 1980s, the U.S. Department of Commerce proposed a standard for defining high-tech enterprises, which is based on the input-output ratio in the process of new product development. It is widely believed that “high input and high output” is the main sign of high-tech enterprises. According to Heckler (2005), high-tech companies describe companies involved in the development and introduction of new products or innovative production processes through social media and product development process the systematic application of scientific and technical knowledge.

Initiated by China State Council in 1999, the Innovation Fund for Technology-Based Small and Medium-Size Firms (the Innofund) is China premier program targeting early-stage technological ventures. It is committed to favor six broad industrial areas: electronics and information technology; bio-medicine and pharmaceuticals; new materials; optics, machinery, and electric integration; environmental conservation; and new energy and energy efficiency.

The Innofund defines “small and medium sized firms” as for-profit businesses that have fewer than 500 employees. An applicant’s R&D expenditure must be at least 5 percent of its annual revenue and at least 30 percent of the firm’s employees must have a college degree or higher (Y. Wang et al., 2017).

High-tech industries, which are based on intellectually-intensive technologies and integrate multidisciplinary technological achievements, are the strategic leading industries of the Chinese national economy. In order to support and encourage the development of high-tech enterprises, China’s Ministry of Science and Technology, Ministry of Finance and State Administration of Taxation jointly issued a policy in 2008, and revised it in 2016. With the new “Measures for the Administration of High-Tech Enterprise Identification” (Ministry of Science and Technology et al., 2016) stipulating that a high-tech enterprise is a resident enterprise registered in mainland China in the “High and New Technology Fields Supported by the State” (including the eight items of electronic information, biology and new medicine, aerospace, new materials, high-tech services, new energy and energy conservation, resources and environment, and advanced manufacturing and automation), which continuously conducts research and development and transformation of technological achievements, forms the core independent intellectual property rights of the enterprise, and carries out business activities on this basis. Since the implementation of “Torch Plan” (the national high-tech industrial development plan), the Chinese high-tech industry has made remarkable achievements.

Synthesizing the relevant literature, the high-tech enterprises referred to in this study satisfy the following conditions: the main technologies and the main products produced by the enterprises belong to the high-tech fields supported by the state, the enterprises have a high proportion of knowledge workers, the enterprises’ research and development expenses account for a high proportion of total revenue; and the enterprises are knowledge-intensive and technology-intensive.

2. Research related to high-tech enterprises.

Scholars at home and abroad have studied high-tech enterprises in a wide range of fields, including innovation performance, innovation management, innovation capability, innovation efficiency, and product development factors. For instance, Xie et al. (2018), using data from 379 high-tech companies in China, examined the relationship between knowledge absorptive capacity and firms’ innovation performance. They found that there are positive relationships between knowledge absorptive capacity and firms’ innovation performance. Fang et al. (2016) examined how to form effective innovation management for high-tech enterprises (HTEs) with

an aim of standardization and found that strategic innovation planning, internal R&D practices and external co-operative are three critical elements. Wei et al. (2019) evaluated the technological innovation capabilities for high-tech enterprises and explored some factors that affect the technological innovation ability of enterprises. In their study, Vaisman et al. (2022) evaluated the innovative activity of three types of firms in the Russian high-tech industry (growing, mature and long-lived enterprises) and found that firms show an increase in innovative activity at the maturity stage.

The emergence of big data brings both opportunities and challenges to high-tech enterprises. How to maintain competitive advantage and improve innovation performance in the big data environment? Some scholars have studied the effects of managerial power and network centrality on innovation performance of high-tech enterprises and found that managerial power has a significant positive effect on innovation performance and network centrality plays a mediating role on managerial power and innovation performance (Lin et al., 2020). With the widespread use of social media software, Seyyedamiri and Tajrobehkar (2021) investigated the impact of social content marketing in social media on the effectiveness of new product development process in high-tech companies in the IT industry in Tehran. The results of the study will lead to increasing the effectiveness of the product development process, market share and achieving revenue goals (Seyyedamiri & Tajrobehkar, 2021).

In addition, some scholars have also focused on the influence of leaders on employees and teams in high-tech companies. For instance, L. Zhou et al. (2019) surveyed R&D team members and their team leaders from 23 high-tech enterprises in China with paired samples, revealing that leader narcissism had a positive impact on team information search effort, thereby promoting team creativity. Bagheri et al. (2022) drawing on data from 310 employees working in 32 Iranian high-technology new ventures, and their respective CEOs, reported that entrepreneurial leadership fosters employees' innovative behavior through the mediating mechanisms of creative self-efficacy and passion for inventing.

In the Chinese environment, government policies can also have an impact on high-tech companies. H. Liu et al. (2020) investigated the impacts of the high-tech enterprise certification policy on corporate innovation in China, by analyzing a unique dataset of listed companies and their affiliates from 2006 to 2015. The findings show that the high-tech enterprise certification can promote corporate innovation in China, especially the innovation captured by invention patents and the intensity of policy matters.

Lei and Guo (2018) argued that the identity policy has a significant incentive effect on the innovation input and innovation output, especially substantive innovation and which can also

promote the innovation input and substantial innovation output of state-owned enterprises and private enterprises. Also, government innovation grants and high-tech park construction can have positive impacts on innovation performance, and the effect of government funds can be maximized when they are given to companies inside the high-tech park (A. Yu et al., 2021). But some scholars have also pointed out that entrepreneurs may be highly motivated to misrepresent their information during grant application, with one study estimating that more than half of Innofund applicants manipulate their financial data (Stuart & Wang, 2016).

Due to the different policies and resources, the differences in economy and geography among provinces make the development of high-tech industry uneven. This is a prominent feature of the provincial high-tech industry. For example, the competitiveness of China's high-tech industry is weaker in the western region than in the eastern region. From the perspective of evaluation method, consensus has not been reached on the true evaluation of the competitiveness results for Chinese provincial high-tech industry.

Scholars have also conducted studies with knowledge workers and managers in high-tech enterprises. Zhu et al. (2016) investigated 356 R&D professionals and their immediate supervisors from 20 high-tech enterprises, tested the mediated moderation effect of inclusive leadership, consciousness, supervisor trust on R&D professionals' innovative performance. The results showed that inclusive leadership has a positive effect on R&D professionals' innovative performance. L. Chen et al. (2018) found that under the uncertainty of economic policy, the knowledge structure of the top management team has a significant positive impact on the innovation performance of high-tech enterprises. R. Huang (2019) used the panel data of 973 listed high-tech enterprises from 2013-2017 as a sample, and concluded that the higher the proportion of technical personnel in enterprises, the better the performance of enterprises; the higher the proportion of personnel with college and above degree, the better the performance of enterprises. W. X. Zhou and Qi (2020) investigated 286 knowledge employees in 50 high-tech enterprises, the results showed that the knowledge employee's performance appraisal justice was positively related to his/her work engagement and job performance. An et al. (2021) studied the Chinese high-tech industries and build a new dynamic data envelopment analysis (DEA) model for this network structure with inter-temporal shared outputs caused by the lagged effects of inputs. In application, the proposed approach is applied to analyze the performance of high-tech industries in Chinese regions. The results show that the average performance is at the middle level, and the overall efficiency is highly correlated with the performance of the technology research and development stage. Thus, China should heavily invest in technology research and development to improve the overall performance of high-tech

industries.

Overall, these studies mostly focus on organizational performance or R&D team performance of high-tech enterprises, and fewer studies have been conducted on the job performance of knowledge workers in high-tech enterprises. This thesis will focus on the job performance of knowledge-based employees in high-tech enterprises.

1.1.2.2 Middle managers

Every manager in an organization shares one related set of secondary roles which will vary according to his/her hierarchical level (i.e., operating management, middle management, or top management) (Floyd & Lane, 2000). Middle managers are responsible for implementing senior management strategies and plans by ensuring junior staff fulfil their role. They maintain a central position in organizational hierarchies and can be seen to have a vital role between senior management and junior staff (Harding et al., 2014).

1. Definition of middle managers.

Harding et al. (2014) defined middle management as a position in organizational hierarchies between the operating core and the apex whose occupants are responsible for a particular business unit at this intermediate level of the corporate hierarchy that comprises all those below the top-level strategic management and above first-level supervision. Floyd and Lane (2000) organized the findings of prior research into a taxonomy of ten managerial roles. According to their categorization, the top management roles are decision-making roles, including ratifying, directing, and recognizing. The middle management roles focus on communicating information between the operating and top levels of management (i.e., championing, facilitating, synthesizing, and implementing). The operating management roles center on reacting to information from the factor and product markets (experimenting), from higher levels of management (conforming), or from both (responding).

Tarakci et al. (2018) argued that because middle managers are positioned in between operational realities and organizational strategy, they are essential actors in strategic renewal and their unique positions offer insights into operations alongside knowledge of strategy. Mustafa et al. (2022) noted that middle-managers are those individuals within an organization's hierarchy who are below top management and above first-level employees. As central organizational actors, middle-managers are well-positioned to share and convert the organization's vision into innovation initiatives.

In the high-tech enterprises, due to the different responsibilities and business, there are different definitions of department settings and titles. Therefore, the middle managers in this

thesis refer to the functional department heads, business department heads, and project directors. They have three main responsibilities, one is to supervise and coordinate the activities of the employees, the other is to implement and execute the decisions of the senior leaders, and the third is to play the role of a bridge between the senior managers and the employees.

2. Researches related to middle managers.

What is the role of middle managers in business operations? Previous research has focused more on the top management team. In recent years, scholars have begun to recognize that in addition to the top management team's influence on business operations, other management teams also play an important role. The consensus among scholars is that the middle management team acts as an important and special role in the business process, both as the leader and follower, and plays an important role in strategic involvement, organizational communication, and departmental management.

S. J. Chen et al. (2017) pointed out that the role of middle managers is important for a firm to realize its innovation goals for three reasons. First, middle managers' strategic role is evident in organizations that adopt innovation strategies. Strategic decision quality can be improved if middle managers share their knowledge with their supervisors and incorporate information into strategy process. Compared with top executives, middle managers have markedly different knowledge since they are connected closely to new market developments, daily operations, changes in customers' demands, and the potential challenges firms are facing. Second, middle managers are in a much better position than top managers to share their understanding of their organization's vision and innovation orientation with employees, a critical basis for organizational innovation. Third, during the implementation of innovation activities, communication between employees and coordination among multiple divisions are needed to guarantee success. Playing a critical role in forging and maintaining organizational linkages, middle managers could improve such demands on communication and coordination.

(1) Role in the organization

Regarding their role in the organization, a study by Heyden et al. (2017) found that both top managers and middle managers can play change initiation and/or change execution roles. The change initiated by top managers does not engender above-average level of employee support. However, change initiated by middle managers engenders above-average level of employee support. Radaelli and Sitton-Kent (2016) argued that middle managers can directly reach any layer of the organization. When they have key resources for knowledge of organizational discourse and social connection, they are likely to adapt to influence executive managers, employees, and peers.

(2) Strategic engagement

As for strategic involvement, Ou et al. (2017) argued that top management in organizations must effectively retain middle managers (MMs) - who are central linking pins in strategy processes - as loss of their human and social capital can threaten strategy implementation. They also can exhibit divergent strategic behavior in organization (Tarakci et al., 2018). P. Y. Li (2018) pointed out that middle managers provide information processing capabilities that help top management teams in the strategic decision-making process. However, the study of Splitter et al. (2021) showed when employee participation in strategy making undermines the middle managers' possibilities for enacting their known strategic activities, whilst also failing to allocate them new strategic activities.

(3) Organizational performance

Concerning organizational performance, Schubert and Tavassoli (2020) found that the effects differ considerably between middle management teams and top management teams. Top management teams' diversity determines whether firms engage in innovation activities at all, while middle management teams' diversity affects the actual outcome of innovation processes, in particular successful product innovations and their degree of market novelty.

Glaser et al. (2016) conducted a survey on a sample of 383 middle managers in a large multinational corporation and the results showed that risk propensity weakens the positive relationship between personal initiative tendency and job performance. This negative moderating effect was further amplified when middle managers receive high job autonomy but was attenuated in business units with a strong performance management context.

Tarakci et al. (2018) found that performance comparisons relative to peers and other organizational units better motivate middle managers' divergent strategic behavior, and managers who identify with the firm are more attentive to organizational rather than individual performance discrepancies.

As the vital force of an enterprise, middle managers play an important role in the implementation of strategic planning and the achievement of organizational goals. This thesis studies investigates the factors influencing the job performance of knowledge workers by different leadership styles of their middle managers, as well as the mediating role of workers' organizational commitment on leadership styles and job performance's relationship in high-tech enterprises.

1.1.2.3 Knowledge workers

1. Definition of knowledge workers.

Compared with traditional enterprises, high-tech enterprises have a high proportion of scientific and technological talents, mostly knowledge workers, whose professional skills and comprehensive quality are higher. The concept of knowledge workers was first proposed by Drucker (1959). He defined it as “people who master and apply symbols and concepts, working by using knowledge or information” (p.277). Drucker’s knowledge-worker’s productivity theory maintains that there are six determinants of knowledge-worker productivity: the knowledge-worker’s work should be knowledge-oriented, knowledge workers should have autonomy, the responsibility of knowledge workers is to innovate continuously, there should be continuous learning and teaching on part of knowledge-workers, the quality and the quantity are at least equally important for knowledge-workers, knowledge-workers should be treated as intellectual assets. Drucker also outlined some of the personal characteristics of a knowledge worker. For example, knowledge workers define for themselves what a task is or should be, and they take responsibility for increasing productivity in a knowledge society (Turriago-Hoyos et al., 2016).

Woodruffe (1999) considered that the knowledge workers are those who “have well professional competence, educational background and industrial experience, also their main purposes of work are creating, sharing and applying knowledge” (p.204).

Guo et al. (2012) analyzed the knowledge workers in China, and defined the knowledge workers as people who are having a bachelor’s degree, strong achievement motivation, and a strong sense of independence, focusing on learning and innovation, and emphasizing on individual’s career development. They are people who use knowledge and information to engage in management and technical services, including middle and senior management executives and professionals.

P. Y. Li (2018) concluded that knowledge workers refer to people who own the special means of production, i.e., knowledge capital and apply knowledge to innovative works. Compared to other employees, knowledge workers are mainly characterized by independence, autonomy, creative work, and strong achievement motive. Additionally, their working process is difficult to monitor, the fruits of their labor are difficult to measure, they scorn authority and have a strong tendency towards voluntary turnover. These characteristics have present unprecedented challenge to the traditional occupational values, such as loyalty and dedication.

2. Research related to the knowledge workers.

In high-tech enterprises, effective management of knowledge workers to improve their performance level is a concern for organizations. The performance of a knowledge worker has rarely been addressed from knowledge-based view perspectives, while it has been addressed

from other perspectives like HR practices and strategy at large. However, the wide range of empirical studies, meta-analyses and systematic literature reviews suggest that one of the closely related issues of the performance of workers is organizational commitment, and that organizational commitment fosters knowledge-worker performance significantly (Razzaq et al., 2019).

Knowledge workers are autonomous and creative, and traditional management practices may not improve their performance levels. Cao and Hamori (2016) using a sample of 312 highly skilled professionals working in over sixty countries, and found that developmental assignments are the strongest driver of organizational commitment, together with support from senior management.

P. Y. Li (2018) focused on the specific mechanism underlying the influence of different leadership styles on knowledge workers' work engagement from the perspective of psychological capital. The results showed that while both transformational leadership and transactional leadership positively influenced knowledge workers' psychological capital and work engagement, compared to transactional leadership, transformational leadership had a greater predictive power. In addition, the psychological capital of knowledge workers not only positively predicts their work engagement, but also moderates the impact of the two leadership styles on work engagement.

The turnover intention of knowledge workers has always been a focus of managers and researchers. H. Huang et al. (2021) studied the effect of knowledge workers' overwork on their turnover intention. Based on the data of 967 knowledge workers from 17 provinces in China, they found that knowledge workers' overwork has a positive effect on their turnover intention. With knowledge workers becoming more and more important, how to reduce the overtime of these workers as well as their turnover rate motivated by overtime is an urgent problem facing enterprises.

Most knowledge workers have strong occupational commitment and weak organizational commitment. How to integrate and improve the occupational commitment and organizational commitment of knowledge workers is the key issue that human resource management needs to solve. Ling and Zhang (2020) taking training as the starting point, career commitment as the mediating variable, and internal employability as the moderating variable, have explored the influence mechanism of training on the organizational commitment of knowledge employees. The analysis of a sample of 385 knowledge workers showed that training positively affects the career commitment and organizational commitment of knowledge employees, and career commitment plays a partial mediating role between training and organizational commitment

(Ling & Zhang, 2020).

At present, most researchers have analyzed employee performance from the perspective of organizational commitment, and fewer have studied the performance of knowledge workers as a group. This thesis attempts to explore the mediating mechanism of organizational commitment of knowledge workers on the relationship between middle manager's leadership style and worker's job performance in order to provide insights and implications for organizational managers.

1.2 Research problem and questions

1.2.1 Research problem

In the big data environment, the competition of high-tech enterprises in China has intensified, and the enterprises must continuously invest in R&D to improve their innovation ability, while the national policies have more influence on this industry (H. Liu et al., 2020). In addition, China's high-tech industry started late, management accumulation is insufficient, and high-tech enterprises are mainly knowledge workers, whose career values are also very challenging to traditional career values (P. Y. Li, 2018). From past studies, the research on job performance focuses more on the top management team, and there are fewer studies on middle managers, and fewer studies on the job performance of knowledge employees in high-tech enterprises, especially the lack of research on the impact of managers' leadership styles on the job performance of knowledge employees. Therefore, the key research problem of this study is to explore the influence mechanism of the leadership style of middle managers in high-tech enterprises on the job performance of knowledge employees. Specifically, it explores the internal influence between transformational leadership, transactional leadership, employee organizational commitment, and job performance. The technical circuit diagram of this study is shown in Figure 1.3.

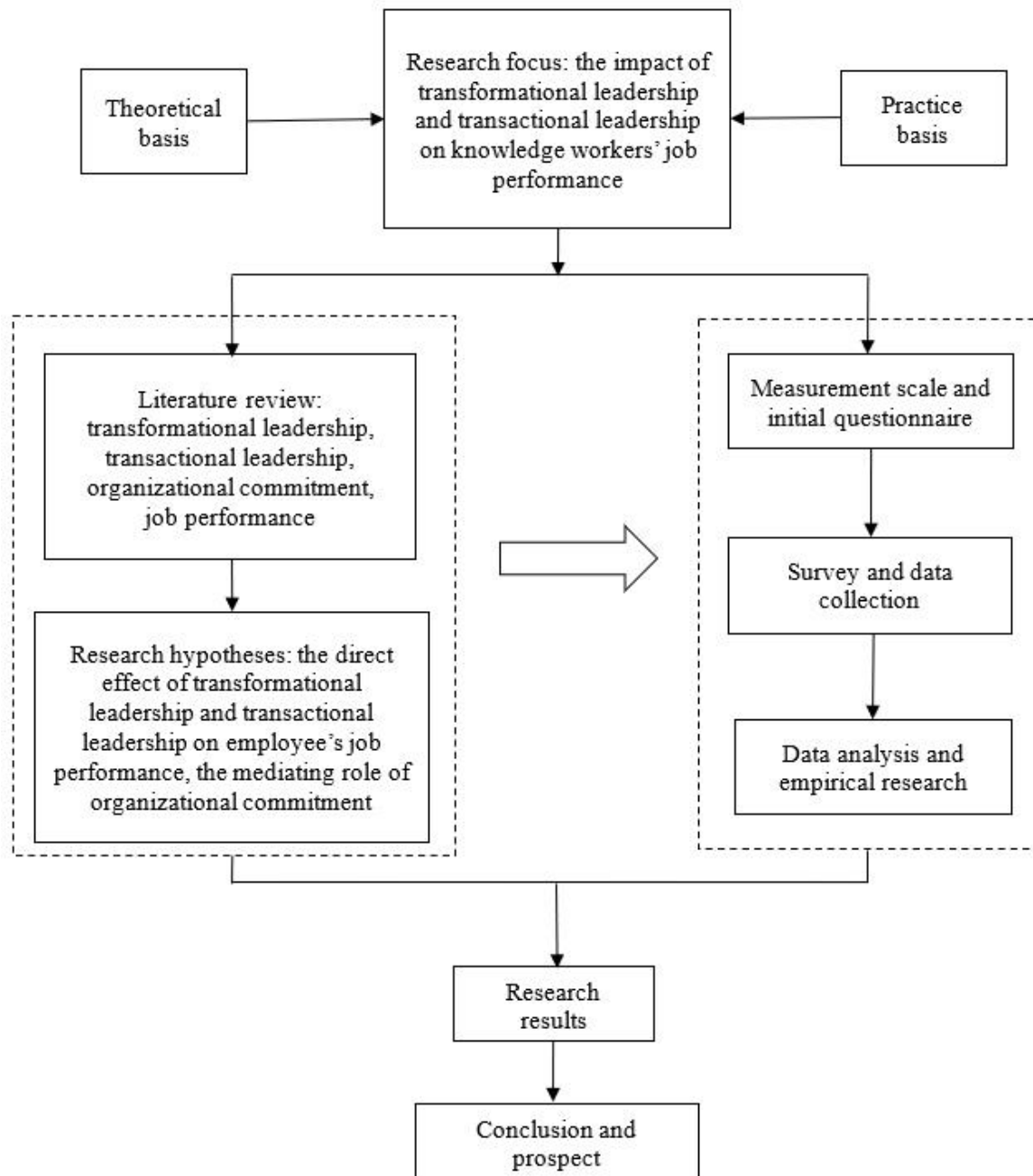


Figure 1.3 The technical circuit diagram

1.2.2 Research questions

The specific research questions are as follows:

1. What is the relationship between transformational leadership style, transactional leadership style of middle managers and the job performance of knowledge workers?

The impact of leadership style on job performance has been studied by many Western and Eastern scholars. Bass (1985b) argued that transformational leadership style could make subordinates produce higher performance than expected. Tepper et al. (2018) found that

subordinates need more transformational leadership when they experience more challenge stress, face greater uncertainty at work, and perform more meaningful work. Owens and Hekman (2016) demonstrated that leader behavior can spread via social contagion to followers, producing an emergent state that ultimately affects team performance. Han et al. (2018) proposed that an organization's high-performance work system (HPWS) affects team managers' transformational leadership (TFL), and that the emergence of TFL and the effectiveness of TFL on team performance are contingent on organizational adaptation and efficiency orientations. Ng (2017) explored multiple mechanism explaining the relationship between transformational leadership and job performance. Gameda and Lee (2020) showed that transformational leadership style had a significant positive relationship with employees' work engagement and innovative work behavior, while transactional leadership style had a significant positive relationship with employees' task performance.

In the context of Chinese culture, how do the dimensions of transformational and transactional leadership styles of middle managers in high-tech companies affect subordinates' performance? Therefore, the first research aim of this study is to explore what is the impact of the middle managers leadership style on job performance of knowledge workers. Do transformational leadership style and transactional leadership style have different effects? What is the effectiveness of each dimension of these two leadership styles?

2. What is the relationship between transformational leadership style, transactional leadership style of middle managers and the continuance commitment, affective commitment, normative commitment of knowledge workers?

A great deal of research has been conducted by domestic and international scholars on the influence of leadership style on employees' organizational commitment. Purnomo et al. (2020) argued that leadership style has a significant effect on organizational commitment. Q. Zhang and Shi (2015) found that transformational leadership and transactional leadership style have significant positive impact on affective commitment, continuous commitment, normative commitment, and transformational leadership style has a larger impact than transactional leadership style on organizational commitment and its dimensions.

Therefore, the second research aim of this study is, to explore what is the effect of leadership style of middle managers in high-tech companies on organizational commitment and its dimensions of knowledge workers.

3. What is the relationship between knowledge workers' affective commitment, continuance commitment, normative commitment and job performance in high-tech enterprises?

There are several studies on organizational commitment and employee job performance. Meyer and Allen (1991) summarized organizational commitment into three dimensions: affective commitment, continuous commitment, and normative commitment. The three-component model of organizational commitment of (Meyer & Allen, 1991) is widely used in the research on organizational commitment. Schreuder et al. (2017) found that perceived fulfilment of team obligations has significant effects on team commitment. When a team member perceives that the team obligations are fulfilled, he/she becomes more committed to the team. Galperin et al. (2020) showed that managers perceive highly capable candidates to have lower commitment to the organization than less capable but adequate candidates. Desky et al. (2020) found leadership trilogy style have positive and significant effect on financial performance, organizational commitment has positive and significant effect on financial performance, organizational commitment has a significant effect on employee performance. Based on the survey results of 201 valid questionnaires for high and new technology enterprises, G. L. Yu and Xu (2019) found scientific and technological researchers' engagement has a direct and significant positive effect on their job performance, and the organizational commitment plays a mediating role in it.

Therefore, what is the impact of affective, continuance and normative commitment on employee job performance? Do they play a different role in the predictions of employee job performance in high-tech companies? This is the third research problem of this study.

4. Does employee organizational commitment have a mediating role between transformational leadership style, transactional leadership style and employee job performance?

In previous studies on the impact of leadership style on job performance, team efficacy, team cohesion, team atmosphere, and job satisfaction have been studied more often as mediation variables, and fewer studies have introduced organizational commitment as an mediation variable (Almutairi, 2016, H. J. Yang & Yang, 2016). H. J. Yang and Yang (2016) found that affective commitment had a mediating effect between transformational leadership and radical innovation, and normative commitment had a mediating effect between transactional leadership and incremental innovation. These findings reveal the mechanisms by which the affective and normative commitments mediate between different leadership styles and types of innovations, and provide new perspectives for a deeper understanding of the impact of leadership behaviors on innovation performance. Almutairi (2016) found that transformational leadership style is positively correlated with job performance and affective organizational commitment. The findings also reveal that affective organizational commitment mediates the relationship between transformational leadership style and job performance.

According to the characteristics of knowledge workers in high-tech enterprises, organizational commitment may be an important intermediary variable to reveal the influence process of predicting variables on criteria variables. The fourth research aim of this thesis is to explore how does leadership style affect employees' performance. Does organizational commitment play a mediating role in this influence process?

1.3 Research significance

Based on the social exchange theory (Blau, 1964), this study intends to explore the influence of transformational leadership style and transactional leadership style of middle managers in Chinese high-tech enterprises on the job performance of knowledge workers, and the mediating role of employee organizational commitment. By expanding and supplementing related studies on transactional leadership style, transformational leadership style, organizational commitment and job performance, this study helps to enrich the theoretical content of social exchange theory and provides new insights and guidance for management practice. The findings of this study are significant for both theory and practice, and are conducive to deepening our understanding of the relationship between leadership style, organizational commitment, and job performance, and promoting management effectiveness and employee performance improvement in high-tech enterprises. The research significance of this study includes two aspects: theoretical significance and practical significance.

1.3.1 Theoretical significance

Firstly, from the perspective of social exchange theory, this study incorporates the two influencing factors of transformational leadership and transactional leadership into the research system of employees' individual performance, expands the research on the outcome variables of transformational leadership and transactional leadership, and enriches the research on the antecedent variables of employee job performance.

Secondly, this study explores the mediating role of three types of organizational commitment, namely affective commitment, continuous commitment, and normative commitment, in the relationship between transformational leadership, transactional leadership and employee job performance, and expands the relevant research on organizational commitment.

Finally, based on the social exchange theory, this study proposes a theoretical model and

conducts empirical research, which clarifies the internal mechanism of the two leadership styles of middle managers, transformational leadership and transactional leadership, affecting the job performance of knowledge workers, which is helpful to enrich the connotation, research scope and applicability of social exchange theory, and also provides reference for the research of social exchange theory in China.

1.3.2 Practical significance

This study aims to reveal the relationship between the leadership style of middle managers, organizational commitment and job performance of knowledge workers, put forward feasible suggestions on how to cultivate middle managers in high-tech enterprises, and give methods on how to stimulate employees' organizational commitment to promote the improvement of employees' job performance.

First, this study aims to explore which leadership style of middle managers is more conducive to improving the job performance of knowledge workers in China's high-tech enterprises, and helping middle managers cultivate their most suitable leadership styles in management practice, so as to improve the job performance of employees.

Second, the findings of this study aim to demonstrate the positive impact of organizational commitment on job performance of knowledge workers so that managers can understand and value the role of organizational commitment in management practice.

Finally, this study reveals the dynamic relationship between transformational leadership, transactional leadership, employee organizational commitment and job performance of middle managers, so as to guide enterprises to effectively train and manage middle managers, so as to help enterprises establish a more efficient work system.

