A CAUSAL MODEL OF HUMAN CAPITAL MANAGEMENT ON TEACHERS' CAREER SUCCESS AT SCIENCE AND TECHNOLOGY UNIVERSITIES IN CHINA

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A dissertation submitted in partial fulfillment of the requirements for the degree of

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Declaration

I, Chen Yunfang (Student ID# 6319200004), hereby certify that the work embodied in this dissertation entitled "A Causal Model of Human Capital Management on Teachers' Career Success at Science and Technology Universities in China" is result of original research and has not been submitted for a higher degree to any other university or institution.

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Dissertation Approval Form

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Abstract

Title	:	A Causal Model of Human Capital Management on Teachers' Career Success at Science and Technology Universities in China
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Advisor	:	..... (Assistant Professor Dr. Maneekanya Nagamatsu)
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This study demonstrates that Human Capital Management (HCM) significantly impacts teachers' career success at Science and Technology Universities in China and contributes to the sustainable development of university innovation. The research implements a causal model of HCM's influence on teachers' career success, with leadership style as a mediating factor. The study's objectives are: 1) To examine the status and development of HCM, leadership styles, and teachers' career success at Science and Technology Universities in China; 2) To analyze the role of leadership style as a mediator in the relationship between HCM and teachers' career success; 3) To provide empirical evidence on the impact of HCM on teachers' career success and offer constructive recommendations.

A quantitative research methodology was employed, using purposive sampling to select participants based on their experience, knowledge, and expertise. Each sample's permission was verified to follow approval from the PIM-REC committee (Approval No: PIM-REC 040/2567). The data from 400 teachers at Science and Technology Universities

in China were gathered through questionnaires and analyzed using SPSS and AMOS software. The study applied the software to conduct descriptive statistical analysis, test reliability and validity, perform exploratory and confirmatory factor analyses, and construct a structural equation model. The hypotheses were confirmed.

The findings reveal that HCM significantly influences teachers' career success, with transformational and transactional leadership identified as mediating factors. The study's primary contribution lies in providing empirical insights into the development of HCM. The results suggest that effective HCM and leadership styles can enhance teachers' engagement in teaching and research, leading to improved outcomes and contributing to the sustainable development of teachers and Science and Technology Universities in China.

Keyword: human capital management, teachers' career success, transformational leadership, transactional leadership

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Chen Yunfang
Oct 17th, 2024

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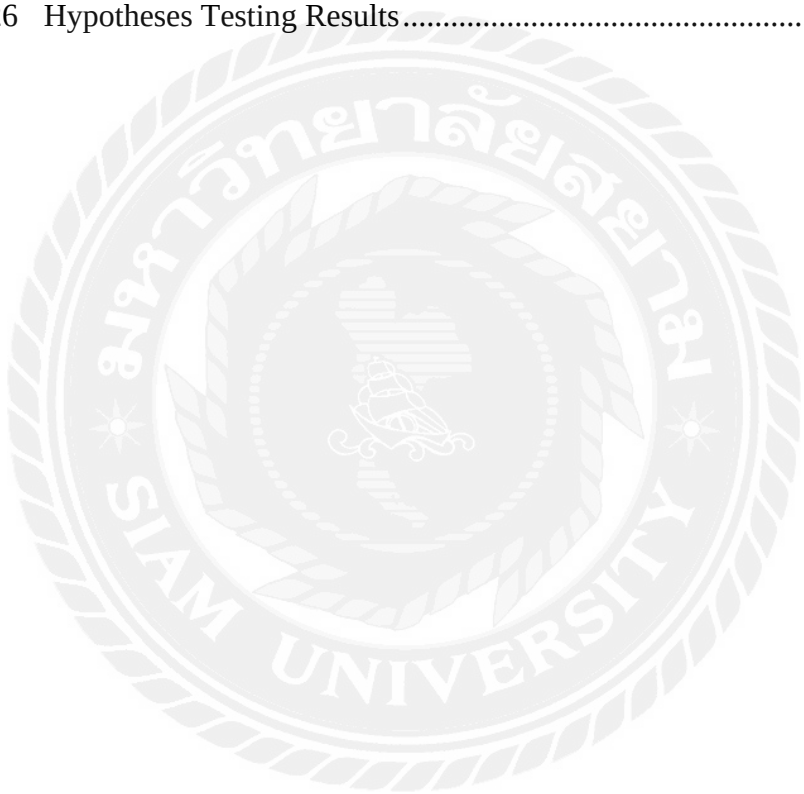

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Chapter 1
Introduction

1.1 Background of the Problem

This study explores the influence of Human Capital Management (HCM) and its various dimensions. It analyzes the impact of leadership on career success and verifies the role of leadership style in the relationship between HCM and career success. The study also provides guidance for university teachers and universities in the sustainable development of individuals and organizations. For individuals, career success signifies the development, fulfillment, and realization of their potential, growth needs, and self-worth. For organizations, it demonstrates that they have effectively developed their human resources, which ultimately leads to organizational success(Judge et al., 1999). As more organizations encourage employees to manage their careers, individuals have sought how to do this effectively. Examining the factors that influence career success is necessary, given the importance of careers to individuals and organizations.

1.1.1 Practice Background

1.1.1.1 Teachers' Career Success at Science and Technology Universities is Helpful to Improving the National Innovation Ability

In today's knowledge economy, driven by information, networks, and digital technologies, innovation capacity has become a critical factor in a nation's ability to compete internationally and establish its global standing. Within the national innovation system, Science and Technology Universities play a pivotal role through their cutting-edge disciplines and contributions to innovation. The success of these universities depends on a dynamic and academically strong team of teachers. According to the latest statistics from the Ministry of Education, the number of teachers at science and technology universities in China reached 62,403 in 2022.

In China, Teachers at Science and Technology Universities are highly skilled and have strong learning abilities, critical thinking skills, and a drive for innovation.

They are the main forces behind the teaching and research efforts of these universities, influencing both educational quality and serving as key resources for innovation and development. University teachers hold multiple roles, including educators, researchers, and knowledge workers, and demonstrate unique traits in career development, such as adaptability and success. Facing new challenges and pressures, such as the internationalization of higher education, digital transformation, and internal management reforms, universities need to strengthen HCM to adapt to teaching, research, and new environments, ultimately achieving career success. Thus, building a robust team of teachers at Science and Technology Universities, maximizing their potential, and helping them achieve career success is critical for developing higher education in China. The teachers' career success requires not only individual effort but also effective HCM within the organization.

1.1.1.2 Teachers' Career Success is Helpful to Sustainable Development for Science and Technology Universities

Career success refers to the positive work outcomes that employees accumulate throughout their careers, resulting in a sense of achievement (London & Stumpf, 1983). Understanding the factors that contribute to career success is interest to both individuals and organizations (Feldman, 1989). Career success is essential not only for personal growth but also for organizational success (Arthur et al., 2005; Hall & Chandler, 2005).

With the rapid growth of economic globalization and information technology, alongside the advent of digital transformation, universities have undergone significant changes in scale, function, and environment. This shift has also brought about considerable changes in teachers' professional values and work attitudes. As a result, universities are now facing new challenges, including the need to enhance technical skills, data-driven decision-making, and continuous learning. Both universities and their faculty must continuously improve HCM to meet the demands of digital transformation and help teachers achieve career success. The sustainable development of a university relies not only on a strong team of teachers and leaders but also on a skilled professional management team. HCM plays an essential role in ensuring the

effective operation and long-term sustainability of universities, significantly contributing to improved career satisfaction.

1.1.1.3 The Level of Human Capital Management Reflects Leadership Quality and Significantly Drives Teachers' Career Success

Career success, defined as the positive achievements or milestones an employee attains throughout their career, is a critical focus in human resource management, organizational behavior, and psychology. For organizations, teachers' career success indicates the effective development of human resources, which in turn contributes to the overall success of the organization.

Leadership style plays a foundational role in shaping teachers' motivation, relationships, and behavior patterns. Human capital is recognized as the most important resource in all organizations, but it must be managed effectively to reach its full potential (Ireland et al., 2002; Lesser & Prusak, 2001). As one of the common characteristics of an organization, leadership style is an important situational factor for the role of HCM. Different HCM have different roles in using various leadership styles (Joo-Lee & Daud, 2018; Ogbeibu et al., 2021).

In the context of universities, leadership style significantly influences teachers' career success. The question of how to improve leadership style and effectiveness, and how to guide teachers toward career success through training and performance policies, has become a pressing issue. In China, the Regulations on the Management of Leaders in Public Institutions were initially formulated in May 2015. This policy serves as a critical HCM framework for leaders in public institutions, including universities. It outlines requirements for leader selection and appointment, training and management, career development, and incentive structures. The HCM system is designed to meet the needs of the scientific and technological revolution, with the primary function of selecting and developing high-quality professionals and leaders for the nation. Given the critical role of leadership in HCM, exploring the influence of HCM on leadership style is a question worthy of further research and discussion.

1.1.2 Theoretical Background

1.1.2.1 Expanding the Research Field of Career Success

There is a notable correlation between HCM and career success. This study will explore how HCM influences career success and introduce a new theoretical perspective on the factors affecting career success. At present, researchers have conducted many studies on the factors affecting employees' career success. The research results mainly focus on organizational performance (Wright et al., 2005), organizational commitment, and employee creativity (Hon & Lui, 2016), but rarely involve the relationship between leadership style and career success. HCM improves the performance of employees such as work efficiency(Cropanzano et al., 2003), employee social networks(Aime et al., 2011), and employee innovation through a series of activities to acquire, configure, use and develop human capital with these characteristics (Cillo et al., 2019).

Although significant research has been conducted on the criteria and influencing factors of career success, few studies have focused on teachers' career success. This study selects HCM, an essential component of the organizational environment, as the independent variable. By verifying the causal relationship between HCM and career success, this research broadens the field of teacher career success and extends the theoretical understanding of career success.

1.1.2.2 Expanding the Theoretical Scope of Human Capital Management

In the era of digital transformation, HCM has become increasingly valued. The career success model encourages employees to adopt appropriate methods for developing and utilizing their human capital, ultimately improving work performance and achieving career success, which benefits organizational success. This study highlights the moderating role of transactional and transformational leadership in the relationship between HCM and career success (Zhu et al., 2012), enriching the theoretical framework of HCM and providing valuable insights for organizations and managers.

1.1.2.3 Expanding Research on the Relationship Between Human Capital Management and Leadership Style

HCM encompasses not only the management of employees but also the management of leaders. This includes employee recruitment, training, motivation, performance management, compensation design, and relationship management. Leadership has long been a focal point for scholars and is defined as the process of interaction and relationship-building with followers to influence, motivate, or empower individuals to achieve specific goals (Łukowski, 2017; Reed, 2021). While leadership definitions vary depending on the context, leaders are often seen as agents of change who provide vision and support to help followers achieve their goals (Judge & Ilies, 2002). Leadership is characterized by the interactive influence between leaders and followers, occurring within a specific context (Bass & Avolio, 1994) and often involving mentoring and coaching (Tang et al., 2018).

Current research on HCM primarily focuses on career success, with little exploration of how HCM influences leadership style. Leadership style plays a pivotal role in influencing others, driving change, motivating employees, fostering innovation, and shaping organizational culture. Leadership style also has a direct influence on employees' performance and the overall success of the organization. This study examines leadership style as a mediator factor at the organizational level in the context of career success. By analyzing the effects of transformation and transactional leadership on career success, the study provides organizations with insights into how to effectively manage both employees and leadership style, thereby fostering employee career success.

1.1.2.4 Leadership Styles on Career Success

This study focuses on two main leadership styles (transformational and transactional) as mediating variables affecting career success. While there are various leadership styles, transformational and transactional leadership were selected due to their theoretical strengths, practical applicability, and complementary nature. These styles have well-defined structures and concepts, with numerous reliable measurement tools available, making it easier to study their influence in an operational and quantifiable manner. This study contributes to the broader understanding of leadership

style in professional achievement by systematically examining how these leadership styles influence career success. Whether two different types of leadership styles influence career success, how well, positive or negative, is worth studying.

Transformational leadership emphasizes enhancing employees' motivation and behaviors beyond their interests by leveraging inspiration, vision, and intellectual stimulation. It focuses on long-term, intrinsic motivation, encouraging employees to invest more energy and creativity through a shared vision and mission.

Transactional leadership drives employee behavior through explicit goal-setting, performance appraisal, and reward mechanisms. It focuses on short-term, extrinsic motivation and directly influences employee performance through clear rewards and punishments.

These two leadership styles offer different perspectives on how to motivate and guide employees toward career success. The combination of their differing approaches enables a comprehensive understanding of the influence of leadership on career success, offering valuable insights for management practice.

1.2 Significance of The Study

A review of the literature review that few studies have explored the influence of HCM on teachers' career success using leadership style as a mediating variable. This study's significance are outlined below.

1)**Exploring the Causal Relationship Between Human Capital Management and Career Success**

This study breaks new ground by moving beyond traditional factors such as organizational commitment, personal initiative, and psychological contracts, which have previously been used to explain career success. Grounded in Self-Determination Theory, it focuses on fulfilling the basic psychological needs of teachers and builds a theoretical model linking HCM to career success. This model incorporates expectations of career outcomes, career achievements, and competitiveness, offering a fresh theoretical perspective. By deepening the understanding of HCM, this study provides valuable insights for Chinese organizations on how to improve their

practices and understand career success, laying the empirical foundation for future research.

2) Analyzing the Role of Leadership Style in the Relationship Between Human Capital Management and Career Success

The effects of HCM vary depending on numerous factors, including leadership style. Transformational and transactional leadership styles represent two typical approaches in organizational management. This study uses a structural equation model to analyze how HCM influences career success with leadership style as a mediator. Rather than focusing solely on mediation or regulation effects, this approach offers a systematic analysis of employees' basic needs and the comprehensive role of leadership style.

In the context of Chinese organizations, optimizing the effects of human resource management policies is crucial for both organizational and individual success. This study empirically examines the relationship between leadership style and teachers' career success at Science and Technology Universities. Measuring transformational and transactional leadership styles provides a scientific basis for how universities can help their teachers achieve career success, thus fostering a win-win situation for institutional development and individual growth.

Additionally, leaders' education levels and work experience (representing their human capital) can significantly influence the value they create, impacting the effectiveness of their team members' human capital. Thus, HCM not only affects leadership style but also plays a critical role in employees' career success. While most existing research focuses on leadership styles, employee relationships, and organizational performance, few studies explore how HCM affects leadership style. This study attempts to conclude theoretical discussion and empirical research to reveal the correlation between HCM and leadership style.

3) Deepening the Causal Model of Career Success

This study highlights the importance of HCM in shaping leadership styles and developing human resources policies that align with teachers' basic psychological needs. By effectively managing human resources, organizations can facilitate the

internalization of teachers' external motivations, spend more time and energy in their teaching and research work, driving behaviors that align with organizational goals.

With the advent of the digital transformation era, HCM has become increasingly important. The career success model is a framework for employees to apply strategies to enhance and utilize their human capital. This leads to better work performance and career achievements, ultimately contributing to organizational success. This study introduces the moderating effects of both transactional and transformational leadership in the relationship between HCM and career success. It deepens the theoretical understanding of HCM and offers practical insights for organizations, managers, and teachers.

In today's age of information, globalization, and rapid change, several factors have made it easier for employees to achieve career success: broader development opportunities, globalization, and technology have expanded career paths and options for professionals. The proliferation of information technology has lowered barriers to knowledge acquisition, enabling individuals to quickly access and share resources. Telecommuting and flexible work models enhance work-life balance, reduce commuting costs, and improve job satisfaction and efficiency. Technological innovation and industry shifts have created new career opportunities, allowing professionals to continually upgrade their skills and expand their development paths. Thus, in the rapidly evolving landscape of global information and technology, professionals, especially those in the fields of science and technology, can continually enhance their capabilities and competitiveness, leading to career success.

1.3 Research Questions

Career success is closely tied to fulfilling personal work values, and individual career pursuits are aligned with organizational goals. Organizations can foster career success for teachers by providing resources such as education, training, career counseling, and strong leadership relationships. This can positively influence teachers' job satisfaction, reduce turnover, and enhance performance, aligning with the institution's operational objectives. Considering the critical role of leadership in career

success, this study explores how transactional and transformational leadership adjust the relationship between HCM and teachers' career achievements. This exploration holds practical significance for employees and organizations and addresses key problems within university teachers' career development.

1)How the current status of Human Capital Management, leadership styles and teachers' career success at the science and technology Universities in China should be academically studied and explained?

2)What are the effects of Human Capital Management, through the style of leadership, on teachers' career success?

3)What are the best approaches for managing human capital that fully support in Science and Technology Universities teachers' career success?

1.4 Objectives

In the context of rapid technological advancements, including the rise of the Internet and artificial intelligence, the social and economic environment is increasingly characterized by instability, uncertainty, complexity, and ambiguity. The transformational impact of the internet era has propelled the knowledge economy forward, repositioning individuals as core drivers of organizational development alongside capital. This shift imposes more stringent requirements on the management of colleges and universities. Given that Science and Technology Universities are hubs of innovative thought, it is essential to leverage HCM to unlock the value of human capital and enhance teachers' career success.

Career success does not depend solely on individual efforts; the HCM of organizations affects the career success of teachers. The relationship between leaders and teachers and the guidance and support for teachers are also the main factors affecting career success. This research aims to analyze how HCM affects career success. What are the underlying mechanisms? What are the mediating mechanisms?

1)To study the status and development of Human Capital Management, leadership styles, and teachers' career success in Science and Technology Universities in China.

2)To analyze the influence of leadership style as a mediating variable to teachers' career success in Science and Technology Universities.

3)To discuss the empirical impact of Human Capital Management on teachers' career success and provide constructive recommendations.

1.5 Research Scope

1.5.1 Science and Technology Universities in China

Science and Technology Universities in China primarily focus on education and research fields in science and technology, emphasizing the development of knowledge and skills (science, technology, engineering, and mathematics). These institutions typically possess vital education and research capabilities, producing outstanding scientists, engineers, and technologists. Currently, 36 universities are designated explicitly as "Science and Technology Universities" in China, reflecting significant progress in science and technology education. The development process of these universities reflects the improvement and innovation of science and technology education in China. For this study, only institutions with "Science and Technology Universities" in their names are included; Those named "college" are excluded.

Science and technology are the core of science and technology Universities. They pay attention to applied science and technological innovation. They are closely connected with industry, with special emphasis on the teaching and research of engineering, computer science, physics, chemistry, and other disciplines. These universities usually focus on cultivating talent in high-tech industries, manufacturing, and innovation.

1.5.2 Teachers in Science and Technology Universities

According to Article 47 of the Higher Education Law of the People's Republic of China, " teachers at higher education institutions must fulfill specific qualifications and roles, including teaching assistants, lecturers, associate professors, and professors." Article 49 states, " The administrative personnel of institutions of higher learning shall implement the system of educational teacher. The teaching of

universities auxiliary personnel and other professional and technical personnel, a professional and technical position appointment system."

Above provisions, the basic qualifications of teachers include obtaining the necessary teaching qualifications, mastering fundamental theories of their discipline, possessing appropriate teaching and research abilities, and fulfilling designated teaching responsibilities. We found that the administrative personnel, teaching teacher, and other technical personnel are not directly engaged in teaching and research work, so it does not belong to the research object of this article. The teacher is defined as a specialized teacher who does full-time teaching and research work. According to the introduction on the university website, there are 62,403 teachers from Science and Technology Universities in China.

In Chinese universities, the teachers are not limited to teaching undergraduate and graduate tutors. They are mixed, teaching undergraduates and guiding graduate students in research work. In addition to having relevant professional knowledge and skills, teachers and teaching tasks are also responsible for promoting social, academic, and research progress, challenging the development of science and technology and academic research to a new height. University teachers have multiple identities, such as "lecturer," "researcher," and "social service provider." Compared with other types of university teachers, teachers in Science and Technology Universities pay more attention to applied research and technological innovation. Teaching methods emphasize practice and technology application and cooperate closely with industry. The standards of professional success are also highly dependent on research achievements and technological innovation.

1.6 Benefits of the Study

Compared to enterprise employees, the work of university teachers is characterized by complexity, knowledge-intensive tasks, creativity, and long-term systematic and academic endeavors. University teachers must adapt to evolving work demands and academic environments throughout their careers. In Science and Technology Universities, teacher training focuses primarily on research and teaching abilities, with limited emphasis on pre-service training or career guidance. As a result,

when confronted with the challenges and pressures of higher education internationalization and digital information advancements, teachers must emphasize adapting to teaching, research, and departmental environments. This adaptation is crucial for teachers' career development and students' learning and growth, teaching quality, and research output. Ultimately, it influences the sustainable development of education.

1) Benefits in educational management: The research findings can foster professional development within educational management frameworks, offering empirical evidence and best practices. This can drive innovation in the sector and enable HR departments to implement effective HCM strategies to enhance teachers' performance and produce more research results.

2) Benefits in universities: The results can help universities better understand the key elements of HCM to provide more effective training, development, incentive, assessment mechanisms, and support measures. By optimizing leadership style, universities can better adapt to digital transformation requirements and promote improving the overall management level, increasing university competitiveness and social progress.

3) Benefits for teachers: Research can help university teachers understand the importance and influencing factors of their ability for career success. This enables them to develop and improve their competence, explicitly increasing the opportunity for career development and the possibility of success. Promoting individual human capital is of great significance to the development of individuals, improving work initiative, making good career planning, and motivating work enthusiasm and performance.

1.7 Limitations

Although this research has achieved some results according to standard research methods, many limitations still need further improvement due to limited research time, funding, and other conditions.

The sample size needs to be expanded on regional and university size selection; the population of this study includes the teacher as the research object, excluding the administrative management, teaching assistant staff, and temporary employees; the randomness of the sample needs to be further improved. This study failed to validate the findings' reliability further through qualitative analysis. Future studies could further support and enrich the existing research findings by profoundly exploring the relationship between HCM, leadership, and teacher career success.

1.8 Research Contribution and Innovations

Through the framework of multi-theoretical integration, this study has some innovations in terms of the research object and practical significance, which provides a more comprehensive perspective for understanding the complex organizational behavior and career development mechanism. This study not only enriches the academic research of Self-Determination Theory, HCM, leadership style, career success, and other theories but also provides new ideas and practical strategies for educational management practice, which helps to improve the quality and effect of teachers' career development. The following are some research contributions and innovations of this study.