1.4 Research method

Through literature analysis, questionnaire survey and statistical analysis, this study explores the relationship between leadership style of middle managers, employee organizational commitment and job performance in high-tech enterprises.

1. Literature analysis method: There are rich literatures on transformational leadership, transactional leadership, employee organizational commitment, employee job performance, which provide sufficient theoretical basis for the model construction, research hypothesis proposal, research result analysis and discussion of this study. Through the summary of these

literatures, this study will clarify the connotations of transformational leadership, transactional leadership, employee organizational commitment and job performance, study the interrelationship between primary variables, and form a conceptual research model.

2. Questionnaire survey method: Based on the literature review, this study defines the element connotation and dimension division of each variable, determines the measurement method. Draws on the mature scale of measuring transformational leadership, transactional leadership, organizational commitment, and job performance at home and abroad, this study compiles the corresponding research questionnaire. Then, the complete questionnaires are distributed in the high-tech enterprise team, and relevant data are analyzed to the model.

3. Statistical analysis method: After obtaining first-hand data through questionnaire survey, this study will use SPSS 26.0 and Mplus 8.0 for data analysis. In the data analysis stage, we will use descriptive statistical analysis, reliability analysis, and validity analysis to describe and analyze the characteristics of the samples, as well as path analysis method to validate our research hypotheses and to help us to deeply understand the relationship between the research variables.

1.5 Research process and content structure

1.5.1 Research process

Starting from the background of the research topic, this thesis firstly defines the research problem, identifies the source of the problem as well as the research questions. Next, extensive literature reading was conducted, and the theoretical model and research method of this study were initially proposed on the basis of literature research. Then the field research was started, questionnaires were systematically launched, statistical analysis of the collected data was conducted, theoretical models and hypotheses were verified, and conclusions were drawn. Then data pre-processing and data analysis were conducted, and finally the research results of the topic were summarized.

1.5.2 Content structure

This thesis divided into five chapters, the specific structure is as follows.

Chapter 1: Introduction. This chapter introduces the practical background and theoretical background, proposes the research objectives and research questions, states the theoretical

significance and practical significance, and clarifies the research methods, process and content in detail to ensure the scientificity and feasibility of the study.

Chapter 2: Literature review and research hypotheses. First, this chapter comprehensively reviews the connotations, dimensions, and measurements of transformational leadership, transactional leadership, organizational commitment, and job performance. Secondly, this chapter summarizes the current research status of transformational leadership, transactional leadership, organizational commitment, and job performance at home and abroad. Finally, this chapter clarifies the core ideas of social exchange theory, constructs a mediation model based on the social exchange theory, and proposes the research hypotheses.

Chapter 3: Research method. This chapter identified the participants of the study and the survey method, clarifies the questionnaire design process and the scales used for the main variables, and describes the basic information of the survey process and the sample. The provision of this information will ensure the reliability and credibility of the study and provide a basis for analysis and discussion in subsequent chapters.

Chapter 4: Data analysis and results. This chapter mainly performs descriptive statistical analysis, correlation analysis, reliability analysis and validity analysis of sample data. Through these analyses, we will provide a comprehensive characterization and assessment of the characteristics and relationships of the sample data. In addition, we will apply path analyses to verify the total, direct and indirect effects regarding the hypothesis of this study. The results of these analyses will help us to quantify and explain the relationships and effects between the research variables. Through effective data analysis, we will be able to draw strong conclusions about the relationships among the transformational leadership, transactional leadership, employee organizational commitment, and job performance, and provide support for subsequent discussions and inferences.

Chapter 5: Discussion and conclusion. This chapter summarizes the data analysis results, expounds the theoretical contribution of the research, and puts forward policy recommendations from the macro level of the government, the industry meso level, the micro level of enterprises and the individual level, points out the limitations of this research, and provides suggestions for future research.

1.6 Summary

Starting from the practical background and theoretical background, this chapter has put forward the main objectives and problems discussed in this study, and clarified the theoretical and

practical significance of the research. At the same time, the research method, research process and content structure of this study were clarified. Through the discussion in this chapter, we will have a clear understanding of the background, objectives and significance of the study, as well as the scientificity and feasibility of the study. At the same time, the elaboration of the research method, research process and research content provide the basis for the analysis and discussion in the subsequent chapters.

Chapter 2: Literature Review

Firstly, this chapter sorts out the existing literature, introduces the connotation, dimensions and measurement scales of major variables such as transformational leadership, transactional leadership, organizational commitment and job performance, and reviews the empirical research results of the above variables. Secondly, this chapter expounds the core ideas of social exchange theory, constructs a mediation model based on social exchange theory, and puts forward the relevant hypotheses involved in the internal mechanism of transformational leadership and transactional leadership affecting knowledge workers' job performance.

2.1 Transformational leadership and transactional leadership

In the face of the ever-changing external environment, organizational change is becoming more and more intense. As the executor of organizational change, the leader plays an important role in the process of change. Leadership is the process of interaction between leaders and subordinates, and leaders try to influence the behavior of their subordinates to achieve organizational goals (G. A. Yukl, 2010). In other words, leadership is described as an impact-based choice of behavior (Krause, 2004). The definition of leadership is based on factors such as a leader's personal characteristics and behaviors, relationships with followers, interactions with other stakeholders, perceptions of leaders by others (Nusair et al., 2012). Because leadership is so varied and influenced by many variables, such as the environment, there is no universal definition of leadership (Alblooshi et al., 2021). Kanungo (1998) argued leadership is leaders use of various social power bases to influence others to achieve organizational goals, the definition was put forward earlier and is more classical (G. A. Yukl, 2010).

Early leadership research went through several different stages, and the main leadership research can be divided into four perspectives, namely the trait approach, the behavioral approach, the power influence approach, and the situational approach (Lo et al., 2010). From the perspective of the trait approach, Mahoney et al. (1960) deemed that certain personal traits or personalities are the criteria that distinguish leaders from non-leaders, and argued that leaders are born with certain traits rather than being trained. Stogdill (1974) summarized ten important leadership traits, namely achievements, toughness, insight, initiative, self-confidence,

responsibility, coordination capacity, tolerance, influence and social skills.

From the perspective of the behavioral approach, Stogdill (1950) defined leadership as the process (behavior) that influences the activities that an organized group carries out to achieve a goal, and emphasized the purpose of this process. Burns (1978) also argued that leaders are neither born nor made, they evolve from a structure of motivations, values, and goals. Thus, he defined leadership as leaders inducing followers to act toward certain goals that represent the values, motivations, wishes, needs, desires and expectations of leaders and followers (Burns, 1978).

From the perspective of the power influence approach, Bass and Stogdill (1990) defined leadership as the interaction between two or more members of a group, which often involves the structuring or reorganization of the situation and members' perceptions and expectations. In interactive relationships, the leader's behavior affects others more than the actions of others (Bass & Stogdill, 1990). Rost (1993) emphasized that leadership is an influence relationship between leaders and followers who intend to make real revolution that reflects their common purpose. This definition of leadership by Rost (1993) includes four essential elements: relationships are built on influence, leaders and their subordinates are actors in that relationship, leaders and their subordinates intend real revolution, and leaders and their subordinates intend to make changes that reflect their common goals. From these essential elements, we can see that leadership is a relationship of influence in which leaders and their subordinates influence each other to achieve real revolution that reflects their common purpose.

From the perspective of the situational approach, Silva (2016) argued that leadership can be defined as the process of interacting with people in a given context who accepts someone as their leader in order to achieve a common goal. This definition emphasized that leaders, followers, and the environment play a very important role in the leadership process. Antonakis and Day (2018) deemed that leadership is the nature of the process of influence that occurs between leaders and followers, and explored how this influence process is explained by the disposition characteristics and behaviors of the leader, the perception and attribution of the leader by the follower, and the context in which the influence process occurs. In conclusion, no matter how leadership is defined, Bennis (2009) pointed out that there should be three basic elements of leadership. The first element is to guide the vision: leaders come up with a clear idea of what they want, both professionally and personally. The second element is passion: leaders must love what they are doing and be passionate about it. The third element is integrity: the basic part includes self-knowledge, candor, and maturity.

Based on different research methods, scholars have developed numerous leadership theories, as shown in Table 2.1. At the same time, different leadership styles can be divided according to different theories. For instance, Behavioral leadership theory (Stogdill & Coons, 1957) categorized leadership into two dimensions - Consideration and Initiating Structure. Consideration refers to the leader's degree of concern for interpersonal relationships and emotions of the employees, while initiating structure refers to the leader's behavior focused on task orientation and organizational structure to achieve organizational goals (Stogdill & Coons, 1957). It classified leadership styles into four categories resulting from the crossing of the two dimensions - high initiating structure/high consideration, high initiating structure/ low consideration, low initiating structure/ low consideration, low initiating structure/ high consideration (Stogdill & Coons, 1957).

Path-goal theory (House & Mitchell, 1975) stated that leaders are able to exhibit different leadership styles depending on the situation, such as directive leadership (letting subordinates know what is expected of them), supportive leadership (showing concern for subordinates' needs), participative leadership (encouraging subordinates to participate in goal decisions and solving specific problems), and achievement-oriented leadership (striving for higher standards of performance and having more confidence in the ability to meet challenging goal). Contingency model (Fiedler, 1978) attributed the effectiveness of group leaders to the motivational disposition of the leader, and the degree of situational favorability for the leader, and proposed two basic leadership styles, task-oriented and relations-oriented leader.

Situational theory (Hersey et al., 1979) required leaders to determine the appropriate leadership style to use in a given situation, by understanding workers' ability and willingness to accomplish tasks, and then adjusting their leadership style and proposed four leadership styles - directing, coaching, supporting, and delegating. Directing leaders provide clear guidance and instructions on what employees should do, how to do it, and when to complete tasks. Coaching leaders not only provide clear guidance, but also focus on the personal development and growth of their employees. Supporting leaders focus on the emotional needs and well-being of employees, providing emotional support and encouragement to boost employees' self-confidence and motivation. Delegating leaders believe in the competence and autonomy of their employees and encourage them to make decisions and solve problems (Hersey et al., 1979).

Management grid theory (Blake & Mouton, 1982) focused on task (production) and employee (people) orientations of managers, the combination of concerns between the two

extremes, and proposed a grid of five basic leadership styles, namely impoverished, authority-obedience, country club, organization man, and team. Impoverished leaders have low levels of attention and task requirements for their employees, and they often do not put much effort or time into managing their employees, and they do not focus on their development or provide clear guidance. Authority-obedience leaders focus on the completion of tasks and the achievement of organizational goals, emphasize work efficiency and results, and are good at setting clear work requirements and goals. Country club leaders are very focused on the emotional needs and relationships of their employees, and they tend to build a harmonious work environment that values employee satisfaction and well-being, as well as teamwork and emotional engagement of employees. Organization man typically adopt a compromise approach without overemphasizing task requirements or employee relationships in order to achieve a state of relative balance. Team leaders focus on employee development and team collaboration, and they are committed to building a supportive and open work environment that stimulates creativity and self-motivation among team members (Blake & Mouton, 1982).

The full-range leadership theory (Bass, 1985a) proposed three leadership styles: transformational leadership, transactional leadership, and laissez-faire leadership. The full-range leadership theory (Bass, 1985a) described a more complete leadership style from transformational leadership style to transactional leadership style to laissez-faire leadership style, and also reflected the different states of managers' work status from positive to negative, and work performance from effective execution to inaction. Full-range leadership theory has dominated workplace leadership research in recent years (Lord et al., 2017). Therefore, based on the full-range leadership theory, and considering that there are very few laissez-faire leaders in the field of high-tech enterprises (Lord et al., 2017), this study mainly selects two leadership style variables, specifically transformational leadership and transactional leadership, and explores the influence mechanism of the two mentioned leadership styles on employees' job performance. Since the reform and opening up of China, Chinese companies have been going global, and these two leadership styles not only have a wide range of application scenarios in China, but also have a history of empirical research for many years. Also, Benevolence in Chinese Confucianism is consistent with transformational leadership (Fan et al., 2023). Interpersonal relationships are important in Chinese culture, transactional leaders emphasize the importance of the relationship between leaders and followers (Burns, 1978). In addition, high-tech enterprises are centered on technological innovation, and scholars have found that both leadership styles are conducive to the formation of innovation (H. J. Yang & Yang, 2016),

and both positively affect the work commitment of knowledge workers (P. Y. Li, 2018).

Table 2.1 Leadership theory

Theory	Summary
Behavioral leadership theory (Stogdill & Coons, 1957)	Focus on what leaders actually do, not on their qualities. Different patterns of behavior are observed and categorized into different "leadership styles".
Trait theory (Mahoney et al., 1960)	The list of traits or qualities associated with leadership exist in abundance and continue to be produced. It draw on virtually all the adjectives in the dictionary which describe some positive or virtuous human attribute, from ambition to zest for life.
Contingency theory (Fiedler, 1978)	This is a refinement of the situational viewpoint and focuses on identifying the situational variables which best predict the most appropriate or effective leadership style to fit the particular circumstances.
Transactional theory (Burns, 1978)	This approach emphasizes the importance of the relationship between leader and followers, focusing on the mutual benefits derived from a form of "contract" through which the leader delivers such things as rewards or recognition in return for the commitment or loyalty of the followers.
Transformational theory (Burns, 1978)	The central concept here is change and the role of leadership in envisioning and implementing the transformation of organizational performance.
Situational theory (Hersey et al., 1979)	This approach sees leadership as specific to the situation in which it is being exercised. For example, whilst some situations may require an autocratic style, others may need a more participative approach. It also proposes that there may be differences in required leadership styles at different levels in the same organization.
Full-range leadership theory (Bass, 1985a)	On the basis of transformational leadership theory and transactional leadership theory, three leadership styles of transformational leadership, transactional leadership and laissez-faire leadership are developed, and their effectiveness is ranked: transformational leadership is the most effective, transactional leadership is second, and laissez-faire leadership is the most ineffective.

2.1.1 Definition and measurement of transformational leadership

In the face of the ever-changing external environment, organizational change is becoming more and more intense. As the executor of organizational change, the leader plays an important role in the process of change. As the representative of the development trend of leadership theory, transformational leadership is regarded as an efficient leadership mode in the modern competitive environment, and has attracted the attention of the theoretical and business circles (Kammerhoff et al., 2019). We collated the relevant literature of transformational leadership, and firstly combed its conceptual connotation and measurement methods.

2.1.1.1 Conceptual analysis of transformational leadership

According to Burns (1978), outstanding leaders subtly influence the motivation of others

because they possess transformative qualities. Burns (1978) saw leadership as revolution, with leaders and followers often transforming or changing in terms of performance and outlook. Transformational leadership was defined as a process in which the leader and his/her subordinates work together to improve each other's moral and motivational levels (Burns, 1978).

Bass (1985a) deemed that transformational leadership refers to the leadership which aims to motivate employees to work with ideals and ethical values, driven by organizational interests, and constantly improving their own value for the benefit of the team, the organization, and the larger political good, and transcend employee personal interests to achieve the state of "best self". In this view, transformational leadership means that leaders make subordinates aware of the significance and importance of tasks, motivate and meet the high-level needs of subordinates, build an atmosphere of mutual trust, and then encourage subordinates to put organizational and collective interests above personal interests, and produce work results beyond expectations (Bass, 1985a).

G. Yukl (1999) argued that transformational leadership is a set of behaviors that motivate followers to achieve performance that exceeds expectations by changing their attitudes, beliefs, and values, rather than simply gaining obedience. In general, transformational leaders see followers as individuals and spend time coaching them to develop their capabilities and subsequently create meaningful communication between them (Lee, 2005). Transformational leadership is a leadership style that focuses on motivating, encouraging, and leading by example, while also developing the personal potential of followers (Kammerhoff et al., 2019). Scholars have defined the concept of transformational leadership from different research perspectives, as shown in Table 2.2.

Table 2.2 Summary of concepts analysis of transformational leadership

Author	Viewpoint and its definition
Burns (1978)	The driving force of organizational change, the process by which leaders and subordinates enhance each other's ethics and motivations.
Bass (1985a)	Bass (1985) defined transformational leadership from the perspective of how leaders influence subordinates, which claimed that subordinates aim to trust, admire and respect leaders. Transformational leadership enhances subordinates' awareness of the importance and value of tasks; Make subordinates focus first on team or organizational goals, rather than their own interests; Activate the higher needs of subordinates.
G. Yukl (1999)	By influencing employees' attitudes and behaviors, transformational leadership enables them to identify with the mission and vision of the organization and encourages them to complete work tasks by fully empowering and giving employees autonomy. At the same time, the organizational culture, structure and management strategy are adjusted until they match each other, so as to achieve

Sergiovanni (1990)	organizational goals. In conclusion, such a leadership style contributes to the long-term success and sustainable development of the organization.
Egri and Frost (1994)	Transformational leaders can meet the high-level needs and motivations of employees, stimulate their potential and intelligence, and instill their own moral values to employees, arouse their sense of responsibility for ethical issues in the organization, and make them strict with themselves, so as to complete their work tasks with high standards.
Pillai et al. (1999)	Transformational leaders build on their strong values and beliefs to build an organizational vision that helps employees gain insight into their environment and drive organizational change.
Robbins (2001)	By stimulating the internal needs of subordinates, leaders enable subordinates to build organizational interests on their own interests, and establish a working atmosphere of mutual trust, so as to encourage subordinates to perform better than expected. This leadership style not only stimulates intrinsic motivation in subordinates, but also promotes teamwork and efficient performance.
Ackoff (1998)	Transformational leaders have the unique charm of intelligent stimulation and personalized care, thus can exert a huge influence on subordinates, such as enhancing employees' innovation ability, establishing a sense of responsibility for their work, and make them generate a higher sense of identity for organizational development goals to achieve organizational goals.
S. M. Liu and Liao (2013)	Transformational leaders would describe the organizational vision to employees, enhance their sense of identity that the vision can be realized, stimulate the spirit of hard work and selfless dedication of employees, and make them willing to sacrifice their personal interests for the interests of the organization. In addition, transformational leaders help employees realize their self-value in a pleasant working environment by creating a relaxed and pleasant organizational atmosphere, and ultimately achieve organizational goals.
Løvaas et al. (2020)	Transformational leadership encourages employees to actively participate in organizational decisions and come up with innovative ideas to expand employees' horizons and enhance their sense of self-efficacy, thereby drive organizational change and achieve goals.
	Motivate employees to exceed expectations by looking beyond self-interest and focusing instead on the organization's norms, values, and goals.

As shown in Table 2.2, although scholars have different definitions of transformational leadership, their views on the substance of the characteristics of transformational leadership are basically the same. Through comparison, it could be found that scholars' definition of transformational leadership includes the following basic characteristics:

First, transformational leaders will communicate the organization's mission goals to employees in a unique way that actively promotes change and the health of the organization. This type of leadership behavior involves more than simple interchange incentives, but rather inspires employees to continually strive to achieve the organization's vision. Second, transformational leaders focus on long-term goals and benefits, motivate employees to enhance their personal innovation, and create a positive work environment for achieving the organization's strategic goals. They encourage employees to put organizational interests above personal interests and work together to achieve organizational goals. Third, transformational leaders are able to guide employees to pursue individual development and set effective career

goals, as well as to adhere to personal ethical standards and enhance their sense of responsibility. In addition, transformational leaders are able to clarify the organization's vision and mission, clearly outline the organization's blueprint, and inspire subordinates' motivation and work drive. In conclusion, transformational leaders focus on leadership philosophy and have unique leadership concepts that will influence their employees through their own qualities, enhance their subordinates' intrinsic motivation, and inspire them to work hard in pursuit of higher organizational goals.

2.1.1.2 Individual-focused and team-focused transformational leadership

In the early studies, most scholars defined transformational leadership as a holistic concept, focusing only on the impact of transformational leadership on a single level. With the deepening of research, Kark and Shamir (2013) found that the dimensions of transformational leadership point to two different levels respectively: the individual level and the team level. Based on this, scholars put forward the new concept of transformational leadership, which includes two different leadership behaviors: individual-focused and team-focused (X. H. F. Wang & Howell, 2010).

(1) Team-focused transformational leadership

Team-focused transformational leadership was proposed based on the leadership style theory, which focuses on the team as a whole, emphasizes the common values of the team, attaches importance to the team goal, and pays attention to the common interests of the team as a whole (J. B. Wu et al., 2010). Team-focused transformational leadership regards team members as a whole, arouses their identification with the team through communication, and encourages them to work hard for the common goals of the team (X. H. F. Wang & Howell, 2010). As leaders pay more attention to the team as a whole, team members tend to form a relatively more consistent perception of the leader as well, forming a common team culture and behavioral patterns (Yammarino & Bass, 1990), and in turn show more consistent attitudes, emotions, and behaviors, actively engaging in the team's work and contributing to the team's success.

(2) Individual-focused transformational leadership

Individual-focused transformational leadership was proposed based on the contingency leadership theory, which focuses on individual members of the team rather than the team as a whole. Individual-focused transformational leaders adopt different leadership styles for different subordinates in the team based on different situational factors, which leads to inconsistent cognition of individual-oriented transformational leadership behaviors among

team members (Y. Q. Li et al., 2015). In addition, individual-focused transformational leaders will adopt differentiated guidance methods according to different characteristics of team members, and set differentiated work goals for different subordinates (Kark & Shamir, 2013), and thus exert leadership effectiveness through different subordinates' cognition of their own factors (i.e., traits and abilities) or situational factors (i.e., team atmosphere and work characteristics) (J. B. Wu et al., 2010).

2.1.1.3 Dimensions and measurement of transformational leadership

Although Burns (1978) first proposed the concept of transformational leadership, he did not deeply study the structural dimension of transformational leadership. The results of the constituent behaviors of transformational leadership are inconsistent across studies, and the components are so highly interrelated that it is difficult to definitively determine their individual effects (G. A. Yukl & Becker, 2006). This thesis reviews the development process of transformational leadership scale in chronological order.

Bass (1985a) further defined the concept of transformational leadership on the basis of Burns (1978), and proposed a three-dimensional structure of transformational leadership: intellectual stimulation (transformational leaders encourage employees to think, innovate, and challenge conventional wisdom), charismatic-inspiring leadership (transformational leaders inspire and motivate their employees through charisma and passion), and personalized care (transformational leaders are attentive to the individual employee).

With the deepening of research, Posner (1990) carried out research on the elements of effective leadership in a team and summarized the five-dimensional structure of transformational leadership in a team, including five dimensions: challenging process (transformational leaders encourage innovation and continuous improvement in their employees, and encourage their teams to find new solutions, explore new opportunities, and face difficulties and challenges in their work), reaching consensus (emphasize the ability of transformational leaders to inspire a shared vision and commitment among team members), mobilizing members (it involves transformational leaders facilitating teamwork and developing the abilities of their members), setting an example (transformational leaders build trust and respect through their actions and decisions, motivating team members to emulate and follow) and inspiring enthusiasm (transformational leaders provide positive feedback and rewards to team members and encourage them to overcome difficulties). The scale has become a representative tool for measuring transformational leadership at the team level.

Podsakoff et al. (1990) summarized the studies on transformational leadership from 1977

to 1987, and believed that transformational leadership to ensure the effectiveness of leadership should contain six dimensions, and developed a measurement scale corresponding to each dimension. The six key categories are: articulating a vision, providing an appropriate model (e.g., leading by example), fostering the acceptance of group goals, having high performance expectations, providing individualized support, and providing intellectual stimulation. This scale has also been widely used in subsequent related studies.

Bass and Avolio (1994) modified the three-dimensional transformational leadership structure, divided the original charismatic-inspiring leadership into emotional appeals and leadership charisma, proposed the four-dimensional structure of transformational leadership, namely emotional appeals, leadership charisma, personalized care, and intellectual motivation, and developed the corresponding scale. The scale later became a representative scale for measuring transformational leadership. However, Carless (1998) believed that the scale is not accurate in the division of the four dimensions of transformational leadership, and these dimensions have small differentiation validity, so they should be classified into one dimension, namely the dimension of transformational leadership.

Bass and Steidlmeier (1999) argued that transformational leadership consists of four components: 1) Idealized influence: Leaders who apply idealized influence achieve their proposed work ideals by using themselves as role models for their subordinates and motivate their subordinates to follow their example; 2) Inspirational motivation: Transformational leaders tend to emphasize shared values and goals, and clearly communicate job requirements to subordinates to show how they can work together to achieve common goals.; 3) Intellectual stimulation: Leaders encourage their subordinates to be more creative and encourage them to adopt new ways to get work done; 4) Individualized consideration: Transformational leaders understand and address the needs of their subordinates in a timely manner to help them better realize their personal value. They will not only consider the wishes and abilities of the team, but also the wishes and abilities of each individual.

Research by Bass and Riggio (2006) further expanded the meaning of the four components of transformational leadership. Idealized influence represents leadership behavior that reflects the leader's values and beliefs, articulates the leader's sense of purpose, and indicates the leader's ethical orientation. Inspirational motivation is the leadership behavior of leaders who provide challenges to followers and give meaning to their work. Intellectual motivation is the leadership behavior of leaders who encourage followers to question their own assumptions about their own work in the hope that they will reshape the problem and deal with the old

situation in a new way. Individualized consideration is that leaders pay attention to the needs of followers to promote personal growth and enhance personal value. Therefore, transformational leadership is a leadership style that focuses on motivating, encouraging, and leading by example, while also helping to develop the personal potential of followers (Kammerhoff et al., 2019).

Based on a survey and analysis of 1440 employees in financial institutions, Carless et al. (2000) put forward a seven-dimension structural view of transformational leadership, including: providing support to employees, establishing leadership influence, demonstrating, empowering, encouraging, building vision, and innovation awareness.

Based on Podsakoff et al. (1990), MacKenzie et al. (2001) further divided transformational leadership into four dimensions, namely the core transformational leadership behavior (including articulating a vision, providing an appropriate model and fostering the acceptance of group goals), having high performance expectations, providing individualized support, and providing intellectual stimulation. Specifically, articulating the development vision aims to identify and articulate a clear vision of the future. Providing appropriate role models refers to the actions of leaders to set an example for employees and align the values they embrace with the goals of the organization. Promoting acceptance of team goals is leadership that aims to foster collaboration among subordinates and allow them to work together to achieve common goals, even at the expense of their individual goals and ambitions. High performance expectations are when leaders demonstrate high expectations for the work performance of their subordinates. Providing individualized support is defined as the leader's behavior of respecting subordinates, monitoring their personal development, and paying attention to their individual feelings and needs. Intellectual stimulation is when leaders encourage subordinates to re-examine their work planning and push them to find creative and innovative ways to improve work performance (MacKenzie et al., 2001).

Rafferty and Griffin (2004) added a new dimension of "personal recognition" on the basis of the transformational four dimensions to form the fifth dimension, and believed that "personal recognition" is the full recognition and reward given by leaders to employees for their efforts to achieve goals. However, they did not develop a new scale. They only used the research results of House and Howell (1992) on charismatic leadership and the research results of Podsakoff et al. (1990) on the six-dimensional structure of transformational leadership for reference, selected some items and simply pieced them together to form the five-dimensional scale of transformational leadership.

Based on the four-dimensional model of transformational leadership proposed by Bass and Steidlmeier (1999), C. P. Li and Shi (2017) constructed a different four-dimensional model of transformational leadership in the Chinese context, which includes: moral modeling, vision motivation, individualized consideration and leadership charisma. The connotations of vision motivation and leadership charisma are basically the same as those proposed by (Bass & Steidlmeier, 1999), while individualized consideration increases the leader's concern for employees' family and life. Morale modeling is a dimension with Chinese characteristics, which emphasizes the role of the leader's own virtuous behavior as a role model for employees. In general, the dimensions of transformational leadership are divided as shown in Table 2.3.

Similar to definitions, scale development for transformational leaders is based on different dimensions. For instance, Lo et al. (2010) measures transformational leadership using a 20-question scale from the four dimensions of idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration. A sample item of idealized influence is: "My supervisor can emphasize the importance of having a collective sense of mission". A sample item of inspirational motivation is: "My supervisor expresses confidence that goals will be achieved". A sample item of intellectual stimulation is: "My supervisor gets me to look at problems from many different angles". A sample item of individualized consideration is: "My supervisor considers me as having different needs, abilities, and aspirations from others".

MacKenzie et al. (2001) developed a 14-item scale from four dimensions: the core transformational leadership behavior (including articulating a vision, providing an appropriate model and fostering the acceptance of group goals), having high performance expectations, providing individualized support, and providing intellectual stimulation. A sample item of core transformational leadership behavior includes: "My supervisor articulates a vision". A sample item of performance expectations includes: "My supervisor insists on only the best performance". A sample item of individual support includes: "My supervisor shows respect for my personal feelings". A sample item of intellectual stimulation includes: "My supervisor challenges me to think about old problems in new ways". Given MacKenzie et al. (2001) relatively comprehensive definition and measurement of transformational leadership, this study adopts their approach to measuring transformational leadership.

Table 2.3 Dimensions of transformational leadership structure

Author	Dimensionality	Content
Carless (1998)	One-dimensional	One-dimensional transformational leadership
Bass (1985a)	Three-dimensional	Intellectual stimulation, charismatic leadership, and personal care
Bass and Avolio (1994)	Four-dimensional	Emotional appeals, leadership charisma, personal care, and intellectual stimulation
Bass and Steidlmeier (1999)		Idealized influences, inspiring incentives, intellectual stimulation, and personal considerations
MacKenzie et al. (2001)		Core transformational leadership behaviors, high performance expectations, personalized support, and intellectual stimulation
C. P. Li and Shi (2017)		Moral model, vision motivation, personalized care and leadership charm
Posner (1990)	Five-dimensional	Challenging stereotypes, building consensus, mobilizing members, setting an example, and inspiring enthusiasm
Rafferty and Griffin (2004)		Supportive leadership, intellectual stimulation, vision building, personal recognition, and effective communication
Podsakoff et al. (1990)	Six-dimensional	Vision description, high performance expectations, encouragement of collaboration, example setting, personalized care, and intellectual stimulation
Carless et al. (2000)	Seven-dimensional	Supporting, influencing, demonstrating, empowering, encouraging, building vision, and innovation awareness

2.1.2 Related research of transformational leadership

2.1.2.1 Antecedents of transformational leadership

Previous studies have shown that the driving factors of transformational leadership mainly come from two aspects: individual factors and situational factors. For details, see Table 2.4.

Table 2.4 Antecedents of transformational leadership

Research level	Antecedents	Representative research
Individual level	Gender, traits, motivations, and values	(Bass, 1985a, Diebig et al., 2017, Gross et al., 2021, Groves & LaRocca, 2012, Judge et al., 2000, S. Kim & Shin, 2017, Løvaas et al., 2020)
Situational level	Work environment and cultural intelligence	(Afsar et al., 2019, Nielsen & Cleal, 2011, Tafvelin et al., 2018)

1. Individual factors

Previous studies have shown that the leader's gender, personality, emotion, motivation and values are the key factors in the formation of transformational leadership (Bass, 1985a, Diebig et al., 2017, Gross et al., 2021, Groves & LaRocca, 2012, Judge et al., 2000, S. Kim & Shin, 2017, Løvaas et al., 2020).

For example, in terms of gender, female managers tend to be more sensitive, more likely

to show personalized care for employees, and better than male leaders in terms of leadership charm and leadership appeal, so they are more likely to become transformational leaders (S. Kim & Shin, 2017).

In terms of personality traits, research shows that good education from parents in the early stage can cultivate individuals' personality traits of being positive, caring for others and willing to take responsibility, which will stimulate individuals' potential to become transformational leaders to a certain extent (Bass, 1985a).

In terms of emotion, Barbuto and Burbach (2006) found that transformational leaders generally possess high emotional intelligence. Nervous leaders tend to exhibit less transformational leadership behavior (Diebig et al., 2017).

In terms of motivation, Løvaas et al. (2020) found that the intrinsic motivation of leaders is significantly related to the generation of transformational leadership style.

In terms of values, leaders' openness to change, self-transcendence and collectivist work values are positively correlated with transformational leadership, while self-improvement values are negatively correlated with transformational leadership (Groves & LaRocca, 2012). Kanat-Maymon et al. (2020) also explored the correlation between supervisors' autonomous work motivation and transformational leadership based on the motivational self-determination theory and the all-round leadership theory.

2. Situational factors

Research shows that organizational situational variables such as work environment and cultural intelligence are important factors in predicting transformational leadership behavior (Afsar et al., 2019, Nielsen & Cleal, 2011, Tafvelin et al., 2018). For example, Nielsen and Cleal (2011) explored how middle managers' working environment and the situations they face affect the transformational leadership behavior of middle managers. Tafvelin et al. (2018) demonstrated the negative impact of financial stress and an unsupportive work environment on transformational leadership. Afsar et al. (2019) discussed the impact of cultural intelligence on transformational leadership.

2.1.2.2 Outcomes of transformational leadership

Looking back at previous studies, research on the outcomes of transformational leadership has focused on three levels: organizational, team, and individual. For details, see Table 2.5.

Table 2.5 Outcomes of transformational leadership

Research level	Variables
Organizational level	Organizational performance (Howell et al., 2005), organizational knowledge creation practice (Song et al., 2012), and organizational diversity climate (McCallaghan et al., 2019)
Team level	Team creativity (V. Li et al., 2016), non-financial performance, social performance, and environmental performance dimensions of subordinate departments (Patiar & Wang, 2016), project success (Aga et al., 2016), team productivity and overall team effectiveness (Choi et al., 2017), and team innovation performance (Jiang & Chen, 2018)
Individual level	Employee creativity (Gumusluoglu & Ilsev, 2009), job performance (Dias Semedo et al., 2016, Frieder et al., 2018), work participation (Enwereuzor et al., 2018), voice behavior (W. Liu et al., 2010), and job innovation behavior (Bak et al., 2022)
	Employee identification with the leader (Duan et al., 2017), employee mental health (Ding et al., 2020), and organizational commitment (Peng et al., 2020)

1. The impact of transformational leadership on organizational-level variables

At the organizational level, previous researches explored the effects of transformational leadership on organizational performance (Howell et al., 2005), organizational knowledge creation practices (Song et al., 2012), and organizational diversity climate (McCallaghan et al., 2019). Howell et al. (2005) primarily applied transformational leadership to the organizational level, showed that transformational leaders not only use their charisma to attract and unite followers, but also unleash the potential of their subordinates through goal-based management, thereby greatly improving organizational performance. Song et al. (2012) explored the relationship between specific aspects of employee work engagement and leadership practices and knowledge creation outcomes, ultimately verified the role of transformational leadership in promoting organizational knowledge creation practices. McCallaghan et al. (2019) confirmed the positive effects of transformational leadership on organizational diversity climate based on empirical research on South African firms.

2. The impact of transformational leadership on team-level variables

From the team level, previous researches mainly focused on exploring the influence of transformational leadership on team variables such as team performance (Choi et al., 2017) and team creativity (V. Li et al., 2016). Research by scholars confirmed that transformational leadership affects subordinate divisions' non-financial, social and environmental performance dimensions (Patiar & Wang, 2016), project success (Aga et al., 2016), output efficiency, and overall team effectiveness (Choi et al., 2017). Jiang and Chen (2018) found that transformational leaders promote knowledge sharing within teams and improve team innovation performance by developing integration mechanisms for teamwork norms. V. Li et al.

(2016) also found that transformational leadership behaviors have a positive impact on team innovation. However, the findings of Eisenberg et al. (2019) suggested that transformational leadership is less effective at improving the performance of highly distributed teams, possibly due to the difficulty of transformational leaders facilitating team communication in highly distributed teams.

3. The impact of transformational leadership on individual-level variables

At the individual level, the influence of transformational leadership contains employee behavior and attitudes.

In terms of behavior, transformational leadership tended to have an important impact on employee creativity (Gumusluoglu & Ilsev, 2009), job performance (Frieder et al., 2018), work engagement (Enwereuzor et al., 2018), voice behavior (W. Liu et al., 2010), and work innovation behavior (Bak et al., 2022). Gumusluoglu and Ilsev (2009) indicated that transformational leadership can further influence employee creativity by promoting their psychological empowerment. Walumbwa and Hartnell (2011) argued that transformational leaders are effective in improving employees' performance by enhancing their sense of identity and self-efficacy. Transformational leaders also provided employees with sound work information, set reasonable work standards, and had higher expectations for collective goals, so employees tended to improve individual performance under the role of transformational leadership (Frieder et al., 2018, Ribeiro et al., 2018). Enwereuzor et al. (2018) verified that transformational leadership has a positive effect on employee work engagement under the moderating effect of person-job fit. W. Liu et al. (2010) found that transformational leaders can promote voice behavior by enhancing employees' sense of identity. Bak et al. (2022) discussed the influence mechanism of transformational leadership on innovative work behavior in the public sector, examined the mediating role of psychological capital, and finally showed that transformational leadership indirectly influences employees' innovative work behavior through psychological capital.

In terms of attitudes, transformational leadership affected employees' identification with leadership (Duan et al., 2017), mental health (Ding et al., 2020), and organizational commitment (Peng et al., 2020, Ribeiro et al., 2018). Duan et al. (2017) indicated that transformational leadership influences the voice of employees through the leader's voice expectations and the employee's voice role perception, thereby strengthening employees' personal identification with the leader. Ding et al. (2020) deemed transformational leadership as a resource that brings well-being to employees, as it can lead employee to improve their core

self-esteem and gain access to mental health. Peng et al. (2020) explored how and under what conditions transformational leadership translates into emotional engagement in employees, demonstrating that transformational leadership is effective in increasing employees' emotional commitment through employee-perceived work.

2.1.3 Research summary of transformational leadership

Through the literature review, it can be found that although the research on transformational leadership has been extensive and sufficient, it still fails to reveal the mediating mechanism of the role of transformational leadership deeply and comprehensively. Studies found that transformational leadership has a positive impact on organizational performance (Howell et al., 2005, Ribeiro et al., 2018), team performance (Choi et al., 2017), and employee individual performance (Frieder et al., 2018). However, Eliyana et al. (2019) found that when transformational leadership is intervened by organizational commitment, it cannot have a significant impact on job performance. Ribeiro et al. (2018) found that affective commitment mediates the relationship between transformational leadership and individual performance, but as not access the role of other organizational commitment dimensions.

Therefore, this study argues that additional research is necessary to better explore potential mediating variables that help researchers to gain a deeper understanding of the impact of transformational leadership on employees' job performance. This research will focus on the role of organizational commitment and their different dimension, as presented later in section 2.3.

2.1.4 Definition and measurement of transactional leadership

1. Definition of transactional leadership.

Early research recognized that leaders and followers build relationships to determine the content of an exchange, negotiate the costs and benefits of such an exchange, and determine whether the exchange is in their own interest. Then, based on the content of exchange, the leader should reinforce the ideal subordinate behavior and correct the bad subordinate behavior (Hollander, 1958). These contents lay the groundwork for the study of transactional leadership.

Burns (1978), a pioneer in the study of transactional leadership, noted that transactional leaders are those who try to motivate their followers by appealing to their own interests. These leaders motivate subordinates to achieve their desired level of performance by helping them recognize mission responsibilities, identify goals, and develop confidence that they are

achieving their desired level of performance. Bass (1985a) described transactional leaders as people who recognize the needs of their followers and participate in exchange relationships with them, arguing that transactional leaders set specific goals and objectives to identify incentives for achieving tasks and use rewards and punishments to keep subordinates up to job requirements. Jung and Avolio (2000) stated that transactional leaders encourage followers to fulfill their expectations and receive rewards and promotions. These leaders have skills that can be applied to operations and motivate their followers, meeting the needs and ambitions of the organization by exchanging employees' performance. MacKenzie et al. (2001) pointed out that transactional leadership refers to the leadership style embodied in the exchange process of leaders providing positive or negative feedback to employees based on their efforts or performance.

Bass (1985a) proposed that transactional leadership behavior includes two main forms: contingent reward behavior and contingent punishment behavior. Contingent reward behavior is manifested as positive feedback from leaders to employees (such as praise or recognition), while contingent punishment behavior is manifested as negative feedback from leaders to employees (such as reprimand and punishment) (MacKenzie et al., 2001).

Bass and Avolio (1994) further deemed that transactional leadership consists of three dimensions of behavior, including management by exception-active, management by exception-passive, and contingent reward. Management by exception-active refers to the leader's daily monitoring of follower behavior so that it can proactively detect followers' deviations from the norm and correct them in time. In contrast, management by exception-passive corrects errors only after they have occurred. Contingent reward means that followers are rewarded when they complete their intended work. These three components share a common principal-agent logic in the relationship between leaders and followers: managers are responsible for communicating goals and instructions to employees, observing followers' behavior, and reacting accordingly (Young et al., 2021).

The theory of transactional leadership has also been studied in China. W. J. Chen and Shi (2014) further proposed a four-factor model of transactional leadership applicable to Chinese organizations based on the cultural background of China, including process control (the leader's ability to manage and control work processes and task assignments), contingent reward (the leader's ability to reward employees based on their performance and work results), contingent punishment (the leader's ability to take punitive action when an employee performs poorly or violates regulations), and expected input (the degree to which the leader expects and encourages

employees to participate in decision-making and work).

2. Measurement of transactional leadership.

By definition, the scale development of transactional leaders is primarily two-dimensional and three-dimensional measures. MacKenzie et al. (2001) developed a scale containing 7 items based on the two dimensions of contingent reward behavior and contingent punishment behavior. A sample item of contingent reward behavior includes: "My supervisor always gives me positive feedback when I perform well". A sample item of contingent punishment behavior includes: "Would indicate supervisor's disapproval if I performed at a low level".

Lo et al. (2010) developed a scale containing 12 questions based on the three dimensions of management by exception-active, management by exception-passive, and contingent reward. Sample items are: "My supervisor always concentrates his/her full attention on dealing with mistakes, complaints, and failures" and "My supervisor always expresses satisfaction when I meet expectations". Considering that MacKenzie et al. (2001) defined and measured transactional leadership relatively comprehensively, this study adopts their definition and measurement of transactional leadership.

2.1.5 Related research of transactional leadership

2.1.5.1 Antecedents of transactional leadership

Previous studies have shown that the driving factors of transactional leadership mainly come from situational factors and individual factors. For details, see Table 2.6.

1. Influence of situational factors on transactional leadership

Previous studies have shown that situational factors such as values (Ticlau & Hinteá, 2016) and organizational learning ability (Camps & Torres, 2011) have a certain impact on transactional leadership. Ticlau and Hinteá (2016) explored the influence of cultural and political factors such as social values and political values on transactional leadership in the Romanian public administration. Camps and Torres (2011) also showed that there was a positive correlation between employees' perception of organizational learning ability and their leaders' conditional reward behavior.

2. The influence of individual factors on transactional leadership

Previous studies have shown that individual factors such as leadership motivation (Kanat-Maymon et al., 2020), leadership perspective (Gregory et al., 2011), and employee employability (Camps & Torres, 2011) have a certain impact on transactional leadership. Kanat-Maymon et al. (2020) based on motivation-based self-determination theory and holistic

leadership theory explored the positive impact of supervisor's controlled motivation on transactional leadership. Gregory et al. (2011) explored the relationship between dyad-specific perspective taking and transactional leadership from the perspective of leadership. Camps and Torres (2011) verified that employees' self-perceived employability level has a positive impact on their leaders' conditional reward behavior.

Table 2.6 Antecedents of transactional leadership

Research content	Research level	Research variable
Antecedents	Situational factors	Value (Ticlau & Hintea, 2016) and organizational learning ability (Camps & Torres, 2011)
	Individual factors	Leadership motivation (Kanat-Maymon et al., 2020), leadership perspective (Gregory et al., 2011), and employee employability (Camps & Torres, 2011)

2.1.5.2 Outcomes of transactional leadership

Looking back at previous studies, the empirical research on the impact of transactional leadership is mainly divided into two levels: organizational and individual levels, and relatively few studies at the team level. For details, see Table 2.7.

1. The impact of transactional leadership on organizational-level variables.

Previous studies found that transactional leadership has a certain impact on organizational capabilities and performance such as organizational innovation (Prasad & Junni, 2016), organizational absorptive capacity (Zadeh et al., 2020), organizational performance (Patiar & Wang, 2020), and organizational agility (Khairy et al., 2023).

Prasad and Junni (2016) explored how transactional behavior affects organizational innovation under different environmental conditions, and the results showed that transactional leadership has an enhanced effect on organizational innovation, but its effectiveness depends on environmental vitality. In the context of an emerging market environment, Zadeh et al. (2020) demonstrated that transactional leadership influences organizational absorptive capacity through positive effects on exploratory and transformative learning processes.

Patiar and Wang (2020) elucidated the mechanisms by which leadership can improve organizational performance, and their research shows that transactional leadership has a significant impact on departmental financial, nonfinancial, and sustainable performance through the mediating role of managers' perception of compensation and benefits. Khairy et al. (2023) analyzed the data of 500 full-time employees in five-star hotels in Egypt. The results showed that transactional leadership was positively correlated with organizational agility, and organizational trust and dual adaptability played a mediating role in the relationship between

transactional leadership and organizational agility.

Research conclusions suggested that setting specific, measurable, achievable, relevant, and time-bound (SMART) goals is a key aspect of transactional leadership, so managers can collaborate with employees to set goals based on the agility of the organization and encourage them to be proactive in identifying and seizing opportunities (Khairy et al., 2023).

2. The impact of transactional leadership on team-level variables.

Based on the transaction-transformational leadership model, Ma et al. (2022) divided the leadership behaviors of CEOs of start-ups into two categories: transformational leadership behaviors and transactional leadership behaviors. From the perspective of social exchange theory and social information processing theory, they constructed a moderated mediating model and explored the influence of transformational and transactional leadership on the stability of start-up teams. Through the analysis of the questionnaire data of 66 Chinese start-ups, they found that transformational leadership and transactional leadership are positively correlated with the stability of start-up teams, and knowledge hiding plays a mediating role in the relationship between transformational leadership and start-up team stability, and transactional leadership and start-up team stability. In addition, team collectivism plays a moderating role between transformational leadership and knowledge hiding, and between transactional leadership and knowledge hiding. High level of team collectivism strengthens the mediating role of knowledge hiding between transformational leadership and transactional leadership and the stability of start-up teams.

3. The impact of transactional leadership on individual-level variables.

Research showed that transactional leadership affects employees' work engagement (Shkoler & Tziner, 2020), job enjoyment (Shkoler & Tziner, 2020), and perceived psychological empowerment (Jong & Faerman, 2021), improves employees' dynamic capabilities (Xu & Wang, 2019), influences their job performance (Young et al., 2021), and also affects employees' organizational environmental citizenship behavior (G. Wang et al., 2023), green innovation behavior (Cai et al., 2023), entrepreneurial behavior (Klein, 2023), and unethical pro-organizational behavior (J. Kim et al., 2023).

Shkoler and Tziner (2020) indicated that transactional leadership is an important prerequisite for organizational and individual outcomes in an organizational environment, impacting employee engagement and enjoyment of work. Jong and Faerman (2021) also examined the process of transformational leadership and transactional leadership affecting employees' psychological empowerment, and focused on the mediating effect of goal

specificity. Through structural equation model (SEM) analysis, they found that transactional leadership has a positive impact on the motivational state of employee psychological empowerment, and goal specificity plays a mediating role in the relationship between transformational and transactional leadership and psychological empowerment. The results contributed to the discussion of transformational and transactional leadership approaches in goal-setting in the public sector, and provided practical implications that leadership behaviors of public managers could help employees form positive attitudes toward goal specificity, thereby enhancing their perceived degree of psychological empowerment (Jong & Faerman, 2021).

Xu and Wang (2019) explored how transactional leadership affects employees' dynamic ability based on strategic leadership and dynamic competency theory, and show that conditional reward behavior promotes the development of employees' perception and grasp ability, while exception management promotes the development of employees' ability to reconfigure.

Young et al. (2021) indicated that transactional leadership has a double-edged sword effect on follower performance from the perspectives of social exchange theory and self-determination theory. Specifically, transactional leadership has different effects on follower performance through leader-member exchange and psychological empowerment, respectively: contingent reward behavior promotes leader-member exchange but hinders psychological empowerment, active exception management and passive exception management promote psychological empowerment but hinder leadership-member exchange.

G. Wang et al. (2023) explored how transformational leadership and transactional leadership styles shape subordinates' environmental commitments to motivate employees' environmental citizenship behavior when organizations work on large-scale projects, and validates the effectiveness of transformational and transactional leadership in motivating organizational environmental citizenship.

Based on the nested data of 294 employee-leaders of small and medium-sized tourism enterprises in Northeast China, Cai et al. (2023) explored the positive relationship between transactional leadership and employees' green innovation behavior from the perspective of leader-member exchange (LMX) theory. It also verified that workplace learning and green knowledge management would mediate the positive relationship between transactional leadership and green innovation behavior of employees, and the conclusions of the study provided new perspectives and insights for entrepreneurs, decision makers, academics, and experts in the tourism sector.

Through a questionnaire survey on 464 employees, Klein (2023) found that transformational leadership and transactional leadership have a positive impact on employees' entrepreneurial behavior, and organizational support plays a mediating role in the relationship between transformational and transactional leadership and employees' entrepreneurial behavior. Moreover, in highly competitive environments, leadership style is more closely related to organizational support (Klein, 2023).

J. Kim et al. (2023) argued that followers' unethical behaviors for organizational purposes are easily influenced by leaders, but the direction of influence may vary with different leadership styles. Specifically, transactional leadership has a positive relationship with on followers' unethical pro-organizational behaviors. And public service motivation plays a moderating role in the relationship between transactional leadership and unethical pro-organizational behavior of followers.

Table 2.7 Outcomes of transactional leadership

Research content	Research level	Research variable
Outcomes	Organizational factors	Organizational innovation (Prasad & Junni, 2016), organizational absorptive capacity (Zadeh et al., 2020), organizational performance (Patlar & Wang, 2020), and organizational agility (Khairy et al., 2023)
	Team factors	Team stability (Ma et al., 2022)
	Individual factors	Employee engagement (Shkoler & Tziner, 2020), employee enjoyment of work (Shkoler & Tziner, 2020), the degree of psychological empowerment perceived by employees (Jong & Faerman, 2021), the dynamic capabilities of employees (Xu & Wang, 2019), employee performance (Young et al., 2021), organizing environmental citizenship behavior (G. Wang et al., 2023), green innovation behavior (Cai et al., 2023), entrepreneurial behavior of employees (Klein, 2023), and unethical pro-organizational behavior (J. Kim et al., 2023)

2.1.6 Research summary of transactional leadership

Through literature review, it can be found that there is no thorough empirical research system on the relationship between transactional leaders and employee performance. Studies have diverged into the relationship between transactional leadership and employee job performance (Young et al., 2021; Yozgat & Kamanli, 2016). Some researchers concluded that transactional leadership styles have a positive and significant impact on employee performance (Abdelwahed et al., 2022; Yozgat & Kamanli, 2016), others explored the negative effects of transactional leadership on employee job performance (Young et al., 2021).

Therefore, this research will look at the positive effects of transactional leadership styles

and explore the positive impact of this exchange-centric leadership style on employee job performance.

2.2 Job performance

2.2.1 Definition and measurement of job performance

1. Definition of job performance.

A review of previous literature showed that scholars have different views on the definition of job performance. Although scholars have defined job performance differently, there is still a consensus on three things: job performance is what employees actually do, the actions they take, and their contribution to organizational goals (Campbell & Wiernik, 2015). Initially, scholars understood job performance in terms of behavioral outcomes, and then some scholars further suggested that job performance should not only focus on outcomes, but also on the behavioral processes of employees. Also, some scholars believed that performance comprises both a behavioral and an outcome aspect. Therefore, there are mainly three views: performance outcome view, performance behavior view, and performance behavior-outcome view.

(1) Job performance defined from an outcome aspect.

Scholars who hold a outcome view believe that job performance is the record of the output created by a specific job function or activity within a specific time period or the result of work (Bernardin & Beatty, 1984). Hunter (1986) made it more explicit that performance is the single result of an employee's work. The above scholars believe that performance is a concept of results. The main reason is that results are easier to measure with objective standards than behavior, although the process will be affected by objective factors, but the results should be the most convincing evaluation basis (Hochwarter et al., 2003).

As scholars have studied the concept of job performance, the "outcome view" of performance has been challenged: first, due to the flattening of organizational structures and the blurring of job responsibilities, job outcomes may be driven by other factors unrelated to the employee; second, employee performance at work may not always be task-related, and may be influenced by external factors; third, an outcome approach to job performance may lead to short-term benefits, ignore important procedural and interpersonal factors, and reduce organizational commitment (Murphy & Cleveland, 1995).

Therefore, some scholars tend to understand performance from a behavioral and process view, as a complex concept that includes social contextual, emotional and cognitive factors

(Campbell et al., 1990). They believed that employee performance can also be a behavior and should be separated from results (Katz & Kahn, 1978).

(2) Job performance defined from a behavior aspect.

Katz and Kahn (1978) introduced the “structural model of behavioral performance” and thus became the pioneers of behavioral performance research. On this basis, Smith et al. (1983) creatively proposed the “organizational citizenship behavior theory” based on a large number of empirical studies. Brief and Motowidlo (1986) proposed prosocial organizational behavior based on the “organizational citizenship behavior theory” and extended the study of behavioral performance. Researchers developed behavioral measures for this purpose: the Behavior Anchoring Rating Scale (BARS), the Behavior Observation Scale (BOS), and the Critical Incident Technique (CIT) to examine employees' behavior and compare it with the organization's desired behavior in order to determine the level of employee performance (Smith et al., 1983).

The most representative definition of behavioral performance is the one by Campbell et al. (1990), who thought employee performance refers to actions that are significant to organizational goals and are under the control of the individual employee. Scholars also believe that performance consists of the behavior of employees in response to organizational goals according to their capabilities; it is not a consequence or an outcome; it is action in itself, the sum of behaviors of employees (Griffin et al., 2007; Rotundo & Sackett, 2002). Borman and Motowidlo (1997) proposed that behavioral performance has the following characteristics: it should be defined in terms of behavior rather than results; it includes only those behaviors that are relevant to organization's goals; and, it is a multidimensional concept.

Defining job performance from a behavioral aspect is of great significance to both research and practice, and it has laid the theoretical foundation for subsequent studies that divide job performance into multiple dimensions. However, outcomes and behaviors may determine performance simultaneously, and if the performance focuses only on behavior, the behavior may be short-term, and then the final results may not be achieved; if the performance focuses only on the result, the necessity of behavior process, monitoring, and guidance may be ignored, which is not conducive to team cooperation, organizational coordination, and reasonable allocation of resources (Cappelli & Tavis, 2016).

Therefore, from a practical point of view, a good performance should include behavior, output, and result; that is, performance includes not only the relationship between efficiency output and input, but also the degree of effort to achieve the goal and the degree to achieve the

goal (Cappelli & Tavis, 2016).

(3) Job performance defined from a behavior-outcome aspect.

As research has progressed, scholars have come to recognize the need to establish a link between behavior and outcomes. Scholars who hold a behavior-outcome view believe that employee performance is the sum of behaviors and outcomes, and that employee behaviors are an important part of contributing to job outcomes. Therefore, employee performance is not a unidimensional concept, but should include at least two dimensions: behaviors and results (Ashton, 1998). Armstrong and Baron (1998) further defined job performance as the sum of an employee's work results, work behaviors, and work attitudes over a period of time. With the development of the "performance behavior-outcome" view, subsequent research scholars categorized many factors such as employee competency, work attitude, work style, employee quality, employee's ability to learn and innovate, and ability to receive and share knowledge as components of employee performance appraisal.

Woodruffe (1993) stated that performance consists of a combination of behaviors, competencies, and results, and competency is the set of behavior patterns which are needed to allow the incumbent to perform tasks and functions with competence. Pulakos et al. (2000) argued that adaptability in the workplace is the source of performance appraisal. Paul et al. (2004) added job attitudes, arguing that employee performance is made up of behaviors, outcomes and job attitudes. Janssen and Van Yperen (2004) suggested that the ability to innovate is an important indicator belonging to the assessment of employee performance. Pushpakumari (2008) argued that the performance in terms of effort extended to the job of an employee. Ramawickrama et al. (2017) summarizing previous studies, further defined job performance as "the extent to which the employee has shown his or her traits, engaged in behaviors and produced results which are appropriate to task performance, and has engaged in citizenship performance and counterproductive performance during a particular period of time" (p.71).

As scholars have studied job performance, more and more scholars have classified the variable into different dimensions based on their understanding of the meaning of job performance.

Campbell et al. (1990) has studied the U.S. military and summarized the factors affecting employee performance as the eight-factor model of employee performance, which are: job-specific task behaviors, non-job-specific task behaviors, written and oral communication behaviors, demonstrating effort, maintaining personal discipline, facilitating peer and team

performance, supervision or leadership position, management or administration. Of these eight factors, task-specific and non-task-specific proficiency, effort level and personal discipline are important in all jobs. In a subsequent study, Borman and colleagues (Borman & Brush, 1993, Borman & Motowidlo, 1997, Borman & Motowidlo, 1993) divided the eight-factor model of employee performance into two broad categories and named these two categories as “task performance” and “contextual performance”. Task performance is the proficiency with which job incumbents perform activities that are formally recognized as part of their jobs, it is referred to as “in-role prescriptive behavior”. In-role work performance involves activities that are related to employees’ formal role requirements (Borman & Brush, 1993). Contextual performance is defined as not directly involved in production activities, but due to the employee’s background, social network, it lubricates interpersonal or organizational communication, thus improving organizational effectiveness. It is referred to as “extra-role behavior”. Extra role performance involves certain behaviors of employees which are not part of their formal job requirements as they cannot be prescribed in advance for a given job but they help in the smooth functioning of the organization as a social system. This type of behavior is called as organizational citizenship behavior (Bateman & Organ, 1983). Abilities and skills tend to predict task performance while personality and related factors tend to predict contextual performance (Borman et al., 1997).