1) This study Fill research gaps on the career success of university teachers. Most studies focus on general career success factors rather than university teachers. This study brings novelty by examining the career success of university teachers. Through quantitative data analysis, it identifies the standards and influencing factors of teachers' career success at Science and Technology Universities.

2) This study employs structural equation modeling to empirically examine the relationship between HCM, leadership styles, and career success. Exploring the dimensions of HCM and leadership style provides valuable insights into the factors contributing to teacher success.

3) This study provides a fresh perspective on career success in the current social and educational environment. The findings can help universities develop more targeted human resource development and management.

4)Using leadership style as the mediating variable, we explore how HCM ultimately influences teachers' career success by influencing leadership behavior. This level of analysis expands the perspective of traditional HCM research. It emphasizes the importance of cultivating appropriate leadership styles that match the needs of teachers, thereby improving teacher work enthusiasm and performance.

5)Teachers at Science and Technology Universities usually face higher research pressure and technological innovation needs. Studying the influence of HCM and leadership style on career success in this specific environment can reveal the unique mechanism and needs of teachers' career development in the science and technology.

1.9 Definition of Key Terms

Term	Definitions
Self-Determination Theory (SDT)	SDT is a macro theory of human motivation and personality that concerns people's innate growth tendencies and innate psychological needs. (Deci & Ryan, 2000).
Human Capital Management (HCM)	HCM refers to the investment and management of the employees in the organization as capital, and realizes the long-term value return through the recruitment, management and training of the employees.
Leadership Style (LS)	Leadership style refers to the behavioral approach employed by leaders to influence, motivate, and direct employees.
Transformational Leadership (TFLS)	Transformational leadership is a leadership style that aims to encourage, inspire, and motivate employees to innovate and create the change necessary to shape the future success of the organization.
Transactional Leadership (TSLS)	Transactional leadership is a leadership style that utilizes rewards and punishments to motivate and direct employees(Xenikou, 2017).
Career Success (CS)	Career success refers to the positive work-related achievement or psychological accomplishment that a person has accumulated in professional life.

Chapter 2
Literature Review

The details in this chapter will be separated into 6 parts as follows.

2.1 Self-Determination Theory

2.1.1 Concept of Self-Determination Theory

2.1.2 The application field of Self-Determination Theory

2.2 Human Capital Management Theoretical

2.2.1 Concept of Human Capital Management

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2.5.1 The Relationships between HCM and Career Success

2.5.2 The Relationships between HCM and Leadership Style

2.5.3 The Relationships between Leadership Style and Career Success

2.6 Conceptual Framework, Operational Definitions, Hypothesis, and Explanation of Hypothesis

2.6.1 Conceptual Framework

2.6.2 Operational Definitions

2.6.3 Explanation of Hypothesis

2.1 Self-Determination Theory

2.1.1 Concept of Self-Determination Theory

Self-Determination Theory was proposed by Deci and Ryan in the 1980s (Deci & Ryan, 1985). This theory mainly studies the motivation, self-determination, and self-integration process of personal behavior, clarifies the influence of external environmental factors on individual behavior, and explores the organic dialectical relationship between social environment factors, personal basic psychological needs, motivation, and behavior. Self-Determination Theory emphasizes the dynamic role of the personal self in behavioral regulation.

According to the Self-Determination Theory, human motivation is a dynamic, continuous combination of external regulation and internal solidification, and different degrees of autonomy determine the type of motivation. People promote the transformation from external motivation to internal motivation when their basic psychological needs are satisfied(Gagné & Deci, 2005). The theory holds that basic psychological needs are innate and critical for sustained psychological growth, internalization, and well-being(Van den Broeck et al., 2017).

Self-Determination Theory views individuals as active agents, inherently possessing basic psychological needs for growth, development, and self-integration(Ryan, 1995). The theory identifies three fundamental psychological needs: competence, relatedness, and autonomy. The fulfillment of these internal tendencies is influenced by external environmental factors(Marshall et al., 2016). According to SDT, when ecological factors satisfy these three basic psychological needs, individuals are likely to develop positively and healthily, enhancing job satisfaction and performance. Conversely, if these needs are unmet, individuals may experience negative development and even functional impairments (Deci & Ryan, 2000; Gagné & Deci, 2005).

2.1.2 The application field of Self-Determination Theory

Self-Determination Theory (SDT) has been widely used and verified in many fields, such as psychology, management, health, and medical treatment, and these

applications have further promoted the development and perfection of Self-Determination Theory. Combined with the topic, the effects of Self-Determination Theory on the variables included in this study are shown as follows.

1) Career Success

SDT believes that the motivation behavior of individuals is not only influenced by the external environment but also by internal resources, which explains the problem of internal resources, that is, relatively stable individual differences in the orientation of external motivation into non-individual(Guo et al., 2012), control and autonomous orientation (Deci & Ryan, 1985). Independent orientation, personality perfection, self-development, and good social relations positively relate to career success (Greguras & Diefendorff, 2010). It was found that active personality and self-orientation are more likely to obtain demand satisfaction, improve individual life satisfaction and job performance, and promote career success.

2) Human Capital Management

The study found that the matching of the environment influences employees' organizational recognition and work performance, and the appropriate organizational situation can promote the satisfaction of employees' basic psychological needs(Kanat-Maymon et al., 2016), leading to higher work performance and organizational recognition. By providing an excellent working environment, the organization develops and enhances its sense of competence and identity(Gagné & Deci, 2005). Providing employees with flexible work schedules and independent ways to complete their work may increase their sense of autonomy (Morgeson & Humphrey, 2006).

3) Leadership Style

The study found that transformational leaders meet the basic psychological needs of their subordinates as much as possible, thereby improving their job satisfaction, professional self-efficacy, and commitment to their leadership. The independent support of managers can better satisfy the three basic psychological satisfactions of employees, thus increasing their job satisfaction(Roche & Haar, 2020). Transformational leaders improve job satisfaction, functional self-efficacy, and

commitment to leadership by satisfying the basic psychological needs of employees(Messmann et al., 2022).

Deci, Olafsen and Ryan (2017) proposed a framework of Self-Determination Theory, which starts from the work environment and individual differences, takes the basic psychological demand of satisfaction and motivation as the mediator, and takes the work behavior and happiness of employees as the final output results(Deci et al., 2017). Based on the above review and review, this study believes that the self-decision theory is the core theoretical basis for the effect of HCM on teachers' career success. It expounds on the promotion effect of HCM on career success and the corresponding process mechanism from the perspective of motivation and demand.

2.2 Human Capital Management Theoretical

2.2.1 Concept of Human Capital Management

The theory of human capital includes that human resources are the most critical resources; in the process of economic growth, human capital is more prominent, and the growth rate is far beyond material capital, human capital investment, and national income; for human investment, educational investment is an indispensable part, is an essential means to improve human capital effectively; education investment should be based on market supply and demand, and the fluctuation of human price as the symbol of measurement. Based on Schultz's (1961) definition, human capital refers to the capital expressed by the quantity and quality of workers(Schultz, 1961); the number of workers refers to the population, the quality of workers refers to the intelligence of workers, and the knowledge and technical level, management ability and health status of workers. Since the 1980s, human capital has ushered in a more significant space for development, and its connotation has also been expanded; that is, in addition to the knowledge and skills to be mastered, it also includes learning ability, creative ability, strain ability, and so on. Forbes And Piercy (1991) pointed out that human capital is a series of factors that affect individual career development, such as knowledge, skills, education, training, work experience, years of work, cognitive ability, etc (Piercy & Forbes, 1991). The dimensions selected in

this paper mainly include the knowledge, skills, ability, and experience of human capital, which can improve employees' work performance and help them achieve career success.

2.2.2 Concept of Universities' Human Capital Management

Universities' HCM is a critical process focused on enhancing and leveraging the value of teachers' accumulated knowledge, skills, and health, allowing them to appreciate their human capital through effective management. In essence, university teachers' human capital represents the quality and value they bring to their institutions, which can be cultivated and expanded over time. The following outlines the key characteristics of university teacher human capital and its management:

1) University teachers generally possess strong educational solid backgrounds, high levels of learning ability, and notable achievements in teaching and research. Their self-confidence and drive for professional and academic success make them an essential university resource. This capital is further enhanced through continuous investment in professional development, including workshops and research opportunities, which allow for sustained personal and academic growth.

2) Capital with subjective solid initiative. University teachers are highly motivated by intellectual pursuits and high-level spiritual needs, which often revolve around the creation of knowledge, innovation, and societal recognition. They are self-driven, continuously seeking improvement in their teaching quality and research. Their value to society is recognized through their ability to contribute to intellectual advancements and student success, which fosters a strong desire for exploration and achievement in their fields.

3) Highly liquid human capital. University teachers, as knowledge workers, possess highly mobile human capital. Appreciating their value often occurs through opportunities to transfer their skills and knowledge within the institution or between organizations. Teachers with substantial human capital have significant organizational competitiveness in the market economy due to their knowledge, experience, and professional networks. Peter Drucker (1997) highlights that knowledge workers are distinct in autonomy, creativity, and non-monitorable labor processes(Drucker, 1997).

University teachers exemplify these characteristics, as their work, including research, teaching, and academic contribution, is challenging to quantify or supervise in traditional ways.

4)Universities Human Capital Management.

The primary goal of Human Capital Management for university teachers is to support their personal and professional growth, helping them realize the full potential of their capital. This involves providing development opportunities, relieving personal concerns, and enabling teachers to focus entirely on their work, whether in research or teaching.

The process includes strategies to align personal career goals with organizational objectives, ensuring teachers and the university benefit from the relationship. By focusing on motivation, innovation, and resource allocation, HCM in universities can help teachers achieve career success and contribute to the organization's overall success.

Effective HCM ultimately allows the realization and appreciation of the value of university teachers' human capital. It aligns personal growth with the university's goals, facilitating an environment where knowledge workers thrive and contribute meaningfully to teaching and research excellence.

2.2.3 Research on Human Capital Management

Schultz (1961) systematically expounded the theory of human capital for the first time, believing that human capital is the sum of individual physical strength, knowledge, skills, and so on(Schultz, 1961). His analysis proved the decisive role of human capital in economic growth and significantly promoted the development of human capital theory. Becker (1962) further extended the research on human capital to the micro field, defining it as the knowledge and skills individuals acquire through investment in school education, on-the-job training, or other experiences(Becker, 1962). His research first distinguishes between inputs and outputs of human capital; the former emphasizes individual experiences, such as educational experience or work experience, which may lead to the growth of knowledge and skills, emphasizing the acquired knowledge and skills. In the increasingly fierce competitive environment,

human capital has become the core resource for the sustainable development of organizations(Wright et al., 2014). Management researchers are also keen to use it as an essential theoretical basis for examining individual outcomes (Crook et al., 2011; Shaw et al., 2013).

HCM is important for organizations to gain competitive advantages and achieve sustainable development. It promotes the organization's innovation ability, harmonious labor relations, and organizational performance. Especially with the advent of the era of information technology and the knowledge economy, the development and utilization of human capital help employees fully utilize the value of human capital to obtain career success and promote the competitive advantages of organizations, which has become a critical concern of current managers. HCM is the collection of educational human capital, such as skills, knowledge, experience, and innovation ability required by employees to complete their work better.

According to the literature, there are still some deficiencies and problems in the research of HCM. First, from a general point of view, there are many theories in HCM research and few practical and operational research studies. HCM is highly practical and operational. Training employees, designing salaries, conducting performance appraisals, and cultivating innovation ability are common challenges in HCM. There has been relatively little discussion of this content. Secondly, there are relatively few studies on HCM in colleges and universities. There is rich experience in HCM for many excellent organizations, which have been tested in practice. However, there is still little discussion on how to transfer these experiences to university organizations and improve the overall level of HCM in Chinese universities.

2.2.4 Dimensions of Human Capital Management

Youndt (2004) developed a framework for measuring human capital with five dimensions: knowledge, skills, abilities, work experience, education, and training. These dimensions help organizations assess HCM strategies and the value derived from their workforce(Youndt, 2004). Modern HCM covers multiple dimensions, including training and development, salary incentives, performance management, career planning, and so on(Baron & Armstrong, 2007). Alnoor(2020) found that there

are six dimensions (education, experience, health, personal attributes, skills, and training) to measure HCM(Alnoor, 2020). Guo Wenchen (2011) has summarized the four dimensions of HCM: education level, work experience, learning ability, and training(Wenchen, 2011). These dimensions work together to enhance employees' knowledge and skills, thereby promoting career success. The composition dimensions of these HCM can provide a reference for human capital investment and formation.

The composition dimension of human capital includes knowledge, ability, experience, and value. Carmeli (2004) believes that HCM has three dimensions: education level and work experience, organizational members' ability and value, and employees' uniqueness(Carmeli, 2004). From the perspective of dynamic human capital formation, some scholars argue that human capital should include the contribution of knowledge, skills, and abilities to productivity and the critical processes that transform these elements into organizational value.

This view emphasizes the importance of effectively utilizing and applying human capital to enhance organizational outcomes, not just focusing on the accumulation of resources but on their practical deployment for creating long-term value. For example, Coleman (1994) and others emphasized that human capital is the valuable skills and knowledge accumulated by individuals over some time (Coleman, 1994). Pintrich (2000) emphasized the importance of independent learning in HCM, appropriately cut learning goals in the individual learning environment, and adjust their cognition, motivation, and behavior through metacognition to achieve learning success (Pintrich, 2000)

When exploring the relationship between HCM and learning dimensions, the focus often falls on how continuous learning and development initiatives contribute to individual and organizational growth. Several scholars have highlighted this aspect of human capital theory and its influence on professional success. Many studies have stressed integrating continuous learning into HCM strategies to enhance skills, adaptability, and innovation. Wright and McMahan (2011) argue that learning processes are pivotal in expanding human capital by transforming raw abilities into practical organizational outputs(Wright & McMahan, 2011). Tharenou, Saks, and Moore (2007) discuss how continuous learning opportunities in organizations, such as

professional development programs, enhance employee career prospects. Their research indicates that career success strongly correlates with access to and participation in structured learning activities(Tharenou et al., 2007). This is particularly relevant in technology-driven sectors like universities, where the rapid evolution of knowledge necessitates ongoing learning. In the context of dynamic human capital, Teece, Pisano, and Shuen (1997) discuss how learning capabilities within an organization contribute to developing dynamic capabilities(abilities to integrate, build, and reconfigure competencies) to address changing environments(Teece et al., 1997). For universities, this is crucial, as teachers must continuously update their knowledge base to match technological advancements. The learning can encourage the organization to maintain a specific updating trend, acquire knowledge, and develop in response to the needs of the dynamic environment(Eklund, 2020). Boxall and Purcell (2022) and Kuzmin (2020)emphasize lifelong learning as a fundamental aspect of HCM. They argue that organizations should encourage a culture of lifelong learning to support both individual career success and institutional goals(Boxall & Purcell, 2022; Kuzmin et al., 2020).

Becker and Murphy (1992) defined Human Capital as a theoretical and empirical analysis with particular reference to education, discussing how educational investments increase individual productivity, a foundational concept in HCM(Becker & Murphy, 1992). Becker’s work explains that education, as a form of human capital investment, leads to higher earnings and career advancement, directly influencing career success. According to this theory, individuals' career development and success depend on the quality and quantity of human capital brought to the labor market(Becker, 1975), and individual work skills and experience are related to their salary at work(Agarwal, 1981). Lepak, Smith, and Taylor (2007) examined how organizations invest in education and development to increase employees' knowledge, skills, and abilities. Their findings suggest that education is crucial for career success and competitive advantage in knowledge-based industries(Lepak et al., 2007). Research indicates that individuals with higher educational attainment are better equipped to perform in specialized roles, leading to improved job performance and recognition(Ng & Feldman, 2009).

Work experience is an individual's experience performing demanding tasks, providing learning opportunities, and expanding leadership in business knowledge, insight, decision-making skills, and interpersonal effectiveness(Dragoni et al., 2009). Developmental work experience, i.e., work experience that provides opportunities for professional and leadership development (De Pater et al., 2009).

Considering the difference in human capital, some scholars have emphasized the influence of creativity and diversity on innovation and performance, and there is a positive correlation between the scale and type of human capital and innovation and sustainable development (Dermol, 2019). Lee et al.(2010) also highlighted the influence of human capital on organizational creativity and diverse innovation, which can be measured by the number of organizational patents per capital (Lee et al., 2010). Lepak and Snell (2002) highlight the importance of innovation-driven within human capital frameworks. They point out that the most successful organizations invest in formal and informal learning environments that stimulate creative thinking and problem-solving. For university faculty, learning in innovation-driven sectors like science and technology is crucial for advancing personal success and institutional objectives(Lepak & Snell, 2002). Sun et al. (2019) believe that innovation performance and the organizational environment profoundly impact the HCM dimension(Sun et al., 2020). Its distribution also plays a vital role in the development of organizations, especially in cultivating the innovation ability of talents (Dermol, 2019).

West (2002) argues that the generation of individual employee behavior is based on the self-cognition of the atmosphere, encouraging innovation in the work environment(West, 2002). Kleysen and Street (2001) proposed that individual employee innovation behavior mainly consists of five stages: looking for opportunities, generating ideas, forming investigations, supporting, and applying. They also regarded individual employee innovation as a behavior conducive to the organization and introduced and used the generated creativity to all levels of the organization(Kleysen & Street, 2001). Amabile et al. (1989) believe that organizational innovation atmosphere describes organizational members' perception of their working environment and the degree of creativity and innovation in the

working environment they perceive (Amabile & Gryskiewicz, 1989). It is a collective attitude concept of innovation advocated by HCM.

As mentioned in the literature review, educational diversity can somewhat improve organizational productivity, and highly educated employees can contribute to organizational innovation. Related research on HCM has demonstrated its structural dimensions, its formation process, and its influence mechanism on career success. Therefore, seven dimensions were selected as influencing HCM: learning, education, attainment, experience, expertise, innovation, and creativity.

2.3 Leadership Theory

2.3.1 Concept of Leadership Style

Leadership theory mainly comes from social psychology theory, which Bennis (1959) defines as the ability to give organizations vision and transform vision into reality(Bennis, 1959); John (2012) believes that the essence of leadership theory is to emphasize the influence of leaders(John, 2012). Leadership is the influence of leaders on an organization or team or individual to organizational goals and visions (Irshad, 2021; Jang, 2021; Jian, 2019; Mone et al., 2018; Onyeneke & Abe, 2021; Powell, 2017). Traditional leadership research has primarily focused on leadership behavior in established organizations, traits, and the situational factors that influencing leadership. In contrast, modern leadership theory places greater emphasis on values. For example, transactional leadership is characterized by an "exchange relationship," where leadership is exercised through material rewards, while transformational leadership relies on spiritual motivation to inspire and demonstrate leadership.

Leadership effectiveness is inherently linked to leadership behavior, as leadership is a relational process that requires maintaining and fostering strong relationships. Leadership behavior, shaped by leadership style, is pivotal in leadership theory research. This paper explores the impact of leadership styles on employees by using transformational and transactional leadership as mediating variables. These two styles provide a clear framework for comparing and analyzing their influence on employee success. A review of prior leadership theory underscores a common

understanding: leadership is the ability to influence and motivate employees to contribute to organizational efficiency and success.

Leadership style refers to the leadership individual in the long-term leadership practice who is formed, stable and has personalized characteristics. They can lead and influence the organization's members to achieve the organizational purpose and expected goals of the various leadership behavior modes. It includes charming, authoritative, service, transforming, transaction, farsighted, relationship, democratic, demonstrative, commanding, inspiring, encouraging, indulgent, supportive, participatory, visual, and mixed; each leader has a style associated with the work environment, experience, and personality and other leaders(Sethuraman & Suresh, 2014).

2.3.2 Research on Leadership Style

Bass (2009) believed that only people born with some necessary characteristics can become leaders(Bass & Bass, 2009). Allio (2012) believes that some leaders may not be trained or developed but can be born (Allio, 2012). Trait theory focuses on individual attributes and believes that individual attributes can become the unique qualities and personality characteristics of leaders (Colbert et al., 2012); Northouse (1999) suggests that traits can predict their leadership skills, such as agility, insight, responsibility, initiative, persistence, confidence and social skills(Northouse, 1999). Behavioral theory focuses on individual behavior rather than certain traits that individuals possess; Leaders impact employee creativity(Gupta & Singh, 2012). Power change theory is a leadership approach based on organizational needs(Fiedler, 1967). Andibo (2012), based on the theory of power change, leaders should use different leadership styles(Andibo, 2012). Northouse (2013) believes organizations should match their leaders' skills with their style and psychological attitudes(Northouse, 1999).

Regarding the new leadership theory, Burns (1978) proposed the transactional and transformational leadership theory, which described leadership as a process of interaction between leaders and followers(Burns, 1978). Charismatic leadership theory holds that leaders have specific personal characteristics, abilities, and

behaviors and strongly influence subordinates' emotions, values, beliefs, and behaviors(House, 1995). The leader-member exchange theory regards the relationship between leaders and subordinates as an exchange relationship (Graen & Uhl-Bien, 1995), a differentiated one between leaders and subordinates (Erdogan & Bauer, 2010). Full-scale leadership theory summarizes leadership style as transaction, transformation, and laissez-faire leadership(Avolio & Bass, 2001).

Leadership theories flourished in the late 1960s. Halpin & Winer (1957) divided leadership behavior into two categories: task behavior and relational behavior(Halpin & Winer, 1957). The most representative studies of leadership style are the studies of Ohio State University, Michigan State University, and Black and Mouton (1964), which all identified task and relationship behaviors as core leadership behaviors(Blake & Mouton, 1964). Based on this, researchers try to find the best way for leaders to combine task and relational behavior in all situations. Black and Mouton provide a practical model that depicts leadership behavior with nine-scale squares that care for production and care. In addition, there is a more popular British leadership model called "Action-centered leadership," developed by Adair (1973), which expands the two behavioral dimensions of caring for tasks and caring for people, subdividing the orientation of caring for people into caring for individuals and caring for teams(Adair, 1973). According to the theory, influential leaders should consider three levels of needs: work tasks, teams, and individuals, and the more balanced and overlapping the needs, the more influential the leadership will be.