As society continues to advance, scholars believe that employees need to adapt to the complexity of their jobs by constantly learning new knowledge and skills. Allworth and Hesketh (1997) first introduced the concept of adaptive performance that focuses on employees’ response to change. A three-dimensional model consisting of task performance, contextual performance, and adaptive performance was developed. The most influential study on adaptive performance is the work of Pulakos et al. (2000), where the authors highlighted the necessity of the concept of “adaptive performance”. Pulakos et al. (2000) developed a taxonomy of adaptive job performance in the work environment by adding aspects of adaptive performance (how individuals adapt to new conditions or job requirements) to the performance model, and they expanded the scope of the existing performance domain by developing an adaptive job performance model (handling emergencies or crisis situation; handling work stress; solving problems creatively; dealing with uncertain and unpredictable work situation; learning work tasks, technologies and procedures; demonstrating interpersonal adaptability; demonstrating cultural adaptability; demonstrating physical oriented adaptability). We treat job performance as a single dimensional variable in the thesis.

2. Measurement of job performance.

According to different definitions and dimensional divisions, previous empirical studies have used various forms such as three-dimensional scales, two-dimensional scales and one-dimensional scales for the measurement of job performance, including self-assessment and other evaluation.

Williams and Anderson (1991) developed a six-item scale to measure employees' role performance based on two dimensions: in-role performance and out-of-role performance. Example samples include: "I work on activities that will directly affect my performance evaluation" and "I am able to meet the formal performance requirements of the job".

Ingold et al. (2016) developed a 20-item scale based on the two dimensions of task performance scale and organizational citizenship behavior to measure employees' job performance. A sample item for task performance is: "My employee always demonstrates expertise in all work-related tasks". A sample item for organizational citizenship behavior is: "My employee can serve to reassure colleagues when there is an argument between colleagues".

Koopmans et al. (2011) argued that the conceptualization and operationalization of individual job performance are different, and they identify a conceptual framework of individual job performance applicable to different occupations, and divide individual job performance into different dimensions such as task performance, situational performance, counterproductive work behavior, and adaptive performance. Based on this, they also developed an individual work performance scale and validated its construct validity to comprehensively and universally measure individual job performance of workers from different occupational sectors with different health conditions (Koopmans et al., 2013, Koopmans et al., 2014).

The scale developed by Z. X. Chen et al. (2002) is classic and it has been widely used in empirical studies at home and abroad. There are 4 items in this scale, an example of which is: "I make significant contribution to the overall performance of our work unit". This study used this scale to measure job performance.

2.2.2 Related research of job performance

Organizational performance is a key determinant of business growth and survival, and this is achieved by the job performance of organizational members. Therefore, as one of the most important outcome variables in the field of organizational behavior, business managers and academics are interested in what factors predict job performance. Existing research shows that

there are numerous antecedent variables of job performance, and these influencing factors can be broadly categorized into two aspects: individual factors and contextual factors. The individual factors focus on competencies, personality traits, competency characteristics and work attitudes, while the external environmental factors focus on leadership types and behaviors, job characteristics, and organizational characteristics. For details, see Table 2.8.

1. Individual Factors.

With regard to individual factors, competencies including knowledge, skills, motivation, and abilities are significant predictors of job performance (Campbell et al., 1990). Employees' personal qualities, work experience and work attitudes also have significant effects on job performance.

First, from the perspective of employees' personal qualities, employees' work effort (Van Iddekinge et al., 2023), personal emotional intelligence performance (Z. Gong et al., 2019), psychological capital level (Alessandri et al., 2018), and individual creativity (Duarte et al., 2021, Frieder et al., 2018) all have a positive impact on their job performance.

In addition, from the perspective of employees' work experience, employees' tenure in the organization (Loveland et al., 2016), adaptability to work (Sony & Mekoth, 2016), degree of participation in work (G. L. Yu & Xu, 2019) also have a huge impact on job performance.

Finally, in terms of employees' work attitudes, organizational justice (Diehl et al., 2018), job satisfaction (Jalagat, 2016), and organizational commitment (Dias Semedo et al., 2016, Loan, 2020) all have a clear positive impact on job performance.

2. Contextual factors.

In terms of external environmental factors, through combing the previous literature, it is found that leadership style, job characteristics, organizational characteristics and other factors have a significant impact on employee job performance. In terms of leadership styles, transformational leadership styles (Tremblay & Simard, 2018) and transactional leadership styles (Gemeda & Lee, 2020) have a positive impact on employees' job performance. However, laissez-faire leadership has a negative impact on employee job performance (Gemeda & Lee, 2020). Under humble leadership behavior is easier for employees to feel the leader's trust in themselves, which in turn will positively affect the job performance of employees (Cho et al., 2021). Authentic leadership is also positively related to improved individual performance, both through affective commitment and individual creativity (Duarte et al., 2021, Frieder et al., 2018). Other positive leadership styles such as ethical leadership (Walumbwa et al., 2011) and servant leadership (Sudarmo et al., 2022) have also been positively related to higher performance, while

abusive supervision has been negatively associated with performance indicators (Harris et al., 2007).

In terms of work characteristics, C. H. Chen et al. (2016) believed that providing employees with abundant work resources can effectively improve employees' task performance, and job design that provides employees with opportunities to participate in management directly helps to improve employees' job performance. Similarly, Diamantidis and Chatzoglou (2019) found that a good working environment and management support can also effectively improve employee performance. Ghaffari et al. (2017) explored the mechanism of the influence of work motivation and employee job performance, and their research found that responsibility, as the most important motivator, has a positive impact on job performance. Menges et al. (2017) deemed that by enhancing employee energy and reducing stress, such as employers making structural adjustments to job design and compensation to increase the benefits of work for families, performance can be improved by enhancing family incentives. Therefore, maintaining a good balance between family and work can also improve the work performance of employees (Johari et al., 2018). However, research by Obrenovic et al. (2020) showed that work-family conflict, poor mental health, and low psychological safety can negatively impact employees' job performance. G. D. Wu et al. (2019) also explored the relationship between role ambiguity, burnout, and job performance, and verified that role ambiguity and burnout reduce employees' job performance.

In terms of organizational characteristics, L. Wang and Chen (2022) found that under conditions of high intrinsic career goals or low extrinsic career goals, employee experience-based high-performance work systems have a significant positive impact on job performance. In addition, comparative variables in group settings, such as objective internal and external compensation status, are important job performance improvement factors (Sieweke et al., 2017). S. J. Chen et al. (2017) explored the relationship between team pay gap level and job performance and confirmed the role of team pay gap level in improving employee work performance. Research by Lu et al. (2017) showed that job demand significantly improves employee performance when job security is high, while job demand impairs performance to some extent when job security is low.

Table 2.8 Antecedents of job performance research

Research level		Research variables
Individual factors	Personal qualities of employees	The degree of employees' hard work (Van Iddekinge et al., 2023), personal emotional intelligence performance (Z. Gong et al., 2019), individual creativity (Duarte et al., 2021, Frieder et al., 2018), and psychological capital (Alessandri et al., 2018)
	The employee's work experience	Employees' tenure within the organization (Loveland et al., 2016), adaptability to the job (Sony & Mekoth, 2016), and degree of participation in work (G. L. Yu & Xu, 2019)
	The attitude of the employees	Organizational justice (Diehl et al., 2018), job satisfaction (Jalagat, 2016), and organizational commitment (Loan, 2020)
	Other factors	Employee competencies (including knowledge, skills, motivation and abilities) (Campbell et al., 1990)
External environmental factors	Leadership	Transformational leadership (Tremblay & Simard, 2018), transactional leadership (Gemeda & Lee, 2020), humble leadership style (Cho et al., 2021), laissez-faire leadership style (Gemeda & Lee, 2020), authentic leadership (Duarte et al., 2021, Frieder et al., 2018), ethical leadership (Walumbwa et al., 2011), servant leadership (Sudarmo et al., 2022), and abusive leadership (Harris et al., 2007)
	Job characteristics	Work resource (C. H. Chen et al., 2016), work environment (Diamantidis and Chatzoglou (2019), supervisors' support (Diamantidis and Chatzoglou (2019), job incentive (Ghaffari et al., 2017), family-work balance between (Johari et al., 2018), work-family conflict (Obrenovic et al. (2020), mental health and psychological safety (Obrenovic et al. (2020), role ambiguity (G. D. Wu et al., 2019) and job burnout (G. D. Wu et al., 2019)
	Organizational characteristics	Employee experience high performance work system (L. Wang and Chen (2022), objective internal and external pay position (Sieweke et al., 2017), team pay gap level (S. J. Chen et al., 2017), and job demand (Lu et al., 2017)

2.2.3 Research summary of job performance

Through the combing of the literature related to job performance, it can be found that job performance is an important outcome variable in organizational behavior research, and this study agrees with the connotation understanding of job performance from a comprehensive view, that is, employees' job performance includes both the visible goals that employees eventually complete, and the behaviors (including physical and mental work) that employees pay in the process of completing goals (Ramawickrama et al., 2017). In the study of the dimensions and measurement of job performance, this thesis focuses more on task performance, so the one-dimensional job performance scale developed by Z. X. Chen et al. (2002) was used.

At the same time, through the combing of the antecedent variables of employee performance, we know that the relevant empirical research on employee job performance is relatively sufficient on the whole, but not perfect. Studies have found that different leadership

styles such as transformational leadership (Crede et al., 2019), transactional leadership (Gemeda & Lee, 2020) and humble leadership (Cho et al., 2021) all have a positive impact on job performance. However, the impact of different leadership styles on job performance is relatively lacking. In addition to external factors such as leadership, the factors affecting employee performance also include individual employee factors (Loan, 2020). Therefore, this research will explore the influence mechanism of two different leadership styles (transformational leadership and transactional leadership) on employee job performance, and the mediating role of organizational commitment in them.

2.3 Organizational commitment

2.3.1 Definition and measurement of organizational commitment

1. Definition of organizational commitment.

Commitment is a force that binds individuals to processes of action related to one or more goals (Meyer & Herscovitch, 2001). Organizational commitment, which represents an employee's attachment to the organization, is the relative strength of an individual's identification with and participation in a particular organization (Mowday et al., 1981). A large number of scholars have carried out a lot of research in the past few decades on this issue (Allen & Meyer, 1990, Benkhoff, 1997, Hussain & Khayat, 2021, Yahaya & Ebrahim, 2016). A review of previous literature revealed that researchers endow organizational commitment with different connotations from different research perspectives and in combination with their own research needs. Generally speaking, scholars' understanding of organizational commitment can be divided into behavior, attitude and multi-dimensional perspectives, which will be elaborated next.

(1) Behavioral perspective.

Scholars who study organizational commitment with a behavioral approach believed that organizational commitment is a certain behavior, and they mainly focused on the conditions under which this certain behavior recurs, and the impact of this behavior on employee attitudes (Meyer & Allen, 1991). As a representative of behavioral theory, Becker (1960) believed that employees would compare their investment in the organization with the remuneration they received, and if they were measured internally, they believed that the remuneration received was greater than the input, then the individual's commitment to the organization could be improved. Otherwise, the commitment to the organization will decrease.

In addition, Meyer and Allen (1991) argued that the commitment relationship between the individual and the organization is a relationship based on economic interests, and as the individual's commitment to the organization increases, the sunk cost of leaving the organization increases and the individual's willingness to leave the organization decreases.

(2) Attitudinal perspective.

Scholars who study organizational commitment in an attitudinal approach focused on identifying antecedent conditions that contribute to the development of commitment, as well as the behavioral consequences of such commitment (Meyer & Allen, 1991). As the leading exponent of the attitude view, Porter et al. (1974) indicated that there are three psychological factors to organizational commitment: strong belief and acceptance of organizational goals and values (identification), willingness to put in a lot of effort for the organization (participation), and a clear desire to maintain organizational membership (loyalty). They believed that organizational commitment is the power of an individual's identification with and participation in a particular organization (Porter et al., 1974). Correspondingly, Buchanan (1974) deemed that organizational commitment is an individual's recognition of the goals and values of the organization in which he or she operates, the relationship between the individual and the organization's goals and values, and the emotional experience that this identity and relationship brings about the individual and the organization.

(3) Multi-dimensional perspective.

The eclectic school of scholars who believe that the connotation of organizational commitment is multidimensional. Their definition of organizational commitment can vary depending on individual perspectives, but they all agreed that employee loyalty to and engagement with the organization is a core element of organizational commitment (O'Reilly & Chatman, 1986). Meyer and Allen (1991) proposed a commitment model, which incorporate both the attitudinal and behavioral approaches and their complementary relationship. The authors have identified three common themes in the conceptualization of commitment. They argue that the various definitions of commitment can be group into three general categories: affective orientation, cost-based, and obligation or moral responsibility. The three categories were later referred to as affective, normative, and continuance commitment.

In the existing literature, there are still a large number of definitions of organizational commitment in addition to the three mainstream interpretations of organizational commitment mentioned above. A more general definition is that organizational commitment refers to the relative strength of employees' psychological attachment, identification and participation in the

organization, which is a psychological contract between individuals and the organization, and is also a long-term stable mentality of staying in the original organization (Meyer & Allen, 1991).

Similar to the definition, the dimensional division of organizational commitment is also divided into single-dimensional, two-dimensional and multi-dimensional forms.

(1) One-dimensional construct.

The side-bet theory proposed by Becker (1960) is actually a single-dimensional construct. The author argued that organizational commitment is an increase in the unilateral input of organizational members to the organization, fearing that a large “sinking cost” would result from the cessation of investment (Becker, 1960).

Buchanan (1974) and Porter et al. (1974) focused on the emotional component of organizational commitment, arguing that employees' commitment to the organization was due to their emotional dependence on the organization. Mowday et al. (1979) further stated that organizational commitment refers to an individual's acceptance and participation in an organization and is an emotional dependence.

(2) Two-dimensional construct.

Meyer and Allen (1984) proposed a two-factor theory of affective commitment and continuance commitment based on the one-dimensional construct described above. O'Reilly and Chatman (1986) believed that organizational commitment refers to the organization of employees and organizations “psychological contract”, which includes a mixture of compliance, identification, and internalization of different components. The compliance dimension is similar to the continuous commitment in Meyer and Allen (1997) three-component model, and the combination of both identification and internalization is similar to the affective commitment in the three-component model. Angle and Perry (1981) found two distinguishable dimensions in the Organizational Commitment Questionnaire which they labeled “value commitment” and “commitment to stay”, and demonstrated that the dimensions of commitment were differentially predictive of important organizational outcomes.

(3) Multi-dimensional construct.

Scholars' different understandings of organizational commitment have driven the evolution of organizational commitment from a single dimension to multiple dimensions. McGee and Ford (1987) further found that continuous commitment can be divided into two sub-dimensions based on the two-factor theory (Meyer & Allen, 1984). The first dimension reflects commitments based on a small number of available employment options, and the second

reflects commitments based on the personal sacrifices that come with leaving the organization (McGee & Ford, 1987).

Meyer and Allen (1991) proposed a three-component model of organizational commitment, which takes affective commitment, continuance commitment, and normative commitment as the three dimensions of organizational commitment. Affective commitment refers to an employee's emotional attachment, identification, and engagement with the organization. Employees with strong emotional commitment continue to work for the organization because they want to. Continuance commitment refers to the recognition of the costs associated with leaving an organization, including calculating the costs and benefits associated with time spent in the organization, monetary rewards, and organization-specific skills (Jaros et al., 1993). Employees with continuous commitment are often forced to stay with their original organization because the cost is too high or opportunity to leave the organization is too low. Normative commitments reflect a sense of obligation to remain employed. Employees with strong normative commitments feel that they have a sense of obligation that makes them compelled to stay in the organization (Meyer & Allen, 1991).

Swales (2002) further divided organizational commitment into four dimensions, including affective commitment, continuous commitment, normative commitment, and behavioral commitment.

2. Measurement of organizational commitment.

For the measurement of organizational commitment, empirical research generally used three-dimensional scales. Mowday et al. (1979) developed the Organizational Commitment Questionnaire (OCQ), based on a series of studies conducted with 2,563 employees across nine different organizations. Allen and Meyer (1990) developed a 24-item scale based on their own definition of organizational commitment, starting from three dimensions: affective commitment, continuance commitment, and normative commitment. A sample item for affective commitment is: "I would be very happy to spend the rest of my career with this organization". A sample item for continuous commitment is: "It would be very hard for me to leave my organization right now, even if I wanted to". A sample item for normative commitment is: "If I got another offer for a better job elsewhere, I would not feel it was right to leave my organization".

In summary, there is currently no agreement on the concept and dimensions of organizational commitment. Since the dimensional model constructed by Allen and Meyer (1990) is more classic and widely used in empirical research at home and abroad, this scale is

used in this study.

2.3.2 Related research of organizational commitment

Organizational commitment has received a lot of attention in management, and scholars not only defined the concept and dimension of organizational commitment, but also studied the antecedent variables and outcomes of organizational commitment.

2.3.2.1 Antecedents of organizational commitment

Mowday et al. (1981) based on a review of previous studies, suggested that there are at least 25 antecedent variables have been found to be related in some way with organizational commitment. They suggested that the major influences on organizational commitment could be grouped into four categories, including personal characteristics (age, tenure, educational level, gender, race, and various personality factors), job-related characteristics (job scope or challenge, role conflict, and role ambiguity), structural characteristics (organization size, union presence, span of control, and centralization of authority) and work experiences (organizational dependability, personal importance to the organization, positive attitudes toward the organization, perceived pay equity, group norms regarding hard work, leadership style, social involvement) (Mowday et al., 1981).

With the development of person-organization fit theory (Kristof, 2010), the degree of matching between individuals and organizations has gradually attracted the attention of research scholars. The antecedent variables of organizational commitment are more often grouped from two dimensions: individual and organizational. From the organizational level, it mainly includes managerial factors and situational factors. Managerial factors are related to management issues such as leadership development, autonomy on the job, and organizational support (Lo et al., 2010). Situational factors are related to the situation of the organization such as its size, the industry in which it operates, and its image (Bodjrenou et al., 2019).

At the individual level, organizational commitment is primarily influenced by employees' personal characteristics, personal psychological factors, and job-related factors. Personal characteristics, which include demographic variables such as age, gender, marital status, level of education, and length of service (Yahaya & Ebrahim, 2016). Individual psychological factors such as psychological contract (Herrera & De las Heras-Rosas, 2021), subjective career success (Moon & Choi, 2017), psychological capital (C. M. Wu & Chen, 2018), employee satisfaction and employee trust (Yao et al., 2019). Individual job-related factors, such as employee empowerment (Asiri et al., 2016), work autonomy and job complexity (Spanuth & Wald, 2017).

In general, the antecedents of organizational commitment mainly focus on the organizational level and individual level, as shown in Table 2.9.

Table 2.9 Research on the antecedents of organizational commitment

Research level	Research variables
Organizational level	Management factor
	Leadership development, job autonomy, and organizational support (Lo et al., 2010)
	Situational factor
Individual level	Size of organization and industry and image (Bodjrenou et al., 2019)
	Individual characteristics
	Demographic variables such as age, gender, marital status, education level, and years of work (Yahaya & Ebrahim, 2016)
Individual level	Individual psychological factor
	Psychological contract (Herrera & De las Heras-Rosas, 2021), subjective career success (Moon & Choi, 2017), psychological capital (C. M. Wu & Chen, 2018), and employee satisfaction and trust (Yao et al., 2019)
	Individual work-related factors
	Employee empowerment (Asiri et al., 2016), job autonomy, and job complexity (Spanuth & Wald, 2017)

2.3.2.2 Consequences of organizational commitment

Looking back at the previous literature, there are fewer empirical studies on the impact of organizational commitment at the organizational level and team level, mainly focusing on the individual employee level. The impact of organizational commitment on employees can be divided into positive and negative impacts. For details, see Table 2.10

Table 2.10 Consequences of organizational commitment research

Consequences	Research variables
Positive influence	Improved employee organizational citizenship behavior (W. T. Wang et al., 2021), innovative work behavior (X. Zhang et al., 2019), employee performance (Razzaq et al., 2019), job satisfaction (X. Zhang et al., 2019), and reducing turnover intention (Ribeiro et al., 2020, X. Zhang et al., 2019) and counter-productive behavior (To & Huang, 2022)
Negative influence	Hindering personal development (Mowday et al., 1981), engaging in unethical pro-organizational behavior (Grabowski et al., 2019)

On the positive side, organizational commitment can motivate employees to engage in organizational citizenship behavior (W. T. Wang et al., 2021), innovative work behavior (X. Zhang et al., 2019), avoiding counterproductive behavior (To & Huang, 2022), improving employee job performance (Razzaq et al., 2019, Ribeiro et al., 2018), improving job satisfaction, and reducing the turnover intention (Ribeiro et al., 2020, X. Zhang et al., 2019). Allen and Meyer (1990) verified that organizational commitment has a positive impact on employees' organizational citizenship behavior, and concluded that affective commitment has the strongest effect on organizational citizenship behavior, followed by normative commitment, and continuous commitment has the worst impact. W. T. Wang et al. (2021) further explored affective commitment and employees' change-oriented organizational citizenship behavior from the perspective of emotion, and verified the mediating role of affective commitment

between narcissistic supervision and change-oriented organizational citizenship behavior. X. Zhang et al. (2019) used employees in military organizations as sample to explore the positive impact of organizational commitment on employees' innovative work behavior. To and Huang (2022) combined social exchange theory with equity theory to verify the negative effects of affective commitment, continuous commitment and normative commitment on counterproductive behavior. Razzaq et al. (2019) focused on knowledge management practices and explored the positive effects of organizational commitment on knowledge workers' job performance. Sungu et al. (2019) found that when supervisors have high levels of transformational leadership, employees' affective commitment has a stronger positive effect on job performance. X. Zhang et al. (2019) based their study on the theory of organizational commitment, reporting that organizational commitment helps to improve employees' job satisfaction and reduce employee's turnover intention.

On the negative side, excessive organizational commitment can hinder employee self-development (Mowday et al., 1981), lead to greater pressure, and motivate employees to engage in unethical pro-organizational behavior (Grabowski et al., 2019). Mowday et al. (1981) deemed that high commitment can have negative effects on individuals, including career stagnation, family tensions, and hindering self-development. when employees are too loyal to the organization and put the interests of the organization above their personal development, employees may be unwilling or afraid to pursue personal career goals or development opportunities to avoid conflicts with organizational commitment, so excessive organizational commitment can also hinder employees' self-development (Mowday et al., 1981). Mathieu and Zajac (1990) believed that for employees and organizations, a higher level of commitment can bring negative consequences, such as high commitment may lead to greater stress in some cases. Employees with high organizational commitment may be willing to put in more effort and sacrifice for the organization. They may be willing to work overtime, take on additional work tasks, or take on higher work pressures in order to achieve the goals and interests of the organization. This over-engagement can lead to stress and anxiety as they need to constantly work hard to maintain a high level of work performance and meet the needs of the organization (Mathieu & Zajac, 1990). Grabowski et al. (2019) explored the mechanism of influence between organizational commitment and unethical pro-organizational behavior, verifying the positive effects of affective commitment and normative commitment on unethical pro-organizational behavior.

2.3.3 Research summary of organizational commitment

Through the literature review, it can be found that although employees' organizational commitment has received plenty research attention, there is a lack of corresponding empirical research on the relationship between organizational commitment and different leadership styles and knowledge workers' job performance. Studies have shown that leadership styles play an important role in promoting organizational commitment among employees (Asiri et al., 2016), but the impact of specific leadership styles, such as transformational and transactional leadership, on organizational commitment can be further studied. In addition, there is no academic consensus on whether organizational commitment affects job performance. Some studies showed that organizational commitment promotes employee job performance (Eliyana et al., 2019), others showed a weak relationship between organizational commitment and job performance (Mowday et al., 1981). Therefore, this study argues that it is necessary to introduce organizational commitment as a mediating variable to explore the mediating mechanism of transformational leadership style and transactional leadership style affecting employees' job performance.

2.4 Theoretical basis and model construction

2.4.1 Theoretical basis

This study is based on the social exchange theory, aiming to explore the influence mechanism of the two leadership styles of middle managers, transformational leadership and transactional leadership, on job performance of knowledge workers. Next, we elaborate the social exchange theory.

Social exchange theory is one of the most influential conceptual paradigms for understanding workplace behaviors. In the work setting, social exchange is defined as a subjective, relationship-oriented interaction between organizational members, characterized by an exchange of social-emotional benefits (Lavelle et al., 2007). The process of social exchange begins with organizational actors (usually leaders or colleagues, but also employer) treating the target individual in a positive or negative way (Eisenberger et al., 2004). In response to the initial behavior, the target (usually subordinates or co-workers) will accordingly choose to reciprocate the treatment with a positive or negative behavior (Eisenberger et al., 1987). The social exchange theory (Blau, 1964) states that when employers care for employees, quality

social exchange relationships will develop, and employees repay the organization with a more positive work attitude and work behavior, resulting in beneficial results (Cropanzano & Mitchell, 2005). Social exchange theory primarily emphasizes that individuals' voluntary actions are motivated by the rewards they expect to bring, and in fact often bring rewards from others (Blau, 1964). This exchange process is essentially based on the principle of reciprocity (Blau, 1964), codependency at the core, mutual benefit as the purpose (Lawler & Thye, 1999), and when reciprocity does not occur as expected, the other party may withdraw his or her services (Tse et al., 2013).

Social exchange relations include both economic and social-emotional aspects. Economic exchange is often based on condition, involving less trust and more active supervision, while social exchange is often based on emotions, involving more trust and more flexibility (Organ, 1990). The quality of the relationship between the two parties depends on the continuum from economic to social exchange. The former is characterized by a short-term relationship between the two parties based on the exchange of tangible substances, while the latter involves long-term emotional relationships developed on the basis of mutual trust and commitment (Blau, 1964).

Social exchange theory has been widely used in previous research on leadership and employee behavior. For example, Young et al. (2021) verified the mediating role of leader-member exchange between transactional leadership and follower performance from the perspective of social exchange theory. H. W. Wang et al. (2021) drew on social exchange theory to explore how and when supervisor narcissism affects subordinate performance, and discussed the mediating role of affective commitment and the moderating role of power distance orientation. Nohe and Hertel (2017) examined the positive influence relationship between transformational leadership and organizational citizenship based on social exchange theory and compared the mediating roles of attitude variables (affective commitment, job satisfaction) and relationship variables (trust in leadership, leadership-member exchange).

This study argues that two leadership styles, transformational and transactional leadership, promote a committed relationship between leaders and employees. When employees and leaders are in a high-commitment social exchange relationship, employees can feel a sense of reciprocity and will take the initiative to improve their job performance. The theory of social exchange explains the specific mechanism of this process.

2.4.2 Model construction

Based on the social exchange theory, this study constructs a mediation model, explores the mechanism of transformational leadership and transactional leadership styles on job performance of knowledge employee, and focuses on the mediating role of three organizational commitments: affective commitment, continuance commitment, and normative commitment.

First, the study argues that transformational leaders have high performance expectations for their employees, but also provide them with personalized support and intellectual stimulation. It is helpful for these leaders to develop a social exchange relationship with employees, promote employees to do work in line with their values and improve job performance. In addition, when adopting a more transactional leadership style, leaders provide positive or negative feedback to employees based on their efforts or performance. Under the effect of motivation and supervision, employees improve job performance in order to get rewarded and avoid punishment. Therefore, this study argues that both transformational and transactional leadership have a significant positive impact on employee job performance.

In addition, based on the social exchange theory, this study discusses the mediating roles of affective commitment, continuous commitment, and normative commitment between transformational leadership, transactional leadership, and job performance. The social exchange theory (Blau, 1964) states that the process of social exchange begins with the leader treating employees in a positive or negative way, and as a response to the initial behavior, the employee will accordingly choose to reciprocate this treatment with a positive or negative behavior (Eisenberger et al., 1987; Eisenberger et al., 2004). This study argues that transformational and transactional leadership, as two proactive behaviors, motivate employees to establish a committed social exchange relationship with the organization. Then employees can actively improve their job performance to repay the organization based on the principle of reciprocity.