To sum up, this study's leadership style refers to the two leadership styles of transaction and transformation in the new leadership theory. This theory covers the main aspects of modern leadership, including leader characteristics, behavior style, ethics, and the relationship between leaders and employees, and it has a precise measurement index.

2.3.3 Dimensions of Leadership Style

Ohio State University research proposed that the behavior composition of leadership style mainly involves two aspects: relationship behavior and task behavior(Stogdill, 1950). Relationship behavior mainly focuses on how the leader can

establish and maintain an excellent relationship with their subordinates by meeting the psychological needs of the leader, which includes the subordinates' care, support, and encouragement. Task behavior refers to how leaders clearly explain the responsibilities of an individual or organization, including the work of guidance, supervision, and precise requirements for the task.

According to the basic framework of these two leadership styles, this study is represented by transformational and transactional leadership as two dimensions of leadership style in this study. Although there are multiple leadership styles to study the impact of leadership style on career success, we chose transformational and transactional leadership as research variables because of their significant advantages in theory, operability, practical application, and mutual complementarity. These two leadership styles are conceptual and structured, and academia has developed various reliable measurement tools to evaluate them. This makes studying the effects of these styles more operational and quantifiable.

2.3.3.1 Transformational Leadership

The concept of transformational leadership was first proposed by Burns (1978), who believes that when "leaders and subordinates motivate morality and motivation to a higher level," we can see this type of leadership as both leaders and subordinates experience a change in this process(Burns, 1978).

Bass (1997) points out that transformational leaders with leadership and determination, the leadership can depict the excellent vision of the organization, encourage employees, and pay attention to the interests of the organization, at the same time, help employees improve their skills, motivate employees beyond their interests, mining new potential to help the organization get beyond expectations(Bass, 1997).

Over the past 40 years, many researchers have conducted a lot of theoretical and practical exploration of transformational leadership and have achieved fruitful research results. However, scholars have debated the definition and measurement structure of transformational leadership and have yet to reach a consensus. Burns (1978) believes that transformation leaders not only have a higher level of demand motivation in the leadership process but also raise the demand motivation of

employees to a higher level(Burns, 1978). Bass (1985) pointed out that transformational leadership encourages employees to accomplish or exceed expected goals by making them aware of their importance(Bass & Bass Bernard, 1985). Bass (1997) further pointed out that transformational leadership means that leaders stimulate the internal motivation and needs of subordinates through personal charm and charisma, explain clear organizational vision to them, attach importance to their needs at all levels, and provide personalized support to guide subordinates to achieve high performance beyond expectations(Bass, 1997). Transformational leaders explain a clear vision to employees, motivate them through sharing, engagement, and stimulation, and make them confident in the future(Leithwood, 1992). The definition of transformational leadership by prominent researchers is summarized in Table 2.1. It can be seen that although scholars have different definitions of transformational leadership, its essence is the same. Through personal charm, transformational leaders stimulate and cultivate the intelligence of employees, provide individual support to employees, etc., improve the needs and intrinsic motivation of subordinates, help employees learn skills and develop potential, motivate employees to exceed their interests and goals, and achieve high-performance results beyond expectations.

Table 2.1 Definitions of Transformational Leadership

Scholars	Time	Definitions
Burns	1978	Transformational leaders motivate employees with ideal moral values and urge them to continuously improve and surpass themselves to achieve organizational goals(Burns, 1978).
Bass	1985	Transformational leadership motivates employees to accomplish or exceed their expectations by making them aware of their importance(Bass & Bass Bernard, 1985).
Leithwood	1992	Transformational leadership articulates a clear vision to employees and inspires them through sharing, engagement, and stimulation to give them confidence in the future(Leithwood, 1992).

Bass	1997	Transformational leadership means leaders stimulate subordinates' internal motivation and needs through personal charm and charisma, explain clear organizational vision, attach importance to their needs at all levels, and provide personalized support to guide subordinates to achieve high performance beyond expectations(Bass, 1997).

Based on different organizational cultural backgrounds, standards, and perspectives, scholars have different structural dimensions of transformational leadership. Bass (1985) believes that leadership charisma, personalized care, and intelligent stimulation are the three dimensions of transformational leadership(Bass & Bass Bernard, 1985). Bass and Avolio (1993) proposed that the main factors of transformational leadership include four dimensions, namely leadership charisma or idealized influence, motivation, intelligence stimulation, and personalized care, and developed the famous multifactor leadership questionnaire (MLQ) scale(Bass & Avolio, 1993). Mackenzie, Podsakoff, and Rich (2001) proposed measurement from four dimensions(MacKenzie et al., 2001): core transformational leadership behavior, performance expectation, personal support, and intellectual motivation. For example, "My direct leader clearly describes the vision," "My direct leader demands only the best performance," "My direct leader considers my personal feelings when dealing with me," and "My direct leader asks me to think about old problems in new ways." This scale has good reliability and validity and has been widely adopted by scholars such as Kirkman (2009), Liaw, Chi, and Chuang (2010) published article(Kirkman et al., 2009; Liaw et al., 2010). Based on the background of Chinese organizational culture, Another example is Wang Zhen, Chen Loni, and Li Xupei (2015) in their articles published in Management Review(Wang Zhen, 2015). Li Chaoping and Shi Kan (2005) divided transformational leadership into four dimensions by introducing the dimension of Chinese characteristics in the virtue model(Li & Shi, 2005). Podsakoff, Mackenzie, Morrman, and Fetter (1990) propose a six-dimensional structure of vision description, role modeling, intellectual stimulation, high-performance expectations, enhanced teamwork, and personalized care(Podsakoff et al., 1990). Through the review of the literature, it is found that there are abundant

research results on outcome variables of transformational leadership, including employee performance, team performance, organization performance, innovation behavior, organizational commitment, work attitude, work satisfaction, work motivation, organizational citizenship behavior, etc.(Podsakoff et al., 1990). Many empirical studies have proved that transformational leadership can positively predict employee attitude, behavior, and organizational and team performance (Mayer et al., 2012). Transformational leadership has an impact on employee satisfaction, organizational behavior, and organizational commitment (Judge & Ilies, 2002), which is positively correlated with employee satisfaction(Podsakoff et al., 1990)and positively and significantly affects organizational behavior(Li & Shi, 2005)—positively influenced subordinates' creativity(Shin & Zhou, 2003). It is positively correlated with organizational performance(Judge, 2004). Transformational leadership can affect employees' positive emotions, guide them to think positively, and promote their rapid growth; thus, improving performance can increase the mutual trust between leaders and employees(Bass, 2019). Tichy and Devanna (1986) enables employees to identify with the organization and leadership(Tichy & Devanna, 1986).

2.3.3.2 Transactional Leadership

Burns (1978) put forward the concept of transactional leadership in Leadership, pointing out that transactional leadership is a guaranteed leadership style and believes that transactional leadership motivates employees through exchanges with subordinates(Burns, 1978). Bass (1985) constructed the transactional leadership theory based on the leadership member exchange theory (Bass & Bass Bernard, 1985). Bass pointed out that transactional leadership influences followers through reward-based exchange. Transactional leadership refers to the application of the reward system in the organization by leaders to reward and punish employees according to their performance and efforts based on transactions (Pillai et al., 1999), in exchange for their efforts and performance, and ultimately, in exchange for the required results (Leithwood, 1994). Waldman, Ramirez, and House(2001) define transactional leadership as the mutual relationship between leaders and subordinates, an interactive process in which leadership style positively impacts employees(House, 1993; Waldman et al., 2001). Transactional leadership emphasizes cultivating loyalty and trust. As shown in Table 2.2, the literature review summarizes and sorts out previous

researchers' definitions of transactional leadership. The essence of transactional leadership is exchange. Transactional leaders motivate subordinates to work hard to complete tasks based on reward exchange. Transactional leaders pay attention to the achievement of tasks and goals and meet the needs of employees through various incentive means in exchange for the completion of goals and tasks.

Table 2.2 Definitions of Transactional Leadership

Scholars	Time	Definitions
Burns	1978	Transactional leadership has a vital goal. To achieve this goal, the relationship between leaders and members is based on the reciprocal exchange of value(Burns, 1978).
Bass	1985	Transactional leadership is about influencing followers through reward-based exchange(Bass & Bass Bernard, 1985).
Leithwood	1994	Leaders use various reward systems in organizations in exchange for the results that leaders need(Leithwood, 1994).
Pillai	1999	Transactional leadership rewards and provides feedback to subordinates based on their efforts and performance(Pillai et al., 1999).

The structure of transactional leadership is divided into two dimensions, three dimensions, four dimensions, and even seven dimensions. Bass (1985) proposed that transactional leadership mainly includes contingent rewards and exceptional management(Bass & Bass Bernard, 1985). Bass and Avolio (1990) compiled a multifactor leadership questionnaire on this basis, and the reliability and validity of this scale have been verified in many ways(Bass & Avolio, 1990). Podsakoff et al. divided transactional leadership into contingent reward and punishment(Podsakoff et al., 1990). Chen Wenjing and Shi Kan (2014) proposed that in the Chinese organizational context, the structure of transactional leadership includes four dimensions: contingent reward, contingent punishment, process monitoring, and expected input(Chen & Shi, 2014).

2.4 Career Success Theory

2.4.1 Concept of Career Success

In 1934, Thorndike first mentioned the concept of "career success" in their book “Predict Career Success” (Thorndike & Woodyard, 1934), which for the first time defined career success as individual salary in the process of career development, job level achievement, and satisfaction with their career. London And Stumpf, in their 1983 book “Management Career,” point out that career success is a positive work achievement or achievement accumulated throughout their career(London & Stumpf, 1983). The criteria for career success are mainly divided into subjective and objective levels. Hunt, Chonko, and Wood (1986) proposed subjective and objective career success based on individuals' intrinsic and external motivation (Wood et al., 1986). Objective career success is defined by objective results, such as economic reward, promotion, etc. (Gattiker, 1989; Judge et al., 1995); Nicholson (2000) also believed that objective success can be measured by obvious and open standards, such as salary, number of promotions and career status long considered signs of career success(Nicholson, 2000). Subjective success is measured by personal subjective feelings and satisfaction, such as expected salary, salary and promotion opportunities, etc (Arthur et al., 2005). It also includes the evaluation and experience of obtaining personal, meaningful career outcomes(Seibert, 2006). Judge, Higgins, Thoresen and Barrick(1999) think career success was argued to be comprised of intrinsic success (job satisfaction) and extrinsic success(Judge et al., 1999). The concepts are summarized as follows in Table 2.3.

Table 2.3 Definitions of Career Success

Scholars	Time	Definitions

Thornike Woodyard	1934	It refers to achieving an individual's salary, position level, and satisfaction with their career during career development(Thorndike & Woodyard, 1934).
Greenhaus, Parasuraman, and Wormley	1990	An individual's actual and expected response to occupation-related achievements(Greenhaus et al., 1990).
Seibert and Kraimer	2001	People accumulate results, achievements, and positive feelings in their professional work(Seibert & Kraimer, 2001).
Zhou Wenxia	2006	Career success is a concept of The Times, and its connotation will change with the evolution of times and theories(Zhou, 2006).
Judge, Higgins, Thoresen and Barrick	1999	Career success was argued to be comprised of intrinsic success (job satisfaction) and extrinsic success (income and occupational status) dimensions(Judge et al., 1999).

2.4.2 Teachers' Career Success

As a traditional profession, university teachers have their characteristics: (1) college teachers have high intelligence degrees, intensive industry, early investment, and knowledge update pressure. (2) Work is relatively stable, work autonomy. As a public institution, colleges and universities have little pressure on economic benefits and little market risk, so they work as college teachers and are relatively stable. (3) The work is characterized by mental work, and the labor results are difficult to measure; university teachers' main work is teaching and research. (4) The social status of university teachers is relatively high to meet the basic needs of life. Later, more attention is paid to realizing self-worth in the work. These characteristics of the university teacher profession determine the university teachers. There are differences in the connotation and evaluation criteria of employees' career success and successful careers. The influencing factors may not be the same.

Career success refers to the achievement and development in their career, including academic achievement, teaching effectiveness, student feedback, social

recognition, and personal and professional growth. Among the numerous studies on career success, there are few studies on the career success of university teachers. Die & Xiang Fen put forward the career success model of university teachers through the research of research university teachers and put forward four objective career success standards for institutional recognition, research products, teaching effectiveness, and professional visibility in research-oriented universities. For teachers in research-oriented universities, research resources determine the research process and performance and thus affect the objective and subjective professional achievements, such as providing teachers with opportunities for academic conference participation, research, and corresponding training and professional development. Allison and Stewart (1974) and Ng et al. (2005) found a positive correlation between teacher training, skill development, and salary and promotion. Time is an essential predictor of research outcomes (Allison & Stewart, 1974; Ng et al., 2005). Fairweather (2005) found that teachers with more research time have more research output and faster career development. In contrast, teachers with heavy teaching burdens have relatively low salaries, and the guaranteed research time is related to more research results, higher salaries, and teachers' job satisfaction in research universities(Fairweather, 2005). At present, few research results on the success of university teachers exist. Career management comprises professional support, career channel, research incentive, and organizational fairness.

2.4.3 Research on Career Success

Career success is an essential hotspot in the field of management and psychology. We found that career success includes individual subjective and objective career success from the literature. Subjective career success is to be measured by the satisfaction of individual occupation. Objective career success with internal career competitiveness and measured by external professional competitiveness. Individual, organizational, and leadership factors directly affect the employees' career success or indirect effects. The behavior patterns of organizational members can further influence sociodemography's impact on salary and promotion opportunities(Pfeffer, 1991). Human capital factor on the individual salary water Ping is significantly predictive (Ng et al., 2005). Orpen(1994) found that significant positive relationship

between organizational career management and individual career success (Orpen, 1994).

Although there are many successful studies on career success, many studies also explore the dependent and mediating variables of career success. Organizational factors are one of the six factors that affect career success. As an essential organizational factor, whether HCM has a causal relationship with individual career success is worth studying from the perspective of HCM and the leading variables of career success.

Career success is an important component of career research, and its connotation reflects the characteristics of historical changes and social development. At the beginning of the concept, scholars paid more attention to objective aspects such as salary, career status, salary increase, and promotion times. With the advent of the borderless career era and the era of the knowledge economy, scholars focused on subjective career success, such as perceived career, career outcomes, and organizational competitiveness.

2.4.4 Dimensions of Career Success

According to the different evaluation subjects, career success can be divided into objective and subjective. A literature review found that domestic and foreign scholars mainly measure career success at subjective and objective levels. Thorndike and Woodyard (1934) used salary and salary increase to measure career success(Thorndike & Woodyard, 1934). Hunt, Chonko, and Wood (1986) developed a 10-item scale to measure interpersonal, job, and income success(Wood et al., 1986). Eby, Butts, and Lockwood (2003) proposed that objective success was measured by internal and external career competitiveness and developed a career success measurement scale that included six items(Eby et al., 2003), such as "given the skills and experience of the subordinate, the company believes that this subordinate is a value-added resource "and" this subordinate can quickly get similar jobs in other companies. " The measurement scale has high reliability and validity and has been widely used by scholars. Subjective career success is evaluated by the individual's perception of success, emphasizing the individual's subjective feelings. Greenhaus,

Parasuraman, and Wormley (1990) compiled five items for the career satisfaction survey. After much verification, the scale had high reliability and validity and was widely used by scholars(Greenhaus et al., 1990). Turban and Dougherty (1994) developed a four-item scale to measure career success(Turban & Dougherty, 1994).

The factors that influence career success are individual differences and organizational factors. The research on career success comes from psychology, so the research on the influencing factors of career success pays more attention to the individual variables. Demographic variables such as age, personality traits, and gender can better predict and explain the impact on career success(Gattiker, 1989; Ng et al., 2005). Each individual has unique behavior patterns and different educational and intellectual human capital. Studies have proved that human capital factors affect individual wage levels (Ng et al., 2005), and organization members' behavior pattern affects their salary and promotion opportunities(Pfeffer, 1991). Marriage and family have a particular influence on career success. Studies have shown that people with stable family relationships have more income and higher job satisfaction. Married people with children and spouses working have lower incomes than those with the same conditions but spouses who do not work(Schneer & Reitman, 1995). Well-connected families are more likely to develop sustainable careers(Hall & Chandler, 2005). With the emphasis on career success in sociology and management, the research on influencing factors has gradually expanded from the individual to the organization and team levels. Organizational environment factors have an impact on career success (Tharenou, 1995), organizations can predict career success (Judge et al., 1995), and organizational career management has a significant positive correlation with individual career success (Orpen, 1994). There is a positive relationship between mentoring relationship and employees' career success (Hill & Bahniuk, 1998); career assistance, internal support, and in-service education have a positive effect on employees' salaries (Ng et al., 2005), and organizational structure factors have an impact on individuals' wages and career development(Pfeffer, 1991). An application of the biographical inventory and Individual-organizational fit can predict career success(Seibert & Kraimer, 2001), and high-quality leadership member exchange can help employees achieve career success; there are five-factors model of personality and career success(Seibert & Kraimer, 2001).

In conclusion, scholars have conducted extensive research on the influencing factors of career success, and the research perspective is constantly expanding, providing profound insights into understanding and grasping career success. Based on the existing results on the factors affecting career success, we further investigated the mechanism of HCM on career success. Meanwhile, it also enriches the existing literature on career success.

2.5 Related Literature

According to the theoretical literature review, the primary purpose of this study is to deeply study and understand the complex interaction effects of HCM, leadership style, and career success. It is necessary to analyze and establish the relationship between the variables.

2.5.1 The Relationships between HCM and Career Success

In terms of the influence of human capital on career success, it mainly focuses on the evaluation indicators of human capital investment, such as "education background," "work experience," "intelligence," "training," and so on. Human capital theory emphasizes differences in quantity and quality in ability, education, and training. Investing in these traits affects work performance, thus affecting the distribution of remuneration and promotion. According to this theory, individuals' career development and success depend on the quality and quantity of human capital brought to the labor market(Becker, 1964), and individual work skills and experience are related to their salary at work (Agarwal, 1981). Regarding the influence of psychological quality on career success, we focus on career perception and self-efficacy. Appelbaum and Hare Alan (1996) research points out that HCM helps individuals to achieve high self-efficacy, which can encourage employees to take on challenging jobs, set higher work goals, have a high commitment to the goals, and improve their work performance to obtain more career development opportunities to a certain extent(Appelbaum & Hare, 1996).

Through effective investment in HCM, organizations can significantly improve employees' opportunities for career success. In particular, training and

development, performance management, salary incentives, and career planning are the four core influencing factors (Becker & Murphy, 1992; Garavan, 1999). Hatch and Dyer (2004) point out that HCM can effectively mobilize the enthusiasm of employees to participate in decision-making and promote employees to strengthen learning and accumulation, thus enhancing the value of overall human capital and improving personal work effectiveness(Hatch & Dyer, 2004).

Smith (2022) found that systematic HCM practices significantly improved teachers' career satisfaction and promotion opportunities(Smith, 2022). Zhou Wenxia (2015) An empirical study shows that human capital, social capital, and psychological capital can significantly and positively predict career success(Zhou, 2015). Dahling & Lauricella (2017) pointed out that using SDT to guide the HCM of organizations is essential for promoting the career success of experienced employees(Dahling & Lauricella, 2017). Niu et al.(2019) empirical research shows that perfect performance management and career development plans can effectively promote teachers' sense of professional achievement and career stability(Niu et al., 2019). Eby also believes that organizational support, including career support, leadership support, training and development opportunities, and organizational resources, positively correlates with career success(Eby et al., 2003).

2.5.2 The Relationships between HCM and Leadership Style

The effectiveness of leaders depends on the way they behave in different contexts. Organizations can shape a leadership style consistent with their organizational goals by influencing their leaders' behavioral decisions (Siswanto et al., 2022). It was also found that transformational leadership improved job satisfaction and had a significant positive correlation with job motivation. HCM and leadership style are the boundaries of mutual influence(Chuang, 2016). HCM will strengthen the relationship between specific leadership styles and outcome variables, and the influence of HCM on leadership is apparent (Simić, 2020). Therefore, training, learning, and development activities in HCM can influence the behavior style of leaders so that they can adapt and choose the most appropriate behavior patterns. Bass (1985) pointed out that transformational leadership encourages employees to accomplish or exceed expected goals by making them aware of their importance(Bass

& Bass Bernard, 1985). Burns (1978) believes that transformational leaders not only have a higher level of demand motivation in the leadership process but also raise the demand motivation of employees to a higher level(Burns, 1978).

At the same time, some scholars pointed out that HCM behaviors such as organizing career development, management measures, and policies will affect the career success of individuals through career satisfaction and professional identity. For example, scholar Burke (1994) found that the training and development activities of a "Mentoring Program" (experienced team leader) significantly affected the career success of an individual(Burke & McKeen, 1994). At the same time, scholar Allen (2004) mentioned that the tutorial system, namely employees in the guidance relationship, can not only get better promotion opportunities, higher salary, work efficiency, and better environmental adaptability but also have high job satisfaction and low willingness to leave(Allen et al., 2004).

2.5.3 The Relationships between Leadership Style and Career Success

Scholars believe that the support of leadership style positively impacts their subjective career success. A high-quality leadership style can strengthen the support of employees and effectively improve employees' job satisfaction(Ng et al., 2005). Riaz and Haider (2010) emphasized that the appropriate leadership style is an indispensable supporting force when promoting career success through HCM(Riaz & Haider, 2010). Yang Fu et al. (2012) believe that when leaders give subordinates more information, resources, guidance, and other relevant support, this will significantly affect subordinates' career success (Yang Fu, 2012). Career success is a psychological perception of employees of the work results in the organization. Leaders have a direct right to evaluate employees' work performance, output, and results. Different leadership styles will also greatly impact employees' career success(Podsakoff et al., 1990).