In summary, the research model in this study is shown in Figure 2.1.

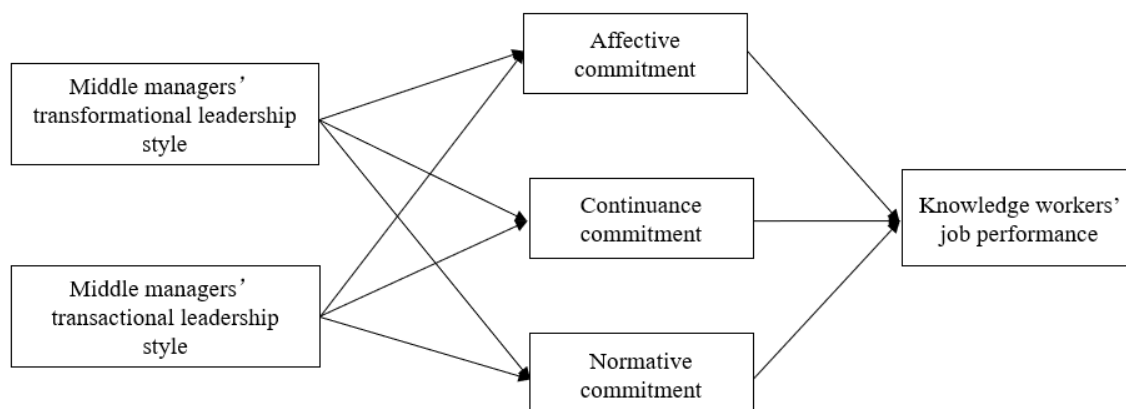


Figure 2.1 Research model

2.5 Research hypotheses

2.5.1 Transformational leadership, transactional leadership, and job performance

As mentioned before, Bass (1985a) proposed that transformational leadership refers to leaders who motivate employees to work with ideals and ethical values, driven by the interests of the organization, to continuously increase their own value, transcend personal interests, and achieve the state of “best self” for the benefit of the team, the organization and the larger political good. Podsakoff et al. (1990) identified six key categories of transformational leadership behaviors: articulating a vision, providing an appropriate model (e.g., leading by example), fostering the acceptance of group goals, having high performance expectations, providing individualized support, and providing intellectual stimulation. MacKenzie et al. (2001) further divided transformational leadership into four dimensions, namely the core transformational leadership behavior (including articulating a vision, providing an appropriate model and fostering the acceptance of group goals), having high performance expectations, providing individualized support, and providing intellectual stimulation. Research showed that transformational leadership can effectively engage subordinates in a process of social exchange based on interpersonal trust, mutual loyalty, strong identification, and ongoing reciprocity with superiors (Tse et al., 2013).

First, transformational leadership aims to fundamentally change the value, goals and aspirations of employees by clarifying the development vision and setting up appropriate work models, so that employees can perform the work in line with their own values (MacKenzie et al., 2001). According to the social exchange theory (Blau, 1964), employees act in accordance

with the values of their leadership under the influence of various transformational leadership behaviors, and are more likely to improve job performance in response to leaders, which in turn exchange for benefits such as bonuses.

In addition, transformational leaders have high performance expectations and provide individualized support for employees. They respect employees' feelings, care about their personal development, and pay attention to their needs (MacKenzie et al., 2001). Based on the social exchange theory (Blau, 1964), under the care of the leader, the employee will develop a quality social exchange relationship with the leader, and then repay the leader with a more positive work attitude and work behavior (Cropanzano & Mitchell, 2005).

Finally, transformational leaders provide intellectual stimulation and encourage employees to focus on finding more effective ways to work (MacKenzie et al., 2001). Employees are driven by transformational leadership to improve their work methods, increase productivity, and demonstrate better performance. In summary, transformational leaders have high performance expectations for their employees, but also provide them with personalized support and intellectual stimulation, which motivates employees to develop high quality social exchange relationships with themselves and drives employees to do work that aligns with their values, thereby improving job performance.

Previous research has also validated the positive effects of transformational leadership on employee job performance. For example, Fan et al. (2023) discussed the influence mechanism of transformational leadership on service performance in the context of public organizations from the perspective of social exchange theory. Based on the sample data of 268 municipal supervisors and lower-level civil servants in China, the study found that transformational leadership had a positive impact on service performance (Fan et al., 2023). MacKenzie et al. (2001) examined the relationship between transformational leadership and salesperson performance in the context of the sales industry, using a sample of 477 salespeople working in a large insurance company in China, and confirmed that transformational leadership not only directly affects work performance, but also indirectly affects it through the mediating role of trust and reduced role ambiguity.

As discussed above, the following hypothesis is put forward:

Hypothesis 1a: Transformational leadership has a positive relationship with employee job performance.

Transactional leadership refers to the leadership style embodied in the exchange process of leaders providing positive or negative feedback to employees based on their efforts or

performance (MacKenzie et al., 2001). As already mentioned, Bass (1985a) proposed that transactional leadership behavior includes two main forms: contingent reward behavior and contingent punishment behavior. Contingent reward behavior is manifested as positive feedback from leaders to employees (such as praise or recognition), while contingent punishment behavior is manifested as negative feedback from leaders to employees (such as reprimand and punishment) (MacKenzie et al., 2001).

The norm of reciprocity in social exchange theory (Blau, 1964) states that in a balanced social exchange, followers who receive various resources from the leader feel obligated to repay the leader by returning valuable resources (Young et al., 2021). On the one hand, transactional leadership has a certain incentive effect on employees. Leaders provide valuable resources to employees in exchange for their higher role performance (Wayne et al., 2002), and when leaders make contingent reward behaviors such as promotions, employees are incentivized to improve their job performance in return for positive feedback from leaders. On the other hand, transactional leadership plays a supervisory role for employees. Employee performance will be monitored because the future rewards and punishments of transactional leaders depend on their performance level (MacKenzie et al., 2001). So, employees will improve their work performance in order to obtain rewards and avoid penalties. To sum up, under the incentive and supervision of transactional leadership, employees are more likely to improve their job performance.

Previous research has also verified the impact of transactional leadership on employee job performance. For example, similar to transformational leadership, MacKenzie et al. (2001) found that the relationship between transactional leaders and salespeople's job performance in the context of the sales industry, taking a sample of 477 salespeople working in a large insurance company in China, and confirmed that transactional leaders not only directly affect work performance, but also indirectly affect job performance through the mediating role of trust and role ambiguity. Young et al. (2021) also constructed a correlation matrix based on social exchange theory and self-determination theory through a meta-analysis with 21 original studies, verifying the double-edged sword influence of transactional leadership on follower task performance and situational performance (contingent reward fosters leader-member exchange but hinders empowerment, whereas management by exception fosters empowerment but hinders leader-member exchange).

As discussed above, the following hypothesis is put forward:

Hypothesis 1b: Transactional leadership has a positive relationship with employee job

performance.

2.5.2 Transformational leadership, transactional leadership and organizational commitment

Organizational commitment is a state of mind that characterizes an employee's relationship with the organization and influences an employee's decision to continue or terminate membership in the organization (Meyer & Allen, 1991). Allen and Meyer (1990) proposed a three-factor model of organizational commitment, which takes affective commitment, continuance commitment, and normative commitment as the three dimensions of organizational commitment. As explained above, affective commitment refers to an employee's emotional attachment and identification with the organization. Continuance commitment refers to an employee's commitment based on the costs associated with leaving the organization. And normative commitment refers to an employee's desire to stay in the organization based on a sense of responsibility, loyalty, or obligation (Allen & Meyer, 1990).

Social exchange theory (Blau, 1964) states that positive or negative exchange relationships with individuals or entities (i.e., leaders and organizations) may affect employees' attitudes and feelings, such as commitment to organizational goals (Brown, 1996). Transformational leaders provide personalized support to employees, build one-on-one relationships with employees, consider their different desires, and meet the emotional needs of each employee (Bass & Stogdill, 1990). As a result, employees become emotionally dependent on organizations, forming emotional commitments based on social exchanges with leaders.

In addition, transformational leadership allows employees to continuously increase their personal value for the benefit of the organization through intellectual stimulation and the expression of high-performance expectations. At the same time, employees will also obtain personal benefits while realizing the benefits of the organization (Bass, 1985a). Under the influence of transformational leadership, employees finish work that aligns with leadership value in order to be rewarded with bonuses, promotions (MacKenzie et al., 2001), then employees can form an economic exchange relationship with leaders and generate continuous commitment.

Finally, transformational leaders articulate a vision for a better future to employees, shape employee values by emphasizing respect and loyalty, and demonstrate the importance of having a sense of collective purpose (Gumusluoglu et al., 2013). When leaders focus on employee development and motivate them intellectually through a compelling vision, employees are more

likely to commit to the long-term goals of the organization (Gumusluoglu et al., 2013), which in turn creates a sense of obligation and normative commitment to remain in the organization. In summary, transformational leaders build emotional connections with employees by providing personalized support to promote employees to generate affective commitment. Employees will also be encouraged to form a continuous commitment by rewarding them for their behaviors that are in line with the organization's vision. It also motivates them to form normative commitments by presenting compelling visions and motivating them intellectually.

Previous research has validated the positive impact of transformational leadership on employee organizational commitment. For instance, Lo et al. (2010) surveyed manufacturing employees in Malaysia based on social exchange theory and verified that transformational leadership has a positive effect on employees' affective, continuous and normative commitments, and that this positive effect is stronger at a high level of leadership-member exchange. Gumusluoglu et al. (2013) also examined how transformational leaders influence the commitment of followers to organizations and leaders from the perspective of social exchange theory, and based on a sample of 445 Turkish R&D personnel, they found that transformational leadership significantly influences the organizational commitment of followers.

As discussed above, the following hypotheses are put forward:

Hypothesis 2a: Transformational leadership has a positive relationship with employee affective commitment.

Hypothesis 2b: Transformational leadership has a positive relationship with employee continuous commitment.

Hypothesis 2c: Transformational leadership has a positive relationship with employee normative commitment.

The norm of reciprocity in the social exchange theory (Blau, 1964) states that in a balanced process of social exchange, followers who have received various resources from the leader feel obliged to return the leader by returning valuable resources (Young et al., 2021).

First, transactional leadership behavior is based on a reciprocal exchange between leaders and employees (Hater & Bass, 1988), and transactional leaders reward employees in exchange for their work contribution and performance (Young et al., 2021). Employees receive transactional leadership rewards (such as bonuses) based on their performance, so employees and leaders develop an economic exchange relationship that leads to continuous commitment.

In addition, in contingent reward behavior, transactional leaders will provide not only material rewards but also psychological rewards according to the work situation of employees

(Lo et al., 2010). Through a series of successful reciprocal exchanges, employees and leaders will develop an emotional connection and a high-quality social exchange relationship, then employees will further generate affective commitment (Cropanzano et al., 2017).

Finally, transactional leaders motivate employees to achieve the desired level of performance by helping them understand mission responsibilities, establish team goals, and develop confidence in their work (Bass & Stogdill, 1990). In this process, transactional leadership may motivate employees to participate actively in their work and a degree of organizational loyalty (Lo et al., 2010), which in turn leads to a sense that they should stay in the organization and generate normative commitment. In summary, transactional leaders will provide conditional material and psychological rewards according to employees' job performance, develop economic exchange relationships and social exchange relationships with employees, and stimulate employees' affective commitment, continuance commitment and normative commitment.

Previous research has also validated the positive effects of transactional leadership on employee organizational commitment. For example, Afshari and Gibson (2016) validate the positive impact of transactional leadership on employee organizational commitment in two different organizations, one from the healthcare sector and one from manufacturing. Lo et al. (2010) surveyed manufacturing employees in Malaysia based on the social exchange theory and verified that, similar to transformational leadership style, transactional leadership has a positive effect on employees' affective, continuance and normative commitments, and that this positive effect is stronger at a high level of leadership-member exchange relationships.

As discussed above, the following hypotheses are put forward:

Hypothesis 3a: Transactional leadership has a positive relationship with employee affective commitment.

Hypothesis 3b: Transactional leadership has a positive relationship with employee continuous commitment.

Hypothesis 3c: Transactional leadership has a positive relationship with employee normative commitment.

2.5.3 Organizational commitment and job performance

The social exchange theory (Blau, 1964) emphasizes that organizational commitment is the result of the exchange between the organization and the individual, and when the leader and the organization care for employees, employees will repay the organization with a more positive

work attitude and more excellent work behavior.

First, affective commitment refers to an employee's emotional attachment, identification with, and commitment to the organization (Allen & Meyer, 1990). Employees who are emotionally invested in the organization often internalize the organization's goals and actively participate in behaviors that benefit the organization, such as improving their own job performance (Duarte et al., 2021, O'Reilly & Chatman, 1986).

In addition, continuous commitment is a kind of commitment that employees generate based on the costs associated with leaving the organization (Allen & Meyer, 1990). Employees with continuous commitment are often forced to stay with their original organization because the cost or opportunity of leaving the organization is too high or too low, respectively, and they often work hard and improve performance in order to get the organization rewards and avoid financial losses from leaving the organization.

Finally, normative commitment refers to the desire of employees to stay in the organization based on a sense of responsibility, loyalty, or obligation (Allen & Meyer, 1990). When employees have the normative commitment, representing that they developed a sense of responsibility to give back to the organization. Furtherly, employees believe that they should be loyal to the organization, work hard, and improve performance in order to repay the organization. In summary, employees with organizational commitment will have an emotional attachment, sense of obligation and responsibility to the organization, then they will work hard and improve performance to repay the organization based on the principle of reciprocity.

Previous research has also validated the positive impact of employee organizational commitment on job performance. For instance, Overstreet et al. (2014) verified that organizational commitment has a positive impact on employees' operational and financial performance based on relevant data from American motor transportation companies, from the perspective of strategic structural performance theory and social exchange theory. H. W. Wang et al. (2021) based on the social exchange theory, recruited 300 MBA students from a large public university in northern China for a questionnaire survey, and recruited 175 participants from a well-known online survey company in China for experimental research, verifying the positive impact of affective commitment on employees' in-role and out-of-role performance. Loan (2020) verified that three organizational commitments: affective, continuance and normative, have a positive impact on employees' job performance based on 547 employees in Vietnamese companies.

As discussed above, the following hypotheses are put forward:

Hypothesis 4a: Employee affective commitment has a positive relationship with job performance.

Hypothesis 4b: Employee continuous commitment has a positive relationship with job performance.

Hypothesis 4c: Employee normative commitment has a positive relationship with job performance.

2.5.4 The mediating role of organizational commitment

As previously stated, social exchange theory (Blau, 1964) states that the process of social exchange begins with the leader treating employees in a positive or negative way, and in response to the initial behavior, the employee will accordingly choose to reciprocate this treatment with a positive or negative behavior (Eisenberger et al., 1987; Eisenberger et al., 2004).

Transformational leadership includes four dimensions, namely the core transformational leadership behavior (including articulating a vision, providing an appropriate model and fostering the acceptance of group goals), having high performance expectations, providing individualized support, and providing intellectual stimulation (MacKenzie et al., 2001).

First, transformational leaders take risks for employees to implement new ideas, listen to their ideas, and pay attention to their need (Nohe & Hertel, 2017).

At the same time, transformational leaders can induce employees to stay in organization by exhibiting individualized considerations, thereby building strong and personalized communication relationships with employees (Hughes et al., 2010). These intellectual stimulation and individualized support behaviors enhance employees' emotional attachment and a sense of belonging to the organization, therefore employees reward the organization by improving their work performance.

In addition, transformational leaders offer attractive and compelling goals for the future of the organization and link the efforts of employees to the achievement of organizational goals (Nohe & Hertel, 2017). This will motivate employees to feel advantageous to stay in the organization, because profit from the organization means that they will also benefit more, so employees will develop normative commitments. In turn, employees internalize organizational goals and achieve them by improving individual performance.

Finally, transformational leadership emphasizes on collective identity and encouraging self-sacrifice for the collective good (MacKenzie et al., 2001), employees increase their sense

of responsibility and obligation to contribute to the organization, and then work harder to benefit the organization under the effect of transformational leadership. In summary, transformational leaders engage employees to establish a committed social exchange relationship with the organization by articulating inspiring visions, establishing compelling goals, and providing individualized support and intellectual stimulation, based on the principle of reciprocity, in which employees actively improve their job performance to reward the organization.

Previous research has also validated the mediating role of organizational commitment between transformational leadership and employee attitudes and behavior variables. For example, Nohe and Hertel (2017) conducted meta-analysis from the perspective of social exchange theory, based on the relevant data of Psycinfo database and Internet search engine Google Scholar, to examine the relationship between transformational leadership, affective commitment, and organizational citizenship behavior. Affective commitment, as an attitude variable, which mediates the positive impact of transformational leadership on organizational citizenship behavior, prompting employees to improve performance beyond their responsibilities (Nohe & Hertel, 2017). Tse et al. (2013) explored the relationship between transformational leadership, affective commitment, and employee turnover intention from the perspective of social exchange theory. Based on a sample of 490 full-time employees working for a large telecommunications company in China, the study found that affective commitment, as an important element in an organization-based social exchange mechanism, mediates between transformational leadership and employees' turnover intention (Tse et al., 2013). Ribeiro et al. (2018) also verified the mediating effect of affective commitment in the relationship between transformational leadership and individual performance in Turkish workers.

As discussed above, the following hypotheses are put forward:

Hypothesis 5a: Affective commitment mediates the relationship between transformational leadership and job performance.

Hypothesis 5b: Continuance commitment mediates the relationship between transformational leadership and job performance.

Hypothesis 5c: Normative commitment mediates the relationship between transformational leadership and job performance.

As already discussed, transactional leadership refers to the leadership style embodied in the exchange process of leaders providing positive or negative feedback to employees based on their efforts or performance (MacKenzie et al., 2001). Transactional leadership is characterized

by a process of negotiation and exchange between leaders and followers (Hollander, 1958).

First, in contingent reward behavior, transactional leaders will not only provide employees with material rewards but also psychological rewards, which greatly satisfies the psychological needs of employees (Lo et al., 2010), so employees will become emotionally attached to the organization, and then work hard to return the organization.

Second, transactional leadership motivates employees by offering or cutting more personal benefits in the form of rewards or punishments (Bass & Stogdill, 1990). With rewards and punishments, it is easy for employees to develop an economic exchange relationship with their leaders, generating continuance commitment, and they will actively improve personal performance in exchange for more financial benefits. Transactional leadership rewards and punishes employees based on performance, reflecting the principle of fairness (MacKenzie et al., 2001). This behavior encourages employees to identify with the organization's goals and values, further reinforces their sense of obligation to remain in the organization, and makes employees more likely to act in a way that is consistent with the organization interests, i.e., improve job performance.

In summary, transactional leadership rewards and punishes employees based on performance, which embodies the principle of fairness and induces employees to generate organizational commitment, and employees further improve work performance to benefit the organization and themselves.

Previous research has also validated the mediating role of organizational commitment between leadership behavior and employee job performance. Young et al. (2021), based on social exchange theory and self-determination theory, have conducted a meta-analysis to construct a correlation matrix using data from 21 empirical studies. The results verify the double-edged sword effect of transactional leadership on follower performance, and further explore the mediating role of leader-member exchange and psychological empowerment in this effect. Specifically, conditional reward behavior promotes the exchange of leadership members but hinders authorization, while exception management promotes delegation but hinders the exchange of leadership members (Young et al., 2021). Overstreet et al. (2014) explored how servant leadership behavior ultimately affects employee job performance through the establishment of organizational commitment from the perspective of strategic structural performance theory and social exchange theory, and verified the positive role of organizational commitment between leadership behavior and employee performance based on relevant data from American motor transportation companies. C. Y. Kim and Park (2015) explored the joint

effects of transactional leadership, employee emotional exhaustion, and leader-member exchange on employees' affective commitment and in-role performance based on stimulus theory, vulnerability-stress theory, and job demand-resource model. A study of 332 employees in a Korean company found that when emotionally exhausted employees worked with leaders with transactional styles and a high level of leader-member exchange, employees' in-role performance deteriorated, and employees' emotional commitment played a mediating role (C. Y. Kim & Park, 2015).

As discussed above, the following hypotheses are put forward:

Hypothesis 6a: Affective commitment mediates the relationship between transactional leadership and job performance.

Hypothesis 6b: Continuance commitment mediates the relationship between transactional leadership and job performance.

Hypothesis 6c: Normative commitment mediates the relationship between transactional leadership and job performance.

2.6 Summary

This chapter has reviewed research on the concepts, theories and models of transformational leadership styles, transactional leadership styles, job performance, and organizational commitment. Through the review of the previous literature, this study claims that the existing empirical research has the following limitations.

First, the previous research has not yet fully understood the relationship between the two leadership styles of transformational leadership and transactional leadership and employee job performance.

Secondly, the previous research does not discuss the mediating role of the different organizational commitment facets between transformational leadership style, transactional leadership style and employee job performance from the perspective of social exchange theory. So there is insufficient understanding of the mechanism of different leadership styles affecting employee job performance.

Contributing to overcome existent limitations, this study constructs a mediation model based on social exchange theory, examines the impact of transformational leadership style and transactional leadership style on employees' job performance, and explores the mediating role of affective commitment, continuance commitment, and normative commitment. The study's

hypotheses are summarized in the table below (Table 2.11).

Table 2.11 Hypotheses summary

	Research hypotheses
Hypothesis 1a:	Transformational leadership has a positive relationship with employee job performance.
Hypothesis 1b:	Transactional leadership has a positive relationship with employee job performance.
Hypothesis 2a:	Transformational leadership has a positive relationship with employee affective commitment.
Hypothesis 2b:	Transformational leadership has a positive relationship with employee continuous commitment.
Hypothesis 2c:	Transformational leadership has a positive relationship with employee normative commitment.
Hypothesis 3a:	Transactional leadership has a positive relationship with employee affective commitment.
Hypothesis 3b:	Transactional leadership has a positive relationship with employee continuous commitment.
Hypothesis 3c:	Transactional leadership has a positive relationship with employee normative commitment.
Hypothesis 4a:	Employee affective commitment has a positive relationship with job performance.
Hypothesis 4b:	Employee continuance commitment has a positive relationship with job performance.
Hypothesis 4c:	Employee normative commitment has a positive relationship with job performance.
Hypothesis 5a:	Affective commitment mediates the relationship between transformational leadership and job performance.
Hypothesis 5b:	Continuance commitment mediates the relationship between transformational leadership and job performance.
Hypothesis 5c:	Normative commitment mediates the relationship between transformational leadership and job performance.
Hypothesis 6a:	Affective commitment mediates the relationship between transactional leadership and job performance.
Hypothesis 6b:	Continuance commitment mediates the relationship between transactional leadership and job performance.
Hypothesis 6c:	Normative commitment mediates the relationship between transactional leadership and job performance.

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Chapter 3: Research Methods

This chapter mainly includes the selection of research objects, the measurement of variables, and the design of scales.

3.1 Research object and procedure

The research object of this study focuses on knowledge workers. Knowledge workers are those who master and apply symbols and concepts, and their work is to use knowledge or information (Drucker, 1959). The final data in this study were collected from 258 knowledge workers at four Chinese enterprises. As shown in Table 3.1, these enterprises are state-recognized high-tech enterprises, involving the industries of Internet, media, and food.

Table 3.1 Information of surveyed enterprises

Number	Enterprises' information	Industry
1	YZ technology company	Internet
2	DZ information company	Internet
3	SW media company	Media
4	AL food company	Food manufacturing

To reach these enterprises, first, we contacted the HR managers of the surveyed enterprises to obtain their collaboration to run the study in the organization. With their help, we have screened the qualified knowledge workers who had a minimum organizational tenure of one year, and asked them if they were willing to participate in the survey. Secondly, we further asked the HR managers of each enterprise to provide the list and contact information of the knowledge workers willing to participate in the survey, and recorded their corresponding email addresses. Next, we created an electronic questionnaire on the relevant software (Questionnaire Star), numbered the qualified knowledge workers, and generated a separate link address for them. We then conducted several rounds of testing to ensure that the e-questionnaires were presented smoothly across different browsers and software, and thus participants could simply click on the link to start answering the questionnaires. Finally, we distributed the questionnaire links to each participant via email. At the beginning of each questionnaire, we explained the research purpose, form, and process to the respondents, and emphasized the anonymity and data confidentiality of the survey. The procedures followed the Declaration of Helsinki's ethical research guidelines (Bošnjak, 2001).

To reduce common method bias, a multi-time points survey was used to collect data (Podsakoff et al., 2024). Specifically, the questionnaire survey was conducted at two time points,

with a time interval of one month, and all variables were evaluated by employees. At time point 1 (April, 2023), we measured predictor variables (i.e., employees' perception of immediate supervisors' transformational leadership and transactional leadership styles), mediating variables (i.e., employees' affective commitment, continuance commitment, and normative commitment), and control variables (i.e., role ambiguity and demographic information). The researchers sent questionnaires at time point 1 to 361 employees at the four companies, and a total of 324 employees returned the questionnaire results, with a response rate of 89.75%.

At time point 2, we measured the criterion variable (the employee's self-rated job performance) and social desirability. The researchers sent the questionnaire link to 324 employees who completed the time 1 survey, and a total of 280 employees returned the questionnaire, with a response rate of 86.42%. At the same time, in order to check the attention of the participants, we added an indicated response item to the questionnaire at time point 1 (Meade & Craig, 2012). Sample item was: "To monitor quality, please respond with a two for this item". After removing the questionnaires that failed the attention test, 258 valid questionnaires were obtained from knowledge workers, and the overall response rate was 71.47%.

Among the finally obtained employee samples, 44.20% are male employee, 85.60% of employees have bachelor's degree or above. The average age of employees is 32.57 years old (Standard Deviation [*SD*] = 6.30), the average organizational tenure is 4.47 years (*SD* = 3.95), the average team tenure is 3.36 years (*SD* = 2.76), the average number of years working with supervisor is 3.11 years (*SD* = 2.62). The descriptive statistics of the sample were shown in Table 3.2.

Table 3.2 The descriptive statistics of the sample

Variables	Category	Proportion
Employees' gender	Male	44.2%
	Female	55.8%
Employees' education	High school diploma or below	6.6%
	Junior college diploma	7.8%
	A bachelor's degree	65.1%
	A master's degree or above	20.5%

Notes: N = 258

3.2 Measures and scale design

The main variables involved in this study include: transformational leadership, transactional leadership, affective commitment, continuance commitment, normative commitment, and job performance. In addition, G. D. Wu et al. (2019) have verified that role ambiguity has a significant negative impact on job performance, so this study also used role ambiguity as a control variable and measured it. Since self-assessment questions related to individual abilities and performance

may result in answers consistent with social desirability, we added a scale to control for social desirability bias. To measure social desirability, we used the MC-2 scale developed by Strahan and Gerbasi (1972). All the variable measurement scales adopted in this study are mature measurement scales and all have been validated and supported in the Chinese context. To ensure the accuracy of the scales, all items were translated into Chinese following the translation-back-translation procedures (Brislin, 1980). The variables were measured using a six-point Likert scale (1 = “strongly disagree”, 2 = “disagree”, 3 = “somewhat disagree”, 4 = “somewhat agree”, 5 = “agree” and 6 = “strongly agree”). The measurement time point, evaluation methods, and sources of each variable are shown in Table 3.3, while the reliability coefficients of each variable are shown in Table 3.4.

Table 3.3 Measures

Variable scale	Evaluation method	Measuring time point	Scale source
Transformational leadership	Employee evaluation	At time point 1	MacKenzie et al. (2001)
Transactional leadership	Employee evaluation	At time point 1	MacKenzie et al. (2001)
Affective commitment	Employee self-evaluation	At time point 1	Allen and Meyer (1990)
Continuance commitment	Employee self-evaluation	At time point 1	Allen and Meyer (1990)
Normative commitment	Employee self-evaluation	At time point 1	Allen and Meyer (1990)
Role ambiguity	Employee self-evaluation	At time point 1	G. D. Wu et al. (2019)
Job performance	Employee self-evaluation	At time point 2	Z. X. Chen et al. (2002)
Social desirability	Employee self-evaluation	At time point 2	Strahan and Gerbasi (1972)

Table 3.4 Variables' reliability coefficients

Variables	Items	Cronbach's alpha
Transformational leadership	14	0.95
Transactional leadership	7	0.88
Affective commitment	8	0.88
Continuance commitment	8	0.93
Normative commitment	8	0.92
Role ambiguity	4	0.84
Job performance	4	0.85
Social desirability	10	0.85

Note: N = 258.