Bass and Avolio (1994) point out that transformational leaders can significantly promote professional success through vision incentives and personalized care. Transactional leaders focus on short-term performance through material incentives, and the impact is relatively limited(Bass & Avolio, 1994). Bass (1997)

further pointed out that transformational leadership means that leaders stimulate the internal motivation and needs of subordinates through personal charm and charisma, explain clear organizational vision to them, attach importance to their needs at all levels, and provide personalized support to guide subordinates to achieve high performance beyond expectations, And then to help employees to achieve their career goals(Bass, 1997). Transformational leadership can influence employees' positive emotions, guide them to think positively, and promote rapid growth, thus improving performance and success (Bass, 2019). Tichy and Devanna (1986) found that transformational can increase the mutual trust between leaders and employees and enable employees to identify with the organization and leadership(Tichy & Devanna, 1986). Zhu et al. (2012) empirical study showed that transformational leaders indirectly promote their career success by enhancing their job engagement and career satisfaction(Zhu et al., 2012). Obedgiu (2022) found that transformational leadership significantly and positively affects employee performance and significantly moderates the relationship between talent management and employee performance(Obedgiu et al., 2022).

Zhou Rong (2024) found that Leadership style plays a pivotal role in shaping employee work attitude, behavior, and performance. Different leadership styles affect employees' motivation, satisfaction, and, ultimately, performance output in their unique ways(Rong, 2024). Wan Meichen（2023）through studying the influence of the leadership behavior of primary and secondary school principals on teachers 'work input, found that transformative and transactional leadership behavior significantly and positively predicts the school organization atmosphere, independent work motivation, and teachers' work input, thus affecting the teachers' career success(Meichen, 2023). Transactional leadership is related to subordinates' satisfaction and job performance (Podsakoff & Schriescheim, 1985) and impacts work motivation and organizational commitment. Transactional leadership positively correlates with employees' creativity and career growth (Chen & Shi, 2014; Guo & Deng, 2008; Judge, 2004). Feng and Zhang（2011）showed that transformative and transactional leaders promoted employee performance(Feng & Zhang, 2011). Man Xiaoyu (2019) found that transformational and transactional leadership can promote

job satisfaction, but the transformational leadership style is a better predictor(Xiaoyu, 2019).

2.6 Conceptual Framework, Operational Definitions, Hypothesis and Explanation of Hypothesis

2.6.1 Conceptual Framework

Based on the Self-Determination Theory, this study constructed the theoretical model of this study. From a new theoretical perspective, we took the HCM as the independent variable, the career success as the dependent variable, and the leadership style as the mediating variable. We will discuss the causal mode of HCM on teachers' career success.

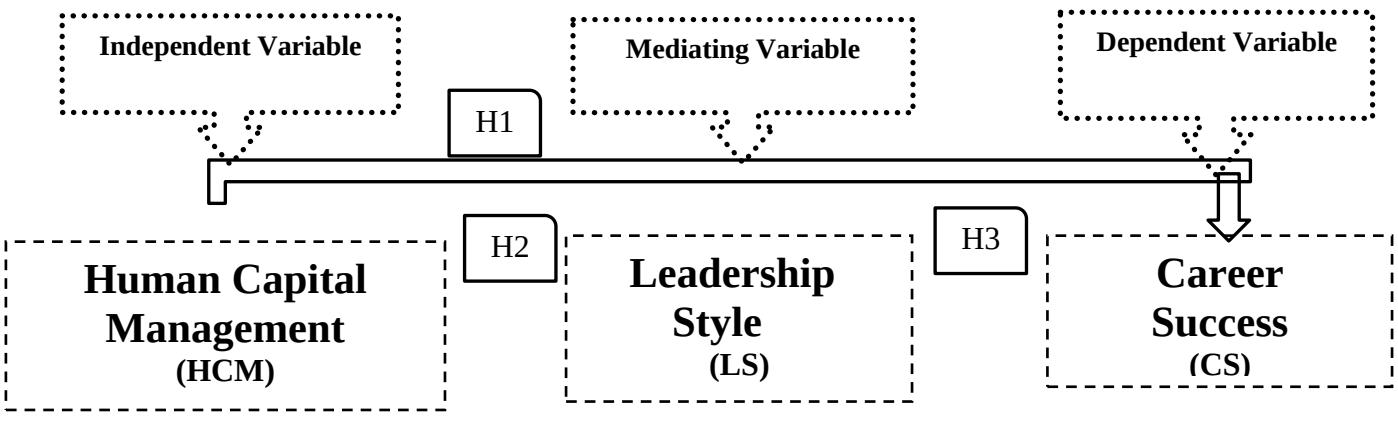
According to the Self-Determination Theory, man is a positive organism with innate basic psychological needs for growth, development, and self-integration. The key to individual growth and development is the satisfaction of autonomy, competence, and relationship needs (Deci & Ryan, 2000). However, this satisfaction is subject to the external environment(Leroy et al., 2015). After fully understanding individual needs and external environment information, individuals instinctively make self-made decisions about the external environment to influence or change individual behavior. When the external environment supports basic psychological needs, the individual moves toward a positive and healthy development, positively impacting job satisfaction and performance (Deci & Ryan, 2000; Gagné & Deci, 2005).

HCM is one of the critical factors in the organizational environment of employees. HCM, through a combination of human resource management activities such as acquisition, allocation, use, and development, can improve the performance of work efficiency and employee innovation, improve the working attitude of employees, give full play to the initiative of employees, and achieve career success. For employees, the most significant environment is the organization(Owen-Smith & Powell, 2008). A significant positive relationship exists between HCM and career success (Orpen, 1994); guiding relationships and employee career success, career assistance, internal support, and on-the-job education positively affect employee

salary (Ng et al., 2005). Grant (2007) found that by enhancing employee feedback and providing an excellent working environment, employees may improve their working skills and relationships with the organization(Grant, 2007). Providing flexible work schedules and self-determined work methods will enhance employees' sense of autonomy(Morgeson & Humphrey, 2006). Scholars show that HCM variables are essential to career success and explain most salary changes and the number of promotions(Dreher & Ash, 1990; Tharenou & Tharenou, 2009). Kirchmeyer(2006) has found that gender gaps in achieved rank and salary, are common indicators of objective success(Kirchmeyer, 2006).

The relevant theories and variables are analyzed and reviewed through the collation of the literature. Research shows that learning, on-the-job education, innovation, and creation are a single activity in the practice of HCM. Salary, promotion, competitiveness, and career achievement result from implementing human resource management practices and the constituent dimensions of individual career success. Therefore, the theoretical framework of this research is as follows.

According to the literature review, the conceptual framework of the relationship between HCM, leadership style and career success is explained as follows: Universities help teachers acquire more professional knowledge, skills and experience through HCM, thereby improving their career success opportunities. Managers match managers with appropriate leadership styles through effective HCM practices (such as training and development, team performance allocation), leadership style plays a mediating role in this process, transactional and transformational leadership in the relationship between HCM and career success. highlights the moderating role of transactional and transformational leadership in the relationship between HCM and career success (Zhu et al., 2012). The conceptual framework as follow Figure 2.1.



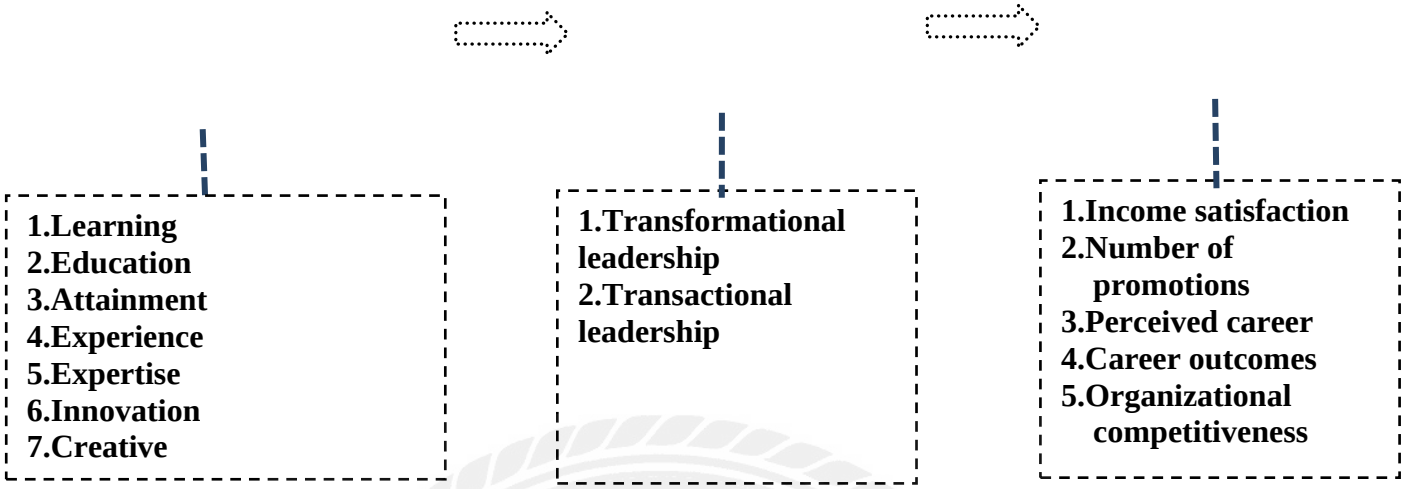


Figure 2.1 Conceptual Framework

From the above framework, several hypotheses can listed as follows.

Hypothesis 1: Human Capital Management has a significant direct affect on teachers' career success.

Hypothesis 2: Human Capital Management has a significant indirect affect on leadership style.

Hypothesis 3: Leadership style has a significant indirect affect on teachers' career success.

2.6.2 Operational Definitions

2.6.2.1 Human Capital Management

Human Capital Management is a set of practices and processes that organizations use to effectively manage their workforce and maximize the value of their human capital. It encompasses a broad range of activities, strategies, and systems aimed at optimizing employees' productivity, performance, and overall contribution to achieving organizational goals. The operational definition of HCM includes the

following key components: recruitment and onboarding, learning, education, attainment, experience and expertise, innovation, and creativity. HCM is a comprehensive approach that recognizes the workforce as a valuable asset and aims to optimize its potential for the organization's benefit. It involves strategic planning, continuous improvement, and the integration of various HR practices to create a cohesive and effective workforce.

2.6.2.1.1 Learning

Learning means acquiring knowledge, skills, and competencies through formal or informal educational experiences. The operational definitions of these terms involve specifying the measurable indicators and criteria that can be used to assess and quantify an individual's learning or educational achievement level. Here are critical components of the operational definitions: learning for skill development, cognitive abilities, behavioral changes, life-long learning, informal learning, adaptability, and growth.

Through continuous learning and self-improvement, employees can acquire more skills to improve work efficiency and gain a sense of professional achievement. Learning ability includes initiative in experience, adapting to a new environment, and completing new tasks faster.

2.6.2.1.2 Education

Education refers to a person's formal education experience, including the whole process from basic to higher education, covering all stages of learning, the academic level obtained, and the significance learned. It is one of the essential criteria to measure a person's comprehensive quality and ability. The criteria for judging the educational level include: formal education levels, years of education, certificates, diplomas, performance metrics, grades and grade point average, standardized test scores, assessment results, technical proficiency, language proficiency, specialized certifications, educational milestones, continuing education,

In the early stages, most researchers applied education as a control variable in studying career success. They believed that the group of higher education was characterized by high income, high status, and high living standards, and they

obtained high occupational happiness. Oswald(1997) found the relationship between education and happiness was summarized as people with higher happiness are well educated. Education can improve individual confidence, develop an excellent attitude, and promote career success. Indirect effects emphasize other education returns, such as income return, social status, employment status, housing status, health status, and so on(Oswald, 1997).