3.2.1 Transformational leadership (predictor variable 1)

Transformational leadership was evaluated with the 14-item scale developed by MacKenzie et al. (2001), which covers four dimensions (i.e., core transformational leadership behavior, performance expectation, personal support, and intellectual stimulation) as shown in Table 3.5. The items for core transformational leadership behavior were: “My supervisor articulates a

vision", "My supervisor provides an appropriate model", and "My supervisor facilitates the acceptance of group goals". The items for performance expectation were: "My supervisor makes it clear that he/she expects a lot from us all of the time", "My supervisor will not settle for second best", and "My supervisor insists on only the best performance". The items for personal support were: "My supervisor acts without considering my feelings (reverse-scored)", "My supervisor treats me without considering my personal feelings (reverse-scored)", "My supervisor considers my personal feelings before acting", and "My supervisor shows respect for my personal feelings". The items for intellectual stimulation were: "My supervisor challenges me to think about old problems in new ways", "My supervisor asks questions that prompt me to think about the way I do things", "My supervisor has stimulated me to rethink the way I do things", and "My supervisor has ideas that have challenged me to reexamine some of my basic assumptions about my work". The Cronbach's alpha was 0.95.

3.2.2 Transactional leadership (predictor variable 2)

Transactional leadership was evaluated with the 7-item scale developed by MacKenzie et al. (2001), which was divided into two dimensions (i.e., conditional reward behavior and conditional punishment behavior), as shown in Table 3.5. The items for conditional reward behavior were: "My supervisor always gives me positive feedback when I perform well", "My supervisor gives me special recognition when I produce at a high level", "My supervisor commends me when I exceed my productivity goals", and "My supervisor frequently does not acknowledge my good performance(reverse-scored)". The items for conditional punishment behavior were: "Would indicate supervisor's disapproval if I performed at a low level", "(My supervisor) lets me know about it when I perform poorly", and "(My supervisor) points it out to me when my productivity is not up to par". The Cronbach's alpha was 0.88.

Table 3.5 Measurement items of transformational leadership and transactional leadership

Variables	Dimensions	Items
Transformational leadership	core transformational leadership behavior	My supervisor articulates a vision.
		My supervisor provides an appropriate model.
		My supervisor facilitates the acceptance of group goals.
	performance expectation	My supervisor makes it clear that he/she expects a lot from us all of the time.
		My supervisor will not settle for second best.
		My supervisor insists on only the best performance.
	personal support	My supervisor acts without considering my feelings (reverse-scored).
		My supervisor treats me without considering my personal feelings (reverse-scored).
		My supervisor considers my personal feelings before acting.
		My supervisor shows respect for my personal feelings.

Transactional leadership	intellectual stimulation	My supervisor challenges me to think about old problems in new ways. My supervisor asks questions that prompt me to think about the way I do things. My supervisor has stimulated me to rethink the way I do things. My supervisor has ideas that have challenged me to reexamine some of my basic assumptions about my work.
	Conditional reward behavior	My supervisor always gives me positive feedback when I perform well. My supervisor gives me special recognition when I produce at a high level. My supervisor commends me when I exceed my productivity goals. My supervisor frequently does not acknowledge my good performance (reverse-scored).
	Conditional punishment behavior	My supervisor would indicate his or her disapproval if I performed at a low level. My supervisor lets me know about it when I perform poorly. My supervisor points it out to me when my productivity is not up to par.

3.2.3 Affective commitment (mediator variable 1)

Affective commitment was evaluated with the 8-item scale developed by Allen and Meyer (1990), as shown in Table 3.6. The items were: "I would be very happy to spend the rest of my career with this organization", "I enjoy discussing my organization with people outside it", "I really feel as if this organization's problems are my own", "I think that I could easily become as attached to another organization as I am to this one (reverse-scored)", "I do not feel like 'part of the family' at my organization (reverse-scored)", "I do not feel 'emotionally attached' to this organization (reverse-scored)", "This organization has a great deal of personal meaning for me", and "I do not feel a strong sense of belonging to my organization (reverse-scored)". The Cronbach's alpha was 0.88.

3.2.4 Continuance commitment (mediator variable 2)

Continuous commitment was evaluated with the 8-item scale developed by Allen and Meyer (1990), as shown in Table 3.6. The items were: "It would be very hard for me to leave my organization right now, even if I wanted to", "Too much in my life would be disrupted if I decided I wanted to leave my organization now", "I am not afraid of what might happen if I quit my job without having another one lined up (reverse-scored)", "It wouldn't be too costly for me to leave my organization now (reverse-scored)", "Right now, staying with my organization is a matter of necessity as much as desire", "I feel that I have too few options to consider leaving this

organization", "One of the few serious consequences of leaving this organization would be the scarcity of available alternatives", and "One of the major reasons I continue to work for this organization is that leaving would require considerable personal sacrifice-another organization may not match the overall benefits I have here". The Cronbach's alpha was 0.93.

3.2.5 Normative commitment (mediator variable 3)

Normative commitment was also evaluated with the 8-item scale developed by Allen and Meyer (1990), as shown in Table 3.6. The items were: "If I got another offer for a better job else-where I would not feel it was right to leave my organization", "I was taught to believe in the value of remaining loyal to one organization", "I think that people these days move from company to company too often", "I do not believe that a person must always be loyal to his or her organization (reverse-scored)", "Jumping from organization to organization does not seem at all unethical to me (reverse-scored)", "One of the major reasons I continue to work for this organization is that I believe that loyalty is important and therefore feel a sense of moral obligation to remain", "Things were better in the days when people stayed with one organization for most of their careers", and "I do not think that wanting to be a 'company man' or 'company woman' is sensible anymore (reverse-scored)". The Cronbach's alpha was 0.92.

Table 3.6 Measurement items of organizational commitment

Variables	Items
Affective commitment	I would be very happy to spend the rest of my career with this organization.
	I enjoy discussing my organization with people outside it.
	I really feel as if this organization's problems are my own.
	I think that I could easily become as attached to another organization as I am to this one (reverse-scored).
	I do not feel like "part of the family" at my organization (reverse-scored).
	I do not feel "emotionally attached" to this organization (reverse-scored).
	This organization has a great deal of personal meaning for me.
	I do not feel a strong sense of belonging to my organization (reverse-scored).
Continuance commitment	It would be very hard for me to leave my organization right now, even if I wanted to.
	Too much in my life would be disrupted if I decided I wanted to leave my organization now.
	I am not afraid of what might happen if I quit my job without having another one lined up (reverse-scored).
	It wouldn't be too costly for me to leave my organization now (reverse-scored).
	Right now, staying with my organization is a matter of necessity as much as desire.
Normative commitment	I feel that I have too few options to consider leaving this organization.
	One of the few serious consequences of leaving this organization would be the scarcity of available alternatives.
	One of the major reasons I continue to work for this organization is that leaving would require considerable personal sacrifice-another organization may not match the overall benefits I have here.
	If I got another offer for a better job else-where I would not feel it was right to leave my organization.
	I was taught to believe in the value of remaining loyal to one organization.

I think that people these days move from company to company too often.
 I do not believe that a person must always be loyal to his or her organization (reverse-scored).
 Jumping from organization to organization does not seem at all unethical to me (reverse-scored).
 One of the major reasons I continue to work for this organization is that I believe that loyalty is important and therefore feel a sense of moral obligation to remain.
 Things were better in the days when people stayed with one organization for most of their careers.
 I do not think that wanting to be a 'company man' or 'company woman' is sensible anymore (reverse-scored).

3.2.6 Job performance (criterion variable)

Job performance was evaluated with the 4-item scale developed by Z. X. Chen et al. (2002), as shown in Table 3.7. The items were: "I make significant contribution to the overall performance of our work unit", "I always complete job assignments on time", "I am one of the best employees in my work unit", "My performance always meets the expectations of the supervisor". The Cronbach's alpha was 0.84.

Table 3.7 Measurement items of job performance

Variable	Items
Individual performance	I make significant contribution to the overall performance of our work unit.
	I always complete job assignments on time.
	I am one of the best employees in my work unit.
	My performance always meets the expectations of the supervisor.

3.2.7 Control variables

Following previous studies (Allen & Meyer, 1990, MacKenzie et al., 2001), this study selected the employee's gender, age, education, organizational tenure, team tenure, work with supervisors, and interaction frequency with supervisor as control variables. Specifically, gender was set as a dummy variable (0 for male and 1 for female). Age, organizational tenure, team tenure, and work with supervisors were recorded in years with open-ended questions. Education was divided into four levels (1 = high school diploma or below, 2 = junior college diploma, 3 = a bachelor's degree, 4 = a master's degree or above). The interaction frequency with supervisor was divided into four levels (1 = daily, 2 = weekly, 3 = monthly, 4 = yearly).

In addition, G. D. Wu et al. (2019) verified that role ambiguity has a significant negative impact on job performance. Therefore, role ambiguity was also used as a control variable in this study. Role ambiguity was evaluated with the 4-item scale developed by G. D. Wu et al. (2019). The items were: "I feel uncertain about how much authority I have in my job", "I don't have clear, planned goals and objectives for my job", "I don't know exactly what is expected of me in my job", "I don't receive clear explanations of what has to be done in my job", as presented in Table

3.8. The Cronbach's alpha was 0.85.

Table 3.8 Measurement items of role ambiguity

Variable	Items
Role ambiguity	I feel uncertain about how much authority I have in my job.
	I don't have clear, planned goals and objectives for my job.
	I don't know exactly what is expected of me in my job.
	I don't receive clear explanations of what has to be done in my job.

Because self-assessment questions related to an individual's abilities and performance may result in answers consistent with social desirability, we added a scale to control for social expectation bias. Social desirability was evaluated with the 10-item MC-2 scale developed by Strahan and Gerbasi (1972). The items were: "I never hesitate to go out of my way to help someone in trouble", "I have never intensely disliked anyone", "When I don't know something, I don't at all mind admitting it", "I am always courteous, even to people who are disagreeable", "I would never think of letting someone else be punished for my wrong doings", "I sometimes feel resentful when I don't get my way", "There have been times when I felt like rebelling against people in authority even though I knew they were right", "I can remember 'playing sick' to get out of something", "There have been times when I was quite jealous of the good fortune of others", and "I am sometimes irritated by people who ask favors of me", as presented in Table 3.9. The Cronbach's alpha was 0.85.

Table 3.9 Measurement items of social desirability

Variable	Items
Social desirability	I never hesitate to go out of my way to help someone in trouble.
	I have never intensely disliked anyone.
	I When I don't know something, I don't at all mind admitting it.
	I am always courteous, even to people who are disagreeable.
	I would never think of letting someone else be punished for my wrong doings.
	I sometimes feel resentful when I don't get my way.
	There have been times when I felt like rebelling against people in authority even though I knew they were right.
	I can remember "playing sick" to get out of something.
	There have been times when I was quite jealous of the good fortune of others.
	There have been times when I was quite jealous of the good fortune of others.

3.3 Summary

This chapter mainly included two aspects. First, we elaborated and explained the process of selecting objects for this study and the information of the final samples to ensure the reliability and representativeness of the study. In the process of selecting objects, we described the recruitment channels and methods in detail, and emphasized the voluntary and informed consent of participants to ensure the observance of ethical principles. In terms of the research process, we developed a detailed questionnaire and described the specific steps and methods of the research.

Then, we introduced the variables selected in this study, including the design of measurement tools and scales for variables to ensure the effectiveness and accuracy of the study. We selected appropriate measurement tools and scales to collect relevant data to ensure the accuracy and consistency of data. We also discuss the reliability and validity of the measurement tools and explain why these tools were chosen to reflect the main study variables.

Through the elaboration and description of the selection of subjects, the research process, and the selection of variables, we aim to conduct a comprehensive evaluation of the research methodology and data quality. This information provided a solid basis for the interpretation and inference of the results of the study and ensured the scientific and reliable nature of the study.

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Chapter 4: Research Analysis and Results

This chapter mainly describes the data analysis process of this study, including analysis methods and strategies, descriptive statistical analysis of each variable, confirmatory factor analysis of the model, common method bias testing, and hypothesis testing.

4.1 Analysis methods and strategies

This study explores the positive relationship of transformational leadership and transactional leadership with knowledge workers' job performance, and the mediating roles of affective commitment, continuance commitment, and normative commitment.

The specific analysis process is as follows: First, we used Mplus 8.0 software to test common method bias and assure variables' validity convergent and discriminant (using AVE and CR estimates). The results assured us that the scales have adequate psychometric proprieties and can be used to accurately measure our constructs. Then, we calculate composite indicators for each variable, and run descriptive and correlational analysis using SPSS 26.0. Specifically, in case of categorial variable we use Spearman's correlation coefficients. Since the theoretical model of this study involves only the verification of direct and indirect effects between the observed variables and the sample size is 258, it is suitable for the path analysis method. Therefore, Mplus 8.0 software was finally used for path analysis to test the hypothesis. To test the mediating effects, this study mainly calculated the 95% biased-corrected confidence intervals using bootstrapping analysis with 5000 bootstrap samples. If the confidence interval did not include 0, the mediating effect was significant.

4.2 Assessment of common method bias

Since the variables used in this study were all reported by employees, there may be potential common method bias (Podsakoff et al., 2024). In order to improve the rigor of the study, procedure control and statistical control methods were used to reduce the potential influence of common method bias on statistical results.

First of all, for the procedure control, we adopted multi-time point data collection method and standardized measurement questionnaire, disrupted the order of items, and adopted reverse

scoring for some questions.

Secondly, for the statistical control, we used unmeasured single potential method factor to evaluate common method bias. Specifically, this study constructed a baseline model (M_{T1}) that included variables measured in Time 1 (i.e., transformational leadership, transactional leadership, affective commitment, continuous commitment, normative commitment) (M_{T1} , $X^2_{(547)} = 1017.459$, comparative fit index [CFI] = 0.917, Tucker-Lewis index [TLI] = 0.909, root mean square error of approximation [RMSEA] = 0.058, standardized root mean square residual [SRMR] = 0.053). Then we added a common approach factor (Podsakoff et al., 2003) on the baseline model (M_{T1}) to construct a new alternative model (M_{c1} , $\chi^2_{(513)} = 852.890$, $CFI = 0.940$, $TLI = 0.930$, $RMSEA = 0.051$, $SRMR = 0.052$). The results showed that the model fit was improved after adding the common method factor ($\Delta\chi^2_{(34)} = 164.569$, $p < 0.05$) compared to the baseline model (M_{T1}). However, the variance explained by common method factor was 11%, which did not exceed the threshold of 25% Williams and Anderson (1991), and there was no significant change in each fitting index ($\Delta CFI = 0.023$, $\Delta TLI = 0.021$, $\Delta RMSEA = 0.007$, $\Delta SRMR = 0.001$) (Y. P. Gong et al., 2022).

In addition, we also constructed a baseline model (M_0) that included transformational leadership, transactional leadership, affective commitment, continuous commitment, normative commitment, and job performance (M_0 , $X^2_{(684)} = 1182.263$, $CFI = 0.919$, $TLI = 0.913$, $RMSEA = 0.053$, $SRMR = 0.053$). Then we added a common approach factor (Podsakoff et al., 2003) to construct a new alternative model (M_{c2} , $\chi^2_{(646)} = 1015.821$, $CFI = 0.940$, $TLI = 0.931$, $RMSEA = 0.047$, $SRMR = 0.051$). The results showed that the model fit was improved after adding the common method factor ($\Delta\chi^2_{(38)} = 166.44$, $p < 0.05$) compared to the baseline model (M_0). However, the variance explained by common method factor was 14%, which did not exceed the threshold of 25% (Williams et al., 1989), and there was no significant change in each fitting index ($\Delta CFI = 0.021$, $\Delta TLI = 0.018$, $\Delta RMSEA = 0.006$, $\Delta SRMR = 0.002$) (Y. P. Gong et al., 2022). The above results showed that our results were not significantly affected by common method bias.

4.3 Convergent validity

The validity mainly includes two aspects, namely, convergent validity and discriminant validity. First, considering the multi-dimensional nature of transformational leadership, this study conducted item parceling according to the four dimensions (i.e., core transformational leadership behaviors, performance expectations, personal support, and intellectual stimulation)

to improve model fit (Little et al., 2002). Then, we test the convergent validity and the results are as shown in Table 4.1. From Table 4.1, we found that all composite reliability (CR) are greater than 0.7, the values of average variance extracted (AVE) were approximately or higher than 0.5 (Fornell & Larcker, 1981). From these results, we infer that the latent variables have great convergent validity.

Table 4.1 Convergent validity analysis results

Construct	Item	Standardized factor load	AVE	CR
Transformational leadership	TFL1	0.607	0.503	0.799
	TFL2	0.815		
	TFL3	0.772		
	TFL4	0.618		
Transactional leadership	TSL1	0.805	0.527	0.885
	TSL2	0.841		
	TSL3	0.788		
	TSL4	0.662		
	TSL5	0.591		
	TSL6	0.638		
	TSL7	0.722		
Affective Commitment	AC1	0.510	0.447	0.865
	AC2	0.707		
	AC3	0.638		
	AC4	0.686		
	AC5	0.671		
	AC6	0.665		
	AC7	0.734		
	AC8	0.710		
Continuance Commitment	CC1	0.723	0.591	0.920
	CC2	0.691		
	CC3	0.776		
	CC4	0.819		
	CC5	0.842		
	CC6	0.819		
	CC7	0.732		
	CC8	0.735		
Normative Commitment	NC1	0.713	0.593	0.921
	NC2	0.749		
	NC3	0.770		
	NC4	0.868		
	NC5	0.788		
	NC6	0.729		
	NC7	0.762		
	NC8	0.772		
Job Performance	JP1	0.657	0.549	0.827
	JP2	0.609		
	JP3	0.828		
	JP4	0.842		

Notes: N = 258; AVE = average variance extracted, CR = composite reliability.

4.4 Discriminant validity

To further analyze the discriminant validity of the variables, this study used Mplus 8.0 software to conduct confirmatory factor analysis. First, considering the multi-dimensional nature of transformational leadership, this study conducted item parceling according to the four dimensions (i.e., core transformational leadership behaviors, performance expectations, personal support, and intellectual stimulation) to improve model fit (Little et al., 2002). Then, this study constructed the baseline model and some alternative models, and the results were shown in Table 4.2. The baseline model (M_0) of this study is a six-factor model, including transformational leadership, transactional leadership, affective commitment, continuance commitment, normative commitment, and job performance. Alternative model 1 (M_1) is a five-factor model, which combines two predictor variables (i.e., transformational leadership and transactional leadership) into one factor. Alternative model 2 (M_2) is a three-factor model, that is, two predictor variables (i.e., transformational leadership and transactional leadership) are combined into one factor, and three mediating variables (i.e., affective commitment, continuance commitment, and normative commitment) are combined into one factor. Alternative model 3 (M_3) is a one-factor model, which combines all variables into one factor.

The results of confirmatory factor analysis showed that the six-factor model had the best model fit (M_0 , $\chi^2_{(684)} = 1182.263$, $CFI = 0.919$, $TLI = 0.913$, $RMSEA = 0.053$, $SRMR = 0.053$), which was better than the five-factor model (M_1 , $\chi^2_{(689)} = 1415.341$, $CFI = 0.882$, $TLI = 0.874$, $RMSEA = 0.064$, $SRMR = 0.079$; $\Delta\chi^2_{(5)} = 233.078$, $p < 0.01$), the three-factor model (M_2 , $\chi^2_{(696)} = 3299.418$, $CFI = 0.579$, $TLI = 0.551$, $RMSEA = 0.120$, $SRMR = 0.167$; $\Delta\chi^2_{(12)} = 2117.155$, $p < 0.01$), and the one-factor model (M_3 , $\chi^2_{(699)} = 4421.385$, $CFI = 0.397$, $TLI = 0.361$, $RMSEA = 0.144$, $SRMR = 0.176$; $\Delta\chi^2_{(15)} = 3239.122$, $p < 0.01$). These results indicated that the main variables in this study had good discriminant validity.

Table 4.2 Confirmatory factor analysis results

Models	χ^2	<i>d.f.</i>	RMSEA	SRMR	CFI	TLI
M_0 : Six-factor model (TFL, TSL, AC, CC, NC, JP)	1182.263	684	.053	.053	.919	.913
M_1 : Five-factor model (TFL + TSL, AC, CC, NC, JP)	1415.341	689	.064	.079	.882	.874
M_2 : Three-factor model (TFL + TSL, AC + CC + NC, JP)	3299.418	696	.120	.167	.579	.551
M_3 : One-factor model (TFL + TSL + AC + CC + NC + JP)	4421.385	699	.144	.176	.397	.361

Notes: N = 258; +: Combining all factors into one factor; TFL: transformational leadership; TSL: transactional leadership; AC: affective commitment; CC: continuance commitment; NC: normative commitment; JP: job performance.

4.5 Descriptive statistical analysis

In this study, SPSS 26.0 software was used to conduct descriptive statistics and correlation analysis for all variables, and the analysis results were shown in Table 4.3.

The results showed that both transformational leadership ($\rho = 0.25, p < 0.01$), and transactional leadership ($\rho = 0.29, p < 0.01$), were positively correlated with employees' job performance. In addition, transformational leadership was positively correlated with affective commitment, continuance commitment, and normative commitment ($\rho = 0.18, p < 0.01$; $\rho = 0.17, p < 0.01$; $\rho = 0.21, p < 0.01$, respectively). The same happened with transactional leadership ($\rho = 0.25, p < 0.01$; $\rho = 0.24, p < 0.01$; $\rho = 0.24, p < 0.01$, respectively). Affective commitment, continuance commitment, and normative commitment were all positively correlated with job performance ($\rho = 0.27, p < 0.01$; $\rho = 0.28, p < 0.01$; $\rho = 0.29, p < 0.01$, respectively). These conclusions provided preliminary support for the further analysis of this study.

In addition, as shown in Table 4.3, age, gender, education, and interaction with supervisor were not significantly correlated with our criterion variable, i.e., job performance. Organizational tenure ($\rho = 0.19, p < 0.01$) and team tenure ($\rho = 0.21, p < 0.01$) were significantly positively correlated with job performance, while role ambiguity was negatively correlated with job performance ($\rho = -0.25, p < 0.01$). In order to comment on control variables intercorrelations with job performance, we did not include age, gender, education and interaction with supervisor in the regression analysis.

Table 4.3 Descriptive statistics and correlations

Variables	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.Age	32.57	6.30														
2.Gender	--	--	-0.8													
3.Education	3.00	.74	.06	.09												
4.Organizational tenure	4.47	3.95	.43**	-.01	.36**											
5.Team tenure	3.36	2.76	.30**	.02	.29**	.83**										
6.Work with supervisor	3.11	2.62	.29**	.03	.23**	.74**	.76**									
7.Interaction frequency with supervisor	1.45	.68	-.02	-.11	.05	.04	.06	-.04								
8.Role ambiguity	2.59	1.19	-.06	.09	.05	-.10	-.10	-.14*	.14*							
9.Social desirability	3.32	.63	-.04	-.02	.17**	.04	-.01	.03	-.01	.24**						
10.Transformational leadership	3.74	1.67	.01	-.15*	.02	-.02	.05	.04	-.03	-.15*	-.08	—				
11.Transactional leadership	3.62	1.65	-.09	-.06	-.01	.02	.06	.07	-.08	-.21**	.08	.11	—			
12.Affective commitment	4.33	1.45	-.03	—	-.04	.02	.04	.05	.02	-.22**	.08	.18**	.25**			
13.Continuous commitment	3.45	1.66	.04	-.07	.00	.13*	.12	.14*	-.02	-.13*	.10	.17**	.24**	.15**		
14.Normative commitment	3.60	1.74	.07	-.09	-.03	.17**	.12	.07	-.10	-.19**	.05	.21**	.24**	.17**	.17**	
15.Job performance	4.68	.92	.03	-.10	.07	.19**	.21**	.20**	-.08	-.25**	.10	.25**	.29**	.27**	.28**	.29**

Notes: N = 258, *p < 0.05; **p < 0.01; Gender: 0 = male; 1 = female; education:1= high school diploma or below, 2 = junior college diploma, 3 = a bachelor's degree, 4 = a master's degree or above; interaction frequency with supervisor: 1 = daily, 2 = weekly, 3 = monthly, 4 = yearly.

4.6 Hypotheses testing

This study used Mplus 8.0 software to examine the impact of transformational leadership and transactional leadership on knowledge workers' job performance, and the mediating role of affective commitment, continuance commitment, and normative commitment. All variables were included in a unique regression analysis, but for clarity of reporting the results will be presented separately. The analysis results were shown in Tables 4.4 and 4.5.

Table 4.4 The results of main effects model

Variables	Affective commitment		Continuance commitment		Normative commitment		Job performance	
	<i>B (s.e.)</i>	<i>p</i>	<i>B (s.e.)</i>	<i>p</i>	<i>B (s.e.)</i>	<i>p</i>	<i>B (s.e.)</i>	<i>p</i>
Control variables								
Organizational tenure	-.036 (.029)	.219	.021 (.045)	.633	.049 (.047)	.294	.017 (.021)	.419
Team tenure	.032 (.059)	.594	.035 (.070)	.617	.031 (.066)	.636	.010 (.031)	.748
Work with supervisor	.034 (.054)	.526	.021 (.065)	.742	-.029 (.057)	.618	.007 (.027)	.799
Role ambiguity	.309(.160)	.054	-.132 (.089)	.137	-.097 (.099)	.327	-.063 (.053)	.238
Social desirability	-.036 (.029)	.219	.276 (.175)	.115	.016 (.192)	.934	.248* (.104)	.017
Predictors								
Transformational leadership	.122* (.050)	.015	.149* (.060)	.013	.197** (.064)	.002	.082* (.033)	.012
Transactional leadership	.181** (.055)	.001	.193** (.061)	.002	.227** (.066)	.001	.090* (.033)	.007
							Total effect	
Transformational leadership							.119*** (.033)	.000
Transactional leadership							.137*** (.033)	.000
Mediators								
Affective commitment	--	--	--	--	--	--	.087* (.041)	.034
Continuance commitment	--	--	--	--	--	--	.068* (.030)	.021
Normative commitment	--	--	--	--	--	--	.082* (.032)	.009
<i>R</i> ²	.139** (.041)	.001	.114** (.036)	.002	.121** (.038)	.002	.275*** (.046)	.000

Notes: N = 258, *p < 0.05; **p < 0.01; ***p < 0.001; B = non-standardized coefficient.

Table 4.5 Testing results of indirect effect

Paths	Indirect effect	s.e.	95% CI
Transformational leadership → Affective commitment → Job performance	.011	.007	[.001, .029]
Transformational leadership → Continuance commitment → Job performance	.010	.006	[.002, .028]
Transformational leadership → Normative commitment → Job performance	.016	.008	[.004, .039]
Transactional leadership → Affective commitment → Job performance	.016	.009	[.002, .047]
Transactional leadership → Continuance commitment → Job performance	.013	.007	[.002, .040]
Transactional leadership → Normative commitment → Job performance	.019	.009	[.005, .051]

Notes: N = 258, *p < 0.05; **p < 0.01; ***p < 0.001.

4.6.1 Transformational leadership model

First of all, this study tested the main path model, which included transformational leadership as predictor variable and employees' job performance as criterion variable. The analysis results of the main path model were shown in Table 4.4. Hypothesis 1a proposed that transformational leadership had a positive relationship with employees' job performance. According to Table 4.4, transformational leadership had a significant positive total effect on employees' job performance ($B = 0.119$, $s.e. = 0.033$, $p < 0.01$). Therefore, hypothesis 1a was supported.

4.6.1.1 The mediating role of affective commitment on the relationship between transformational leadership and job performance

Hypothesis 2a proposed that transformational leadership had a positive relationship with employees' affective commitment. Hypothesis 4a proposed that employees' affective commitment had a positive relationship with job performance. And hypothesis 5a proposed that affective commitment mediated the relationship between transformational leadership and employees' job performance. According to Table 4.4 and Table 4.5, transformational leadership had a significant effect on employees' affective commitment ($B = 0.122$, $s.e. = 0.050$, $p < 0.05$), and employees' affective commitment has a positive effect on job performance ($B = 0.087$, $s.e. = 0.041$, $p < 0.05$). At the same time, the mediating effect of affective commitment on the relationship between transformational leadership and employees' job performance was statistically significant (*Indirect effect* = 0.011, $s.e. = 0.007$, 95% CI = [0.001, 0.029]). In addition, due to the direct effect of transformational leadership on employees' job performance was significant (*Direct effect* = 0.082, $s.e. = 0.033$, $p < 0.05$), so the mediation effect of affective commitment is partial. Therefore, hypothesis 2a, hypothesis 4a, and hypothesis 5a were supported.

4.6.1.2 The mediating role of continuance commitment on the relationship between transformational leadership and job performance

Hypothesis 2b proposed that transformational leadership had a positive relationship with employees' continuance commitment. Hypothesis 4b proposed that employees' continuance commitment had a positive relationship with job performance. And hypothesis 5b proposed that continuance commitment mediated the relationship between transformational leadership and employees' job performance. According to Table 4.4 and Table 4.5, transformational leadership has a positive effect on employees' continuance commitment ($B = 0.149$, $s.e. = 0.060$, $p < 0.05$),

and employees' continuance commitment had a statistically significant effect on employees' job performance ($B = 0.068$, $s.e. = 0.030$, $p < 0.05$). At the same time, the mediating effect of continuance commitment on the relationship between transformational leadership and employees' job performance was significant (*Indirect effect* = 0.010, $s.e. = 0.006$, 95%CI = [0.002, 0.028]). In addition, due to the direct effect of transformational leadership on employees' job performance was significant (*Direct effect* = 0.082, $s.e. = 0.033$, $p < 0.05$), so the mediation effect of continuance commitment is partial. Therefore, hypothesis 2b, hypothesis 4b, and hypothesis 5b were supported.

4.6.1.3 The mediating role of normative commitment on the relationship between transformational leadership and job performance

Similar to previous hypotheses, but focusing normative commitment. Hypothesis 2c proposed that transformational leadership had a positive relationship with this dimension of organizational commitment. Hypothesis 4c proposed that employees' normative commitment had a positive relationship with job performance. And hypothesis 5c proposed that normative commitment mediated the relationship between transformational leadership and employees' job performance. According to Table 4.4 and Table 4.5, transformational leadership has a positive and significant effect on employees' normative commitment ($B = 0.197$, $s.e. = 0.064$, $p < 0.05$), and employees' normative commitment was significantly related with employees' job performance ($B = 0.082$, $s.e. = 0.032$, $p < 0.05$). At the same time, the mediating effect of normative commitment on the relationship between transformational leadership and employees' job performance was significant (*Indirect effect* = 0.016, $s.e. = 0.008$, 95% CI = [0.004, 0.039]). In addition, due to the direct effect of transformational leadership on employees' job performance was significant (*Direct effect* = 0.082, $s.e. = 0.033$, $p < 0.05$), so the mediation effect of normative commitment is partial. Therefore, hypothesis 2c, hypothesis 4c, and hypothesis 5c were supported.

4.6.2 Transactional leadership model

Then, this study tested the main path model with transactional leadership as the predictor variable and employees' job performance as the criterion variable. The analysis results of the main path model were shown in Table 4.4. Hypothesis 1b proposed that transactional leadership had a positive relationship with employees' job performance. According to Table 4.4, transactional leadership had a positive and statistically significant total effect on employees' job performance ($B = 0.137$, $s.e. = 0.033$, $p < 0.01$). Therefore, hypothesis 1b was supported.

4.6.2.1 The mediating role of affective commitment on the relationship between transactional leadership and job performance

Hypothesis 3a proposed that transactional leadership had a positive relationship with employees' affective commitment. Hypothesis 4a proposed that employees' affective commitment had a positive relationship with job performance. And hypothesis 6a proposed that affective commitment mediated the relationship between transactional leadership and employees' job performance. According to Table 4.4 and Table 4.5, transactional leadership has a positive effect on employees' affective commitment ($B = 0.181$, $s.e. = 0.055$, $p < 0.05$), and employees' affective commitment has also a positive effect on job performance ($B = 0.087$, $s.e. = 0.041$, $p < 0.05$). At the same time, the mediating effect of affective commitment on the relationship between transactional leadership and employees' job performance was significant (*Indirect effect* = 0.016, $s.e. = 0.009$, 95%CI = [0.002, 0.047]). In addition, due to the direct effect of transactional leadership on employees' job performance was significant (*Direct effect* = 0.090, $s.e. = 0.033$, $p < 0.05$), so the mediation effect of affective commitment is partial. Therefore, hypothesis 3a, hypothesis 4a, and hypothesis 6a were supported.

4.6.2.2 The mediating role of continuance commitment on the relationship between transactional leadership and job performance

Hypothesis 3b proposed that transactional leadership had a positive relationship with employees' continuance commitment. Hypothesis 4b proposed that employees' continuance commitment had a positive relationship with job performance. And hypothesis 6b proposed that continuance commitment mediated the relationship between transactional leadership and employees' job performance. According to Table 4.4 and Table 4.5, transactional leadership has a positive effect on employees' continuance commitment ($B = 0.193$, $s.e. = 0.061$, $p < 0.05$), and employees' continuance commitment was significantly and positively related with employees' job performance ($B = 0.068$, $s.e. = 0.030$, $p < 0.05$). At the same time, the mediating effect of continuance commitment on the relationship between transactional leadership and employees' job performance was significant (*Indirect effect* = 0.013, $s.e. = 0.007$, 95%CI = [0.002, 0.040]). In addition, due to the direct effect of transactional leadership on employees' job performance was significant (*Direct effect* = 0.090, $s.e. = 0.033$, $p < 0.05$), so the mediation effect of continuance commitment is partial. Therefore, hypothesis 3b, hypothesis 4b, and hypothesis 6b were supported.

4.6.2.3 The mediating role of normative commitment on the relationship between transactional leadership and job performance

Hypothesis 3c proposed that transactional leadership had a positive relationship with employees' normative commitment. Hypothesis 4c proposed that employees' normative commitment had a positive relationship with job performance. And hypothesis 6c proposed that normative commitment mediated the relationship between transactional leadership and employees' job performance. According to Table 4.4 and Table 4.5, transactional leadership had a positive effect on knowledge workers' normative commitment ($B = 0.227$, $s.e. = 0.066$, $p < 0.05$), and employees' normative commitment was significantly and positively related with their job performance ($B = 0.082$, $s.e. = 0.032$, $p < 0.05$). At the same time, the mediating effect of normative commitment on the relationship between transactional leadership and employees' job performance was significant (*Indirect effect* = 0.019, $s.e. = 0.009$, 95%CI = [0.005, 0.051]). In addition, due to the direct effect of transactional leadership on employees' job performance was significant (*Direct effect* = 0.090, $s.e. = 0.033$, $p < 0.05$), so the mediation effect of normative commitment is partial. Therefore, hypothesis 3c, hypothesis 4c, and hypothesis 6c were supported. And it should be clarified the total variance explained by the model as well as what happened with control variables was 0.275 ($p < 0.05$).

4.7 Summary

Through empirical research, this chapter tested the hypothetical relationship between transformational leadership, transactional leadership, and employees' affective commitment, continuance commitment, normative commitment, and job performance. The hypotheses testing results were shown in Table 4.6 and Figure 4.1.

Table 4.6 Hypotheses test results

	Research hypotheses	Results
Hypothesis 1a:	Transformational leadership had a positive relationship with employees' job performance	supported
Hypothesis 1b:	Transactional leadership had a positive relationship with employees' job performance.	supported
Hypothesis 2a:	Transformational leadership had a positive relationship with employees' affective commitment.	supported
Hypothesis 2b:	Transformational leadership had a positive relationship with employees' continuance commitment.	supported
Hypothesis 2c:	Transformational leadership had a positive relationship with employees' normative commitment.	supported
Hypothesis 3a:	Transactional leadership had a positive relationship with employees' affective commitment.	supported
Hypothesis 3b:	Transactional leadership had a positive relationship with employees'	supported

	continuance commitment.	
Hypothesis 3c:	Transactional leadership had a positive relationship with employees' normative commitment.	supported
Hypothesis 4a:	Employees' affective commitment had a positive relationship with job performance.	supported
Hypothesis 4b:	Employees' continuance commitment had a positive relationship with job performance.	supported
Hypothesis 4c:	Employees' normative commitment had a positive relationship with job performance.	supported
Hypothesis 5a:	Employees' affective commitment mediated the relationship between transformational leadership and employees' job performance.	supported
Hypothesis 5b:	Employees' continuance commitment mediated the relationship between transformational leadership and employees' job performance.	supported
Hypothesis 5c:	Employees' normative commitment mediated the relationship between transformational leadership and employees' job performance.	supported
Hypothesis 6a:	Employees' affective commitment mediated the relationship between transactional leadership and employees' job performance.	supported
Hypothesis 6b:	Employees' continuance commitment mediated the relationship between transactional leadership and employees' job performance.	supported
Hypothesis 6c:	Employees' normative commitment mediated the relationship between transactional leadership and employees' job performance.	supported

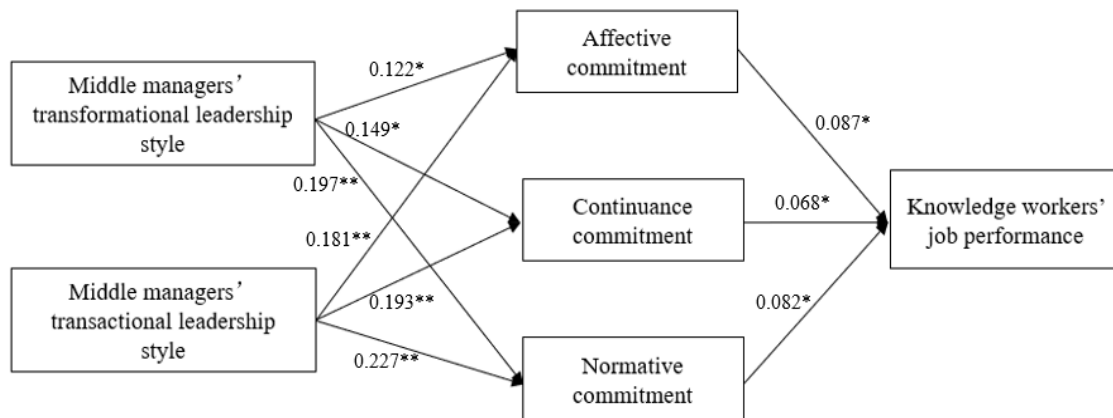


Figure 4.1 Main findings

Notes: Non-standardized coefficients; *p < 0.05; **p < 0.01

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Chapter 5: Research Conclusion and Implications

Based on the empirical research results above, this chapter elaborates the research conclusions, theoretical contributions, and practical contributions. In addition, this chapter also discusses the limitations of this research and the prospect of future research.

5.1 Research discussion and conclusion

Based on the social exchange theory (Blau, 1964), this study constructed a mediation model, explored the effect mechanism of transformational leadership and transactional leadership of middle managers' on knowledge workers' job performance, and focused on the mediating role of the three kinds of organizational commitments (i.e., affective commitment, continuance commitment, and normative commitment).

In this study, we adopted the data collection method of multiple time points to obtain the two-stage time-delay questionnaire data of 258 knowledge workers from 4 Chinese enterprises. In this study, we adopted the method of path analysis to verify the positive effect of transformational leadership and transactional leadership on knowledge workers' job performance, as well as the mediating role of affective commitment, continuance commitment, and normative commitment between transformational leadership and job performance, and transactional leadership and job performance. This chapter summarizes and discusses the empirical results.

5.1.1 The effect of transformational leadership on knowledge workers' job performance

On the one hand, this study examined the positive relationship between transformational leadership and knowledge workers' job performance. The empirical results of this study showed that transformational leadership was positively related with knowledge workers' job performance, after controlling for employees' organizational tenure, team tenure, work with supervisors, role ambiguity and social desirability. Therefore, hypothesis 1a was supported.

Consistent with social exchange theory (Blau, 1964), the results of this study suggested that transformational leaders would articulate a vision for development, set an example at work, promote acceptance of team goals, have high performance expectations of employees, and

provide personalized support and intellectual stimulation. Under the leaders' care and concern, employees would develop a social exchange relationship with the leaders, make work in line with the values of the organization and the leaders, and then repay the leaders with a more positive work attitude and work behavior (Cropanzano & Mitchell, 2005). For example, they would improve their work methods, improve their work efficiency, and then show better job performance. Chi and Pan (2012) found that transformational leadership at the individual and unit levels had a positive impact on follower task performance, through hierarchical linear modeling analysis of 85 leaders and 343 followers in 85 bank branches. Based on social exchange theory, Fan et al. (2023) studied 268 Chinese municipal civil servants to verify the positive impact of transformational leadership on service performance.

5.1.1.1 The mediating role of affective commitment

This study explored also the mediating effect of knowledge workers' affective commitment on the relationship between transformational leadership and employees' job performance. The empirical results of this study with the path analysis method showed that transformational leadership could improve knowledge workers' affective commitment, while affective commitment could promote employees improved job performance, after controlling employees' organizational tenure, team tenure, work with supervisors, role ambiguity and social desirability. Therefore, hypotheses 2a and 4a were supported, as well as hypothesis 5a.

According to social exchange theory (Blau, 1964), when a leader treats an employee in a positive or negative way, employees would, in turn, choose to reciprocate this treatment with a positive or negative behavior as a response to the initial behavior, then the process of social exchange occurs (Eisenberger et al., 1987, Eisenberger et al., 2004). The results of this study suggested that transformational leaders not only take risks for employees to implement new ideas, but also listen to employees' ideas and pay attention to their needs (Nohe & Hertel, 2017). In addition, they are also able to induce employees to stay in organization by expressing personalized considerations, and thus establish a strong and personalized communication relationship with employees (Hughes et al., 2010). These intellectual stimulation and personalized support behaviors enhance the employee's emotional attachment and sense of belonging to the organization, so that the employee can repay the organization by improving job performance. Ribeiro et al. (2018) also verified the mediating effect of affective commitment in the relationship between transformational leadership and individual performance in Turkish workers.

To sum up, this study draws the following conclusion: transformational leadership would

enhance the affective commitment of knowledge workers, and thereby have a positive effect on their job performance, that is, the affective commitment of knowledge workers has a mediating effect on the relationship between transformational leadership and employees' job performance.

5.1.1.2 The mediating role of continuance commitment

This study also explored the mediating effect of knowledge workers' continuance commitment on the relationship between transformational leadership and employees' job performance. The empirical results of this study with the path analysis method showed that transformational leadership could improve knowledge workers' continuance commitment, while continuance commitment could enhance employees job performance, after controlling the previously mentioned control variables. Therefore, hypotheses 2b and 4b were supported. The research results also showed that the indirect effect of continuance commitment on the relationship between transformational leadership and employees' job performance was significant. Therefore, hypothesis 5b was supported.

According to social exchange theory (Blau, 1964), transformational leaders could provide an attractive and compelling goal for the future of the organization and connects employees' efforts to the achievement of the organization's goals (Nohe & Hertel, 2017), so that employees feel that it is advantageous to stay in the organization, because the profit of the organization means that they will also get more benefits. Hence, employees will generate continuance commitment. In turn, employees will internalize organizational goals and achieve organizational goals by improving personal job performance. Almutairi (2016) studied 227 Saudi female nurses in four hospitals in Riyadh to validate the mediating role of affective, continuance, and normative commitment in the relationship between transformational leadership and job performance.

To sum up, this study draws the following conclusion: transformational leadership would enhance the continuance commitment of knowledge workers, and subsequently have a positive effect on their job performance. That is, the continuance commitment of knowledge workers has a mediating effect on the relationship between transformational leadership and employees' job performance.

5.1.1.3 The mediating role of normative commitment

In addition, this study explored also the mediating effect of knowledge workers' normative commitment on the relationship between transformational leadership and employees' job performance. The empirical results of this study with the path analysis method showed that

transformational leadership fosters knowledge workers' normative commitment, while normative commitment promotes employees higher job performance, once more controlling for previously identified variables. Therefore, hypotheses 2c and 4c were supported. The research findings revealed that the indirect effect of normative commitment on the relationship between transformational leadership and employees' job performance was significant. Therefore, hypothesis 5c was supported.

According to social exchange theory (Blau, 1964), transformational leadership emphasizes collective identity and encourages employees to sacrifice themselves for collective interests (MacKenzie et al., 2001). Under the influence of such behaviors, employees would enhance their sense of responsibility and obligation to contribute to the organization, and then work harder to improve their job performance, so as to benefit the organization.

To sum up, this study draws the following conclusion: transformational leadership would enhance the normative commitment of knowledge workers, and thereby have a positive effect on their job performance, that is, the normative commitment of knowledge workers has a mediating effect on the relationship between transformational leadership and employees' job performance.

5.1.2 Transactional leadership and knowledge workers' job performance

On the other hand, this study examined the positive impact of transactional leadership on knowledge workers' job performance. The empirical results of this study showed that transactional leadership was positively correlated with knowledge workers' job performance, after controlling already mentioned variables. Therefore, hypothesis 1b was supported.

Consistent with the norm of reciprocity in social exchange theory (Blau, 1964), in the process of a balanced social exchange, followers who receive various resources from the leaders are obligated to repay the leader by returning valuable resources (Young et al., 2021). The research results show that transactional leadership not only has a certain incentive effect on employees, but also has a certain supervision effect on employees, and then promotes them to improve their job performance. On the one hand, when leaders make conditional reward behaviors such as promotion to employees, they will motivate employees to improve their job performance in return for positive feedback from leaders. On the other hand, the rewards and punishments of transactional leaders for employees in the future depend on their performance level (MacKenzie et al., 2001). Under the condition that performance is monitored, employees will also improve their performance in order to obtain rewards and avoid punishment.

5.1.2.1 The mediating role of affective commitment between transactional leadership and performance

This study explored the mediating effect of knowledge workers' affective commitment on the relationship between transactional leadership and employees' job performance. The empirical results of this study with the path analysis method showed that transactional leadership could improve knowledge workers' affective commitment, while affective commitment could promote employees improved job performance, considering control variables. Therefore, hypotheses 3a and 4a were supported.

The research results showed that the indirect effect of affective commitment on the relationship between transactional leadership and employees' job performance was significant. Therefore, hypothesis 6a was supported.

According to social exchange theory (Blau, 1964), when a leader treats an employee in a positive or negative way, employees would, in turn, choose to reciprocate this treatment with a positive or negative behavior as a response to the initial behavior, then the process of social exchange occurs (Eisenberger et al., 1987, Eisenberger et al., 2004). The results of this study show that transactional leadership not only provides material rewards to employees, but also psychological rewards, which greatly satisfies the psychological needs of employees (Lo et al., 2010). Therefore, employees will have emotional attachment to the organization, improve their emotional commitment to the organization, and then work hard to improve job performance in order to repay the organization. C. Y. Kim and Park (2015) explored the joint effects of transactional leadership, employee emotional exhaustion, and leader-member exchange on employees' affective commitment and in-role performance based on stimulus theory, vulnerability-stress theory, and job demand-resource model. A study of 332 employees in a Korean company found that when emotionally exhausted employees worked with leaders with transactional styles and a high level of leader-member exchange, employees' in-role performance deteriorated, and employees' emotional commitment played a mediating role (C. Y. Kim & Park, 2015)

To sum up, this study draws the following conclusion: transactional leadership would enhance the affective commitment of knowledge workers, and then have a positive effect on their job performance. That is, the affective commitment of knowledge workers has a mediating effect on the relationship between transactional leadership and employees' job performance.

5.1.2.2 The mediating role of continuance commitment between transactional leadership and performance

This study also explored the mediating effect of knowledge workers' continuance commitment on the relationship between transactional leadership and employees' job performance. The empirical results of this study with the path analysis method showed that transactional leadership could improve knowledge workers' continuance commitment, while continuance commitment could enhance employees' job performance, after controlling some employees' characteristics. Therefore, hypotheses 3b and 4b were supported.

The research results showed that the indirect effect of continuance commitment on the relationship between transactional leadership and employees' job performance was significant. Therefore, hypothesis 6b was supported.

According to social exchange theory (Blau, 1964), the results of this study show that transactional leaders motivate employees by offering or reducing more personal benefits in the way of reward or punishment (Bass & Stogdill, 1990), easily develop economic exchange relations with employees, and make employees produce sustainable commitments. Under the influence of continuous commitment, employees will take the initiative to improve their personal job performance in exchange for more economic benefits. Le Trinh et al. (2021) validated the mediating role of affective, continuance, and normative commitments in transactional leadership and job performance, using lecturers and staff from FPT University in Da Nang as research subjects.

To sum up, this study draws the following conclusion: transactional leadership would enhance the continuance commitment of knowledge workers, and then have a positive effect on their job performance, that is, the continuance commitment of knowledge workers has a mediating effect on the relationship between transactional leadership and employees' job performance.

5.1.2.3 The mediating role of normative commitment between transactional leadership and performance

Finally, this study explored the mediating effect of knowledge workers' normative commitment on the relationship between transactional leadership and employees' job performance. The empirical results of this study with the path analysis method showed that transactional leadership could improve knowledge workers' normative commitment, while normative commitment could push employees to improve their job performance, after controlling employees' organizational tenure, team tenure, work with supervisors, social desirability, and

role ambiguity. Therefore, hypotheses 3c and 4c were supported.

The research results showed that the indirect effect of normative commitment on the relationship between transactional leadership and employees' job performance was significant. Therefore, hypothesis 6c was supported.

According to social exchange theory (Blau, 1964), the results of this study show that transactional leadership rewards and punishes employees based on performance, which reflects the principle of equity (MacKenzie et al., 2001). This approach encourages employees to identify with the goals and values of the organization, further increasing their sense of obligation to remain in the organization, and thus making employees more likely to act in a way that is consistent with the goals and interests of the organization, namely, improving job performance.

To sum up, this study draws the following conclusion: transactional leadership would enhance the normative commitment of knowledge workers, and, subsequently, have a positive effect on their job performance, that is, the normative commitment of knowledge workers has a mediating effect on the relationship between transactional leadership and employees' job performance.

Overall, the findings of the present study indicate that both transformational and transactional leadership styles have the ability to increase the commitment of knowledge workers with their enterprises, and thereby foster improved levels of individual performance.

5.2 Theoretical contribution

This study provides some theoretical contributions to the study of social exchange theory, transformational leadership, transactional leadership, affective commitment, continuance commitment, normative commitment, and job performance. It is mainly reflected in the following six aspects.

1. The results of transactional leadership and transformational leadership are expanded.

From the perspective of social exchange theory (Blau, 1964), this study explored the impact of transformational leadership and transactional leadership on knowledge workers' job performance, enriching the outcome research of transformational leadership and transactional leadership.

The process of leadership influencing employees can be viewed as a group-based process aimed at encouraging employees to achieve certain goals (Alina, 2013). Transformational leadership is a leadership style that emphasizes that leaders care for and trust their employees

by providing clear goals, support, and challenges to motivate employees' intrinsic motivation (Kammerhoff et al., 2019). Previous research on transformational leadership style mainly focused on the impact of transformational leadership on organizational performance (Howell et al., 2005), organizational knowledge creation practices (Song et al., 2012), and organizational diversity (McCallaghan et al., 2019), as well as on team variables such as team performance (Choi et al., 2017) and team creativity (V. Li et al., 2016), and paid insufficient attention to the individual variable of knowledge workers' job performance.

Based on the social exchange theory (Blau, 1964), this study found that transformational leadership helps to promote the development of social exchange relationship between employees and leaders, and promote knowledge workers to make work in line with their values, thus improving their own job performance. This conclusion expands the research on the consequences of transformational leadership and further deepens our understanding of transformational leadership in high-technology enterprises.

Transactional leadership focuses on using rewards and punishments as incentives to guide employees' behavior by establishing clear contractual relationships with employees (Bass, 1985a). Previous studies have shown that transactional leadership has a certain impact on organizational capabilities and performance such as organizational innovation (Prasad & Junni, 2016), organizational absorptive capacity (Zadeh et al., 2020), and organizational performance (Patiar & Wang, 2020), and also explored the impact of transactional leadership on employees' job participation (Shkoler & Tziner, 2020), job enjoyment (Shkoler & Tziner, 2020), dynamic ability (Xu & Wang, 2019), and job performance (Young et al., 2021) at the individual level. However, existing studies differ greatly on the relationship between transactional leadership and employees' job performance (Young et al., 2021, Yozgat & Kamanli, 2016). Some studies believe that transactional leadership has a positive and significant impact on employee performance (Abdelwahed et al., 2022, Yozgat & Kamanli, 2016), while other studies have confirmed the negative impact of transactional leadership on employee performance (Young et al., 2021).

According to the social exchange theory (Blau, 1964), this study confirmed that employees are likely to improve their job performance under the incentive and supervision of transactional leadership. This conclusion clarifies the positive effect of transactional leadership on the job performance of knowledge workers, and further provides empirical support for the effectiveness and positive significance of transactional leadership, namely in high-technology companies.

2. The antecedents of knowledge workers' job performance are enriched.

This study focuses on transformational leadership and transactional leadership, and explores the driving factors that affect the job performance of knowledge workers. Organizational performance is the key factor that determines the development of the enterprise, and this is achieved by the job performance of the organization members. Therefore, job performance is one of the most important outcome variables in the field of organizational behavior. Previous studies on the antecedent mechanism of employees' job performance mainly focused on individual factors such as employee's work effort (Van Iddekinge et al., 2023), personal emotional intelligence performance (Z. Gong et al., 2019), and psychological capital level (Alessandri et al., 2018), as well as external environmental factors such as work environment (Diamantidis & Chatzoglou, 2019), work incentive (Ghaffari et al., 2017), work-family conflict (Obrenovic et al., 2020). In general, previous studies have studied the antecedents related to employees' work performance, paying attention to the influence of different leadership styles such as transformational leadership (Crede et al., 2019), transactional leadership (Gemedu & Lee, 2020), authentic leadership (Duarte et al., 2021, Ribeiro et al., 2018) and humble leadership (Cho et al., 2021) on job performance. However, previous studies on employees' job performance mainly focused on the whole staff, and rarely targeted knowledge workers.

Knowledge workers those who use knowledge and information to engage in management and technical services, with strong achievement motivation, strong sense of independence, emphasis on learning and innovation, and emphasis on personal career development (Guo et al., 2012). In modern enterprises, the proportion of knowledge workers is increasing. Taking knowledge workers as research objects, this study simultaneously verified the mechanisms by which both transformational and transactional leadership styles affect the performance of knowledge workers, which is consistent with the philosophy of "both/and" rather than "either/or" (Kundi et al., 2023). In addition, the research conclusions have important reference value and significance for enterprises to manage knowledge workers, improve their work enthusiasm and improve their job performance.

3. The mediating role of different organizational commitments in the relationship between transformational leadership and knowledge workers' job performance is explored.

Based on the social exchange theory (Blau, 1964), this study explored the mediating role of affective commitment, continuance commitment, and normative commitment on the relationship between transformational leadership and the job performance of knowledge workers. Organizational commitment is a psychological state that characterizes the employee's relationship with the organization, emphasizes the degree of loyalty and belonging of

employees to the organization, and thus influences the employee's decision to continue or terminate membership in the organization (Allen & Meyer, 1990), and it is crucial in the process of leadership decisions affecting employees' behavior. Previous studies have mainly explored the mediating role of individual's psychological perception variables such as psychological empowerment (Gumusluoglu & Ilsev, 2009), employee identity (W. Liu et al., 2010), and employee self-efficacy (W. Liu et al., 2010) among individual variables such as transformational leadership and employee behavior, and paid less attention to organizational commitment.

Based on the social exchange theory (Blau, 1964), this study verified that transformational leadership prompts employees to establish affective commitment, continuance commitment, and normative commitment to the organization by clarifying inspiring vision, establishing convincing goals, providing personalized support and intellectual stimulation. Employees will take the initiative to improve their job performance in return for the organization. This conclusion provides a new perspective for the explanation of the influence mechanism of affective commitment, continuous commitment, and normative commitment on the relationship between transformational leadership and individual outcomes, and further improves the understanding of affective commitment, continuous commitment, and normative commitment as mediating mechanisms. It also further enriched the research of organizational commitment and social exchange theory (Blau, 1964) at the individual level. Organizations could improve the job performance of knowledge workers by cultivating transformational leadership and enhancing organizational commitment. These findings have important implications for organizations to formulate human resource management strategies and implement talent development plans.

4. The mediating role of different organizational commitments in the relationship between transformational leadership and knowledge workers' job performance is explored.

From the perspective of social exchange theory (Blau, 1964), this study reveals the mediating role of affective commitment, continuance commitment, and normative commitment on the relationship between transactional leadership and knowledge workers' job performance. Previous studies have confirmed that transactional leadership has a significant impact on team performance, including department financial performance, non-financial performance, and sustainable performance, via the mediating role of managers' compensation and welfare perception (Patlar & Wang, 2020). At the same time, transactional leadership can also shape employees' environmental commitment, thus encouraging employees to act organizational environmental citizenship behaviors when the organization carries out large-scale projects (G.

Wang et al., 2023). However, previous studies have not explored how transactional leadership affects individual attitudes and behaviors through various organizational commitments of employees. We believe that transactional leaders reward and punish employees based on their performance, which reflects the principle of fairness and induces employees to make organizational commitment. Employees will further improve their job performance to benefit the organization and themselves.

This study verified that transactional leadership could affect the job performance of knowledge workers through three mediating mechanisms: affective commitment, continuance commitment, and normative commitment. This conclusion can not only improve the understanding of how transactional leadership affects the job performance of knowledge workers and open the “black box” of the research on the impact of transactional leadership on employees' job performance, but also further enrich the research on affective commitment, continuance commitment, and normative commitment at the individual level.

5. The research on the impact of transformational leadership and transactional leadership in the Chinese context is expanded.

The research background of this study is malleable. Previous relevant studies have focused on the impact of different leadership styles, such as transformational and transactional leadership, on employee job performance in the Western context (Owens & Hekman, 2016, Tepper et al., 2018), while relatively few studies have been conducted in the Chinese context. China is experiencing rapid economic transformation and development, especially with the advent of the mobile Internet era and the development of the digital economy, as knowledge-intensive and technology-intensive high-tech enterprises are increasingly showing a driving role in leading economic growth (Fang et al., 2016). However, there are significant differences between Chinese culture and Western culture, including but not limited to values, social relations, and power structures. These differences may have an impact on the management practices of Chinese high-tech enterprises, and further influence the mechanism of transactional and transformational leadership on employees' job performance.

In the context of Chinese culture, factors such as interpersonal relationships, collectivist values, and authoritative leadership play an important role in the organization, which is different from the value orientation of Western culture which emphasizes individualism, equality, and task orientation (Luo et al., 2017). Due to the characteristics of Chinese culture, transactional leadership and transformational leadership may present some special influence mechanisms in Chinese high-tech enterprises. For example, transactional leadership may motivate employees by providing material rewards and resource support to meet the emphasis placed on economic

and material returns in Chinese culture (Cai et al., 2023). On the other hand, transformational leadership may adapt to the needs of Chinese enterprises in the rapidly changing environment by shaping corporate vision and stimulating employees' autonomy and innovation ability (Luo et al., 2017). Therefore, understanding the differences between Chinese culture and Western culture is crucial for studying the impact of transactional leadership and transformational leadership on employees' job performance in the Chinese context. This will help to reveal the relationship between leadership style and employees' job performance in Chinese high-tech enterprises, and provide managers with more specific and targeted suggestions to promote employees' job performance and organizational development.

Therefore, under the context of China's high-tech enterprises, this study verifies the influence of middle managers' transformational leadership and transactional leadership styles on the job performance of knowledge workers, as well as the mediating role of affective commitment, continuance commitment and normative commitment. The conclusions of this study have important reference value and significance for enterprises to manage knowledge workers, improve employees' organizational commitment, and improve job performance, and also make important research contributions to the development of cross-cultural leadership research.

6. The research samples in this study are innovative to some extent.

Knowledge workers are those who rely on knowledge and expertise to perform tasks and make decisions in their work (Ghlichlee & Larijani, 2024). They typically have a high degree of specialized knowledge, skills, and experience, and are able to apply the knowledge to problem solving, innovation, and improving job results (So et al., 2023). In the Internet era, knowledge workers are important drivers of organizational innovation and competitiveness, and they play a key role in organizational change and adaptability, which could help organizations adapt to the changing external environment (So et al., 2023). Knowledge workers rely on their own expertise and skills in their work, so the influence of leadership on them is particularly important (Ghlichlee & Larijani, 2024).

First, by studying the impact of transformational leadership and transactional leadership on the job performance of knowledge workers, we can gain insight into how leadership behavior affects employees' innovation, job motivation, and job performance, which helps organizations better understand how to develop effective leadership strategies to stimulate the potential of knowledge workers. Transformational leadership improves the job performance of knowledge workers by stimulating their innovation and autonomy, while transactional leadership stimulates knowledge workers' job performance by providing rewards and feedback (Ma et al.,

2022). Based on the findings, organizations can develop leadership training and development programs for knowledge workers to improve leaders' transformational and transactional leadership behaviors, which could enhance the interaction and cooperation between leaders and knowledge workers, thus improving the job performance of employees.

Secondly, the study of the impact of transformational leadership and transactional leadership on the job performance of knowledge workers can strengthen the comprehensiveness and applicability of leadership theory. By deeply studying the mechanism and effect of different leadership styles, we can improve and develop the leadership theory and make it more practical and instructive. It will help improve the quality and effect of organizational leadership and better adapt to the needs of the era of knowledge economy.

In sum, this study takes knowledge workers as research samples to verify the influence mechanism of transformational leadership and transactional leadership on the job performance of knowledge workers. The research conclusions are of great significance for enterprises to manage knowledge workers and stimulate their job potential.

5.3 Practical contributions

This study mainly provides the following practical implications.

1. Developing transformational leaders.

Firstly, managers need to clarify the organizational vision, pay attention to the needs of employees, and provide personalized support to improve the individual job performance of knowledge workers. The results of this study show that transformational leadership has a significant positive effect on the job performance of knowledge workers. Transformational leaders share a clear vision and goals with employees so that they understand how their work fits into the organization's overall strategy, inspire a sense of purpose and dedication, and realize the importance of their work to the organization (Jong & Faerman, 2021). This practice helps to increase the motivation and responsibility of employees, and encourages them to work towards a common goal, thereby improving job performance. At the same time, transformational leaders encourage employees to continuously learn and improve their skills by stimulating their intrinsic motivation and potential, they provide training and development opportunities, develop personal development plans, and work with employees to set goals (J. Kim et al., 2023). Such practice can enhance the professional ability and knowledge level of employees, and thus improve their job performance. In a word, transformational leadership is a leadership style that focuses on motivation, encouragement, and leading by example

(Kammerhoff et al., 2019). These leaders will clarify the development vision for employees, provide appropriate role models at work, promote employees to accept team goals, have high performance expectations for employees, and provide employees with personalized support and intellectual stimulation (Podsakoff et al., 1990). Therefore, in actual leadership practice, middle managers should first work with subordinates to formulate clear goals and expectations, guide subordinates to combine personal interests with organizational interests by clarifying the organization's mission and vision, form a common direction of struggle, and jointly pursue the long-term development and success of the organization with them (Ma et al., 2022). At the same time, middle managers should convey and practice core values such as quality, innovation, collaboration, and integrity, and stimulate employees' work motivation and professional values through words and deeds, so as to motivate employees to work actively and pursue excellence (MacKenzie et al., 2001).

Secondly, managers need to lead by example, set a good work example, and create a positive work environment that inspires workers' intrinsic motivation and work engagement (Kammerhoff et al., 2019). Specifically, they should demonstrate an efficient, professional, and responsible work attitude to inspire employees' enthusiasm and drive for excellence. Through their own efforts and achievements, middle managers can set up a positive work benchmark and motivate employees to pursue higher job performance (Jong & Faerman, 2021).

Besides, managers need to have timely insight into subordinates' needs and motivations, pay attention to subordinates' growth and development, create an environment that supports innovation and learning, and provide conditions for employees to improve work efficiency (Alblooshi et al., 2021). Specifically, middle managers should actively focus on employees' individual needs and career issues, understand employees' personal and career goals, engage in meaningful dialogue with them, and provide suitable opportunities and challenges for development. At the same time, middle managers should listen to the opinions and feedback of employees, solve their problems and difficulties, and provide the necessary training and support in a timely manner (J. Kim et al., 2023). Finally, middle managers could also establish a positive team culture that encourages cooperation and knowledge sharing among employees to promote job performance (Ma et al., 2022).

2. Developing transactional leaders.

Firstly, organizations and managers need to establish legitimacy and improve reward and punishment mechanisms in order to improve the job performance of knowledge workers. The results of this study show that transactional leadership has a significant positive effect on the job performance of knowledge workers. Transactional leadership refers to the leadership style

embodied in the exchange process of providing positive or negative feedback to employees based on their efforts or performance (MacKenzie et al., 2001). Transactional leaders work with employees to set clear job goals and reach consensus with employees. They define job tasks, expectations and performance standards to ensure that employees have a clear understanding of job requirements, which in turn helps to improve employees' job efficiency and job quality, thus improving job performance (Khairy et al., 2023). At the same time, transactional leaders stimulate the job motivation of employees by giving incentives and rewards. They establish clear reward and punishment mechanisms and give employees appropriate rewards and recognition, thus enhancing the job motivation of employees and making them work harder, thus improving job performance (Cai et al., 2023). In short, under the incentive and supervision of transactional leadership, employees are more likely to improve their work performance. Therefore, organizations should set clear responsibilities and roles for middle managers to help leaders establish authority and legitimacy in the organization, and make conditional reward behaviors and conditional punishment behaviors more effectively (Zadeh et al., 2020). Specifically, the organization should establish clear rules and regulations, including the development of clear performance evaluation criteria, reward and punishment policies. In addition, relevant guidance and training should be provided to middle managers to ensure that they have clear basis and procedures for rewarding and punishing behaviors, so that middle managers could reward and punish in a more fair and transparent manner, and ensure the implementation of authority and legitimacy (Cai et al., 2023).

In addition, middle managers should pay attention to the individual needs of employees, provide appropriate rewards and incentives, improve the enthusiasm and efficiency of employees, and stimulate employees to improve job efficiency (Astakhova & Porter, 2015). Specifically, establishing regular performance evaluations and feedback mechanisms, and discussing with employees about their job performance, achievement of goals, and development needs (Khairy et al., 2023). Providing timely and specific feedback, highlighting employee strengths and areas for improvement, and developing action plans accordingly (Cai et al., 2023). Regular performance evaluation and feedback could help middle managers and employees jointly understand job performance and provide opportunities for improvement (J. Kim et al., 2023).

At the same time, managers need to establish clear rules and standards, provide clear working guidelines and assessment standards for knowledge workers, and establish a fair and reasonable reward and punishment mechanism in order to effectively evaluate employee performance (Patiar & Wang, 2020). Specifically, middle managers could set clear work

guidelines and goals for knowledge workers, clarify the requirements of work processes, task allocation, priorities and work standards, ensure that employees understand the job responsibilities, expected results and time frame, and provide them with clear work orientation (Khairy et al., 2023).

3. Increasing employees' organizational commitment.

Organizations, managers and employees need to recognize the importance of organizational commitment and effectively increase the connection between employees and the organization. The empirical results of this study confirm that affective commitment, continuance commitment, and normative commitment play a mediating role in the influence of transformational leadership and transactional leadership on the job performance of knowledge workers. Based on this, organizations, managers, and employees need to pay attention to the important role of organizational commitment.

From the perspective of the organization, first of all, the organization should provide a safe, comfortable, fair, and equal working environment for knowledge workers, so that they can feel the support and care of the organization, so as to improve the affective commitment of employees (Lo et al., 2010). Secondly, organizations can enhance the normative commitment of knowledge workers by strengthening corporate culture, establishing effective and reasonable values and goals, and allowing employees to identify with the mission and philosophy of the organization. Finally, organizations can provide comprehensive training programs and long-term career norms to help employees improve their own abilities and career development, thereby improving employees' continuous commitment (Razzaq et al., 2019).

From the perspective of managers, including middle managers, first of all, they need to pay attention to the mental health and work pressure of knowledge workers in real time, and take corresponding measures to relieve the work pressure and work anxiety of employees, so that employees can feel the care and support of the organization, so as to improve their affective commitment. Secondly, managers need to recognize and reward employees' outstanding performance and contributions in a timely manner, so that employees can feel their value and importance, and thus improve their continuance commitment (Razzaq et al., 2019). In addition, managers need to set clear goals and expectations, reduce role ambiguity, let employees understand the development direction of the organization and their own work tasks, and provide employees with clear guidance and support (Santos et al., 2015), so as to improve employees' normative commitment.

From the perspective of employees, first of all, employees need to establish friendly interpersonal relationships with managers and colleagues, enhance trust and cooperation

between them, so as to better integrate into the organization and improve the affective commitment to the organization (S. J. Chen et al., 2017, Hill et al., 2019). In addition, employees need to pay attention to their own development and growth, constantly improve their professional abilities and enhance their personal qualities, so as to better adapt to the development needs of the organization and improve their continuous commitment to the organization (Yao et al., 2019). Finally, employees need to pay timely attention to the performance system and future development plan of the organization, understand the strategic plan and development goals of the organization, so as to better adapt to the needs of the organization and improve the normative commitment to the organization (Bandura, 1986, Wood & Bandura, 1989).

4. Building a high-level team of knowledge workers.

First of all, transformational leadership refers to a leadership style that can stimulate employees' innovation and development. When building a high-level team of knowledge workers, leaders can adopt transformational leadership to stimulate employees' innovation ability and autonomy, which includes encouraging employees to come up with new ideas, supporting their innovative practices, providing resources and training support, and giving positive feedback and recognition (Jong & Faerman, 2021).

Secondly, transactional leadership focuses on the exchange relationship with employees and uses rewards and punishments as a means to motivate employees' job performance. In teams of knowledge workers, leaders can adopt transactional leadership to stimulate employees' job performance, which includes establishing clear goals and reward mechanisms, setting clear work standards and expectations with employees, and providing appropriate rewards and recognition to motivate employees' high job performance (Khairy et al., 2023).

In addition, affective commitment refers to the affective identification and loyalty of employees to the organization, and leaders can improve employees' affective commitment by shaping a positive work atmosphere and organizational culture, as well as focusing on employees' personal growth and development, which includes establishing good communication channels, providing support and care, promoting teamwork and employee participation in decision making (Lo et al., 2010). Continuance commitment refers to employees' long-term commitment to the organization and their willingness to stay. Leaders can enhance employees' continuance commitment by providing development opportunities, promotion paths, and career planning, which includes providing training and learning opportunities, developing personal development plans, giving promotions and incentive mechanisms to motivate employees to continue to engage and develop (Razzaq et al., 2019) .

Normative commitment refers to employees' moral obligation and responsibility to the organization. Leaders can cultivate employees' normative commitment by clarifying the values and ethics of the organization and setting an example, which includes establishing and transmitting clear organizational values and ethical standards, encouraging employees to participate in social responsibility activities, and establishing good ethics and incentive mechanisms (Bodjrenou et al., 2019).

To sum up, to build a high-level team of knowledge workers, leaders can adopt transformational leadership and transactional leadership to stimulate employees' innovation and job performance. At the same time, emphasis should be placed on affective commitment, continuous commitment, and normative commitment to enhance employees' sense of belonging, retention willingness, and moral responsibility.

5.4 Limitations and directions for future research

Since the transformational leadership and transactional leadership were proposed, scholars have conducted a large number of academic studies and achieved fruitful results (MacKenzie et al., 2001). This study is a useful supplement to the study of localization leadership behavior theory and has important guiding significance for business management practice. However, due to the limitation of research energy and time, there are still some limitations, which need to be considered when interpreting the study's findings and further improved by future research.

First, Based on the perspective of social exchange theory (Blau, 1964), this study examines the impact of two leadership styles, transformational leadership and transactional leadership, on the performance of knowledge workers. However, there is a leadership style that aims to balance contradictions and conflicts in an organization (i.e., paradoxical leadership), whose impact on employee performance cannot be ignored (Y. Zhang et al., 2015). Kundi et al. (2023) argued that paradoxical leaders create a flexible work environment that empowers employees and takes into account their work needs, which ultimately improves employees' in-role and out-of-role performance. She et al. (2020) also confirmed that paradoxical leadership positively affects employee service performance through the mediating role of leadership identity. Therefore, future research can explore the role of middle managers in influencing knowledge workers' performance from the perspective of other leadership styles, such as paradoxical leadership (Y. Zhang et al., 2015), to further enrich antecedent research on the performance of knowledge workers.

Secondly, based on the social exchange theory (Blau, 1964), this study explores the

mediating mechanism between transformational leadership, transactional leadership and the job performance of knowledge workers from the perspectives of affective commitment, continuance commitment, and normative commitment. However, there are other potential mechanisms in the process of transformational leadership and transactional leadership affecting the job performance of knowledge workers. In the future, the internal mechanism of different leadership styles (i.e., transformational leadership and transactional leadership) and employees' job performance can be further enriched from other perspectives. For example, according to social identity theory, employees will identify more with organizations that bring them a higher sense of security, self-realization, and sense of belonging. When individuals recognize that they belong to a specific group, they will also be aware of the emotions and value meanings brought by other members of the group (Sillince & Golant, 2018). Therefore, positive work attitudes and behaviors are adopted to maintain organizational goals and interests (R. Zhou et al., 2016). Therefore, future studies may try to explore the relationship between transformational leadership, transactional leadership and employees' job performance from the perspective of individual or organizational identity (De Roeck et al., 2016), and further enrich the research on the consequences and internal mechanisms of transformational leadership and transactional leadership.

Thirdly, there are some limitations in the research design. In this study, questionnaire survey was used to collect data and verify relevant hypotheses. Although this study adopts a multi-time point collection method, this method only reduces the influence of common method bias (Podsakoff et al., 2003) on the research results as much as possible. In essence, the collected data are still cross-sectional data, particularly, the job performance is self-rated by employees, so the causal relationship between variables is not reflected in operation. Besides, time factor was not considered when designing the research. Based on such limitations, future research should consider the multi-source of data, and try to use a variety of research methods to conduct empirical tests, such as situational experiments and longitudinal studies. At the same time, job performance can be measured using other evaluators (leaders, colleagues) or other objective indicators to further improve the validity and reliability of the findings.

Finally, due to various practical reasons, the number of research objects is not large, which may affect the accuracy of the research results to some extent. Future studies should avoid this shortcoming, expand the sample scope and increase the number of participants to support the validity of the results of this study. In addition, the samples of this study are mainly from Chinese enterprises. Future studies can collect and repeat experiments from other countries with different cultures, and analyze whether the impact of transformational leadership and

transactional leadership on the job performance of knowledge workers working in high-technology enterprises is different in dissimilar cultural contexts by means of comparison, so as to compare with the research conclusions of this study and understand the impact of cultural differences on leadership effectiveness.

5.5 Summary

This chapter mainly summarized and discussed the results of the research, discussed the theoretical contributions, provided some practical implications for how transformational leadership and transactional leadership can improve the effectiveness of middle managers in the management of knowledge workers, and explained the existing research limitations and future research prospects of this study.

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Annex A: Questionnaires

Survey questionnaire 1

Dear Sir/Madam,

Thank you for participating in this survey! The purpose of this study is to understand the impact of different styles of leadership on employees. We hope that the results of the research can help companies improve management and make your working environment more enjoyable and efficient.

There is no right or wrong answer to all the questions in this questionnaire, you just need to express your thoughts based on your feelings. The survey takes about 10 minutes to complete. Participation in this survey is strictly voluntary: you can choose to participate or not to participate. If you choose to participate, you can stop your participation at any time without having to provide any justification. And we hereby promise you that all your answers will be anonymous and used for scientific research only. Your answers are confidential and will not be reported back to your colleagues, supervisors or the company. In the research, we will analyze the overall data obtained from this survey and will not reflect any personal information.

The study will take place in two phases, that is, two questionnaires that will address different topics, with a lag of 4 weeks. In this sense, we will ask you to generate a mobile digit and then providing it in the second phase. We stress that the creation of this code will not identify you personally but will allow us to match the answers given in the two phases.

If you have any questions or suggestions about this study, please call or email the member of our research team and we will respond as soon as possible.

Tel:

E-mail:

Research group

Part 1: Your basic Information

This is only for statistical purposes.

-
1. The last six number of your mobile phone: _____.
 2. Your age: Please write your age in years in the boxes: ____ Years.
 3. Your gender: ☐Male ☐Female

4. Your educational background: ☐High school degree or below ☐College degree ☐Bachelor's degree ☐Master's degree or above
5. How many years have you worked in your organization: ____ Years.
6. How many years have you worked in your team: ____ Years.
7. How many years have you worked with your current supervisor: ____ Years.
8. How often do you interact with your current supervisor: ☐Daily basis ☐Weekly basis ☐Monthly basis ☐Yearly basis

Part 2: Your understanding of your supervisor

Please tick (✓) the most appropriate number in the right column (1 to 6) based on your supervisor's behavior and leadership style.

1. Strongly Disagree 2. Disagree 3. Somewhat Disagree 4. Somewhat Agree 5. Agree 6. Strongly Agree

		Strongly Disagree←→Strongly Agree					
1	My supervisor articulates a vision.	1	2	3	4	5	6
2	My supervisor challenges me to think about old problems in new ways.	1	2	3	4	5	6
3	My supervisor facilitates the acceptance of group goals.	1	2	3	4	5	6
4	My supervisor makes it clear that he/she expects a lot from us all of the time.	1	2	3	4	5	6
5	My supervisor insists on only the best performance.	1	2	3	4	5	6
6	My supervisor will not settle for second best.	1	2	3	4	5	6
7	My supervisor acts without considering my feelings.	1	2	3	4	5	6
8	My supervisor shows respect for my personal feelings.	1	2	3	4	5	6
9	My supervisor treats me without considering my personal feelings.	1	2	3	4	5	6
10	Please respond with a "2" for this question.	1	2	3	4	5	6
11	My supervisor points it out to me when my productivity is not up to par.	1	2	3	4	5	6
12	My supervisor provides an appropriate model.	1	2	3	4	5	6
13	My supervisor asks questions that prompt me to think about the way I do things.	1	2	3	4	5	6
14	My supervisor has stimulated me to rethink the way I do things.	1	2	3	4	5	6
15	My supervisor lets me know about it when I perform poorly.	1	2	3	4	5	6
16	My supervisor always gives me positive feedback when I perform well.	1	2	3	4	5	6
17	My supervisor gives me special recognition when I produce at a high level.	1	2	3	4	5	6
18	My supervisor commends me when I exceed my	1	2	3	4	5	6

	productivity goals.						
19	My supervisor frequently does not acknowledge my good performance.	1	2	3	4	5	6
20	Please respond with a "5" for this question.	1	2	3	4	5	6
21	My supervisor would indicate his or her disapproval if I performed at a low level.	1	2	3	4	5	6
22	My supervisor considers my personal feelings before acting.	1	2	3	4	5	6
23	My supervisor has ideas that have challenged me to reexamine some of my basic assumptions about my work.	1	2	3	4	5	6

Part 3: Your personal opinion

To what extent do you agree with the following statement? Please tick (✓) the most appropriate number in the right column (1 to 6) based on your true feelings about your company.

1.Strongly Disagree 2. Disagree 3. Somewhat Disagree 4. Somewhat Agree 5. Agree 6. Strongly Agree

		Strongly Disagree←→Strongly Agree					
1	I am not afraid of what might happen if I quit my job without having another one lined up.	1	2	3	4	5	6
2	It would be very hard for me to leave my organization right now, even if I wanted to.	1	2	3	4	5	6
3	I think that people these days move from company to company too often.	1	2	3	4	5	6
4	I think that I could easily become as attached to another organization as I am to this one.	1	2	3	4	5	6
5	I do not feel like "part of the family" at my organization.	1	2	3	4	5	6
6	I do not feel "emotionally attached" to this organization.	1	2	3	4	5	6
7	This organization has a great deal of personal meaning for me.	1	2	3	4	5	6
8	I do not feel a strong sense of belonging to my organization.	1	2	3	4	5	6
9	I do not believe that a person must always be loyal to his or her organization.	1	2	3	4	5	6
10	Please respond with a "3" for this question.	1	2	3	4	5	6
11	Jumping from organization to organization does not seem at all unethical to me.	1	2	3	4	5	6
12	One of the major reasons I continue to work for this organization is that I believe that loyalty is important and therefore feel a sense of moral obligation to remain.	1	2	3	4	5	6
13	If I got another offer for a better job else-where I would not feel it was right to leave my organization.	1	2	3	4	5	6
14	I was taught to believe in the value of remaining loyal to one organization.	1	2	3	4	5	6
15	I would be very happy to spend the rest of my career with this	1	2	3	4	5	6

organization.

16	I enjoy discussing my organization with people outside it.	1	2	3	4	5	6
17	I really feel as if this organization's problems are my own.	1	2	3	4	5	6
18	Too much in my life would be disrupted if I decided I wanted to leave my organization now.	1	2	3	4	5	6
19	It wouldn't be too costly for me to leave my organization now.	1	2	3	4	5	6
20	Please respond with a "5" for this question.	1	2	3	4	5	6
21	Right now, staying with my organization is a matter of necessity as much as desire.	1	2	3	4	5	6
22	I feel that I have too few options to consider leaving this organization.	1	2	3	4	5	6
23	One of the few serious consequences of leaving this organization would be the scarcity of available alternatives.	1	2	3	4	5	6
24	One of the major reasons I continue to work for this organization is that leaving would require considerable personal sacrifice-another organization may not match the overall benefits I have here.	1	2	3	4	5	6
25	Things were better in the days when people stayed with one organization for most of their careers.	1	2	3	4	5	6
26	I do not think that wanting to be a "company man" or "company woman" is sensible anymore.	1	2	3	4	5	6

Part 4: Your personal feelings

To what extent do you agree with the following statement? Please tick (✓) the most appropriate number in the right column (1 to 6) based on your true feelings.

1.Strongly Disagree 2. Disagree 3. Somewhat Disagree 4. Somewhat Agree 5. Agree 6. Strongly Agree

		Strongly Disagree←→Strongly Agree					
1	I feel uncertain about how much authority I have in my job.	1	2	3	4	5	6
2	I don't have clear, planned goals and objectives for my job.	1	2	3	4	5	6
3	I don't know exactly what is expected of me in my job.	1	2	3	4	5	6
4	I don't receive clear explanations of what has to be done in my job.	1	2	3	4	5	6

Survey questionnaire 2

Dear Sir/Madam,

Some weeks ago, we have invited you to take part of a study that aims to understand the impact of different styles of leadership on employees. As explained at that time, the study takes place in two phases, that is, two questionnaires addressing different topics. We are contacting

you to invite you to participate in the second part of the study.

We would like to remember that there is no right or wrong answer to all the questions in this questionnaire, you just need to express your thoughts based on your feelings. The survey takes about 10 minutes to complete. Participation in this survey is strictly voluntary: you can choose to participate or not to participate. If you choose to participate, you can stop your participation at any time without having to provide any justification. And we hereby promise you that all your answers will be anonymous and used for scientific research only. Your answers are confidential and will not be reported back to your colleagues, supervisors or the company. In the research, we will analyze the overall data obtained from this survey and will not reflect any personal information.

In order to link your participations in the two phases of this study, we have asked you to generate a mobile digit in the first phase. We will now ask you to provide us that mobile digit again. We stress that the provision of this code will not identify you personally but will allow us to match the answers given in the two phases.

If you have any questions or suggestions about this study, please call or email the member of our research team and we will respond as soon as possible.

Tel:

E-mail:

Research group

Part 1: Your basic Information

This is only for statistical purposes.

1. The last six number of your mobile phone: _____.
2. Your age: Please write your age in years in the boxes: ____Years.
3. Your gender: ☐Male ☐Female
4. Your educational background: ☐high school degree or below ☐college degree ☐bachelor's degree ☐master's degree or above

Part 2: Your personal opinion

To what extent do you agree with the following statement? Please tick (✓) the most appropriate number in the right column (1 to 6) based on your true feelings about your company.

1. Strongly Disagree 2. Disagree 3. Somewhat Disagree 4. Somewhat Agree 5. Agree 6. Strongly Agree

		Strongly Disagree←→Strongly Agree					
1	I make significant contribution to the overall performance of our work unit.	1	2	3	4	5	6
2	I always complete job assignments on time.	1	2	3	4	5	6
3	I am one of the best employees in my work unit.	1	2	3	4	5	6

4	My performance always meets the expectations of the supervisor.	1	2	3	4	5	6
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Part 3: Your personal feelings

To what extent do you agree with the following statement? Please tick (✓) the most appropriate number in the right column (1 to 6) based on your true feelings.

1. Strongly Disagree 2. Disagree 3. Somewhat Disagree 4. Somewhat Agree 5. Agree 6. Strongly Agree

		Strongly Disagree ← → Strongly Agree					
1	I never hesitate to go out of my way to help someone in trouble.	1	2	3	4	5	6
2	I have never intensely disliked anyone.	1	2	3	4	5	6
3	When I don't know something, I don't at all mind admitting it.	1	2	3	4	5	6
4	I am always courteous, even to people who are disagreeable.	1	2	3	4	5	6
5	I would never think of letting someone else be punished for my wrong doings.	1	2	3	4	5	6
6	I sometimes feel resentful when I don't get my way.	1	2	3	4	5	6
7	There have been times when I felt like rebelling against people in authority even though I knew they were right.	1	2	3	4	5	6
8	I can remember "playing sick" to get out of something.	1	2	3	4	5	6
9	There have been times when I was quite jealous of the good fortune of others.	1	2	3	4	5	6
10	I am sometimes irritated by people who ask favors of me.	1	2	3	4	5	6