2.6.2.1.3 Attainment

Attainment means the practical ability formed through the accumulation of experience, which enables individuals to deal with various tasks and challenges at work more efficiently. These abilities are strengthened in constant practice and become a personal human capital advantage.

It refers to the process or result of achieving, acquiring, or achieving a specific goal, achievement, or status. The term often describes achievements or progress in education, careers, personal goals, etc.

2.6.2.1.4 Expertise

Expertise describes an individual's knowledge and skills in a particular field. The operational definitions for these terms involve specifying measurable indicators and criteria to assess and quantify an individual's level of experience and expertise. Here are the critical components of the operational definitions: duration of practice, variety of exposure, hands-on practice, depth of knowledge, innovative thinking, critical analysis, demonstrated achievements, portfolio of work, published article, adaptability, professional development, integration of new knowledge, recognition by peers, endorsements, and recommendations, teaching and mentoring, transfer of knowledge, educational contributions.

2.6.2.1.5 Experience

Experience refers to the knowledge, skills, and insight an individual accumulates through practice, work, study, and life. This experience covers specific professional skills, the ability to solve problems, the flexibility to deal with complex situations, and a deep understanding of the industry, organization, and work. Teachers' experience includes rich teaching experience, strong academic research

accumulation, and the ability to show a high degree of adaptability and problem-solving ability in the face of various challenges in teaching, research or management.

2.6.2.1.6 Innovation

Innovation refers to transforming novel ideas, products or processes into applications with practical value that bring influence or value. Innovation is to improve the existing things, but can also be a thorough breakthrough, belongs to a kind of change behavior, innovation behavior can bring new ideas, products and methods, which is a strong human competitive advantage.

2.6.2.1.7 Creative

Creative refers to the ability to produce novel, unique, or extraordinary ideas, and is a process of thinking and imagination. Creative emphasizes the generation of new concepts, new ideas, or new ways of solving problems, often related to the individual's imagination, associative ability, and non-traditional ways of thinking. The manifestations of creativity include: proposing unique ideas or solutions that have not been considered, breaking down the traditional ways of thinking and producing innovative ideas inconsistent with existing knowledge, and exploring different possibilities through multi-angle and multidimensional thinking.

2.6.2.2 Leadership Style

Leadership style refers to the behavior patterns and methods used by leaders in managing and influencing others. Leaders may adopt different leadership styles depending on their personality, experience, goals, and environment. Leaders are like advisors, guiding subordinates to improve themselves. It refers to interacting with employees and raising each other to a higher level of need and motivation.

2.6.2.2.1 Transformational Leadership

Transformational leadership is a leadership style that involves inspiring and motivating followers to achieve their full potential and exceed their expectations. The operational definition of transformational leadership includes measurable indicators and criteria to assess and quantify the specific behaviors and qualities associated with this leadership style: assessing leaders based on their ability to inspire, empower, and elevate their followers to higher levels of performance and personal development.

2.6.2.2.2 Transactional Leadership

Transactional leadership is a leadership style that focuses on exchanging rewards and punishments to achieve compliance and performance from followers. The operational definition of transactional leadership includes measurable indicators and criteria to assess and quantify the specific behaviors and qualities associated with this leadership style. The operational definitions of transactional leadership involve assessing leaders based on their ability to manage tasks, monitor performance, and enforce compliance through rewards and punishments.

2.6.2.3 Career Success

Career success is a multi-faceted concept encompassing various dimensions of achievement and satisfaction in an individual's professional life. The operational definition of career success involves specifying measurable indicators and criteria to assess and quantify success and fulfillment in one's career. Here are critical components of the operational definition of career success: income satisfaction, number of promotions, perceived career, career outcomes, and organizational competitiveness.

2.6.2.3.1 Income Satisfaction

Income satisfaction reflects individual feelings and views about their income level rather than an objective quantification of income. The income satisfaction operational definition involves specifying measurable metrics and criteria to assess and quantify individuals recognizing their financial income. Income satisfaction is often associated to actual income and personal expectations, cost of living, work content, and comparisons with others. These definitions recognize the subjective nature of income satisfaction and aim to capture the various factors that contribute to individual assessment of their financial satisfaction.

2.6.2.3.2 Number of promotions

The number of promotions means a straightforward quantitative measure that reflects an individual's career progression within an organization. The operational definition involves specifying measurable criteria to determine and quantify the count of promotions an individual has received. By defining these components, the

operational definition of the number of promotions provides a clear and consistent way to quantify an individual's career progression within an organization.

Refers to the number of times a person gets promoted or promotions during his career. It can reflect progress and career growth.

2.6.2.3.3 Perceived career

Perceived career means an individual's subjective assessment of their achievements, progress, and satisfaction in their professional life. The operational definition involves specifying measurable indicators and criteria to assess and quantify an individual's perception of success in their career. The operational definitions of perceived career involve a combination of self-reported measures, reflective assessments, and satisfaction indicators that capture the subjective nature of an individual's perception of success in their professional life.

An individual's perception of their career goals involves a person's subjective judgment and understanding of his career development, career achievement, career prospects, and career path.

2.6.2.3.4 Career outcomes

Career outcomes mean the tangible and intangible results or achievements that individuals attain professionally. The operational definition of career outcomes involves specifying measurable indicators and criteria to assess and quantify the various dimensions of success and achievements in a person's career. We recognize both the tangible achievements (such as promotions and salary increases) and intangible aspects (such as job satisfaction and professional development) that contribute to an individual's overall success in their career. These definitions help provide a comprehensive understanding of the various dimensions of career outcomes.

It refers to an individual's results, honors, or achievements in his career. For example, in a particular field, there are abundant social resources for relations and discourse authority in the professional field. The scarcity of resources makes professional achievements relatively richer.

2.6.2.3.5 Organizational Competitiveness

Organizational competitiveness means the ability of a company or entity to effectively position itself within the market, outperform competitors, and achieve sustainable success. The operational definition of organizational competitiveness involves specifying measurable indicators and criteria to assess and quantify the various factors that contribute to an organization's competitive strength. Eby (2003) proposed a comprehensive career success standard that includes career satisfaction and career competitiveness (internal and external)(Eby et al., 2003). Internal competitiveness gives individuals a strong sense of achievement, making it easier to achieve psychological success. The external competitiveness of organizations (including the competitiveness of employees in the same position as other organizations, the value brought to the University, etc.) also makes teachers feel happy.

It refers to individuals' competitive advantage and ability within and outside the organization. The organization regards its employees as increasing resources and realizes its self-value.

2.6.3 Explanation of Hypothesis

2.6.3.1 Hypothesis 1: Human Capital Management significantly directly affect teachers' career success.

2.6.3.1.1 Meaning of Hypothesis

The more Human Capital Management is better managed, the more it affects teachers' career success. This hypothesis means that HCM directly and significantly affects the extent to which employees achieve success in their careers. Increased human capital investment can make employees feel more successful in their careers. Organizations invest many resources to improve teachers' knowledge and skills by providing training, learning opportunities, and professional development programs. By constantly improving their knowledge and skills, teachers are more likely to adapt to career requirements, make outstanding contributions, and thus feel career success.

2.6.3.1.2 Reason of Hypothesis

The hypothesis posits that organizations with effective HCM practices will likely positively influence employees' career success. It suggests that the investment in and strategic HCM can indicate the success of employees and organization. This hypothesis underscores the importance of aligning human capital strategies with overall organizational goals and the individual career aspirations of employees.

2.6.3.1.3 Hypothesis's Supporting Theory or Research

According to the Self-Determination Theory, one of the cores of individual human growth and development is the satisfaction of basic psychological needs, and external environmental factors can affect the satisfaction of psychological needs(Deci & Ryan, 1985). SDT determines that basic psychological needs confirm three psychological needs: autonomy, relationship, and competence. As an important factor in an individual's external environment, HCM influences employee satisfaction, job promotion, and organizational competitiveness through a series of HCM activities such as selection and training, promotion and elimination, and academic education. Meeting their basic psychological needs can improve their happiness and job performance(Baard et al., 2004). The characteristics of employees' environment can improve their work performance by meeting their basic psychological needs(Van den Broeck et al., 2016). The need for self-realization is positively correlated with employee performance (Doeze Jager-van Vliet et al., 2017). Employees' enthusiasm to participate in decision-making can be mobilized through the effective implementation of human capital. Employees can be encouraged to strengthen their learning and accumulation, and the overall value of human capital can be enhanced(Heckman, 2000). HCM improves employees' knowledge, skills, and abilities. At the same time, it allows them to use their knowledge, skills, and ability to improve the organization's performance (Combs et al., 2006). Through the above theories, this study puts forward the hypothesis that HCM directly affects employees' career success.

Theories and research supporting the relationship between HCM and career success mainly include the following aspects: Gary Becker (1964) believes that investment such as education and training is a kind of human capital accumulation, which can improve employees' productivity and career success(Becker, 1964). Lazear

(1999)emphasizes the importance of skills and experience gained for career success(Lazear, 1999). Becker and Murphy (1992) emphasized the importance of knowledge and skills and proposed the influence of human capital on income and career success in the job market(Becker & Murphy, 1992). Jeffrey Pfeffer (1998) highlights how organizations can improve employee productivity and career success through effective HCM practices, such as training and development(Pfeffer, 1998). Denise Rousseau (1997) emphasizes the positive influence of organizations on employee development, including training, learning, and career development programs, which are critical to employee career success(Rousseau, 1997). Cappelli (1999) emphasizes improving employee career success through effective recruitment, training, and development(Chadwick & Cappelli, 1999). Richard Florida (2002) proposed the influence of knowledge employees on the competitiveness of organizations and cities(Florida, 2002). T.V. Rao (2004) emphasized the importance of training and development for employees' career success and organizational performance and emphasized organizations' strategic thinking on HCM(Rao, 2004).

2.6.3.2 Hypothesis 2: Human Capital Management has a significant Indirect affect on leadership style.

2.6.3.2.1 Meaning of Hypothesis

More HCM is better managed through leadership, which will help employees achieve career success. This hypothesis means that HCM helps promote the leadership of employees and managers, thereby creating favorable conditions for teachers' career success.

2.6.3.2.2 Reason of Hypothesis

By providing leadership training and development opportunities, HCM can help managers better understand their leadership style and help them improve their decision-making and problem-solving skills. Good leadership helps to build a positive team culture and encourages employees to work together better. By training team leaders, HCM can help managers adopt the appropriate leadership style to manage teachers and help teachers achieve career success.

2.6.3.2.3 Hypothesis's Supporting Theory or Research

Self-determination theory not only applies to employee management but also can help to shape and develop leadership. Meeting the basic psychological needs of leaders and matching them to the appropriate leadership style can improve their leadership effect. The effectiveness of leaders depends on the way they behave in different contexts. Organizations can specifically influence leaders 'behavioral decisions, thus shaping a leadership style consistent with the organization's goals. Leadership style improves employees' happiness and work performance by meeting the basic psychological needs of employees(Van den Broeck et al., 2016; Van den Broeck et al., 2010), and leadership-independent support directly or indirectly impacts the satisfaction of individuals' basic psychological needs (Taylor & Lonsdale, 2010).

According to the literature, HCM and leadership behavior are the boundaries of each other's influence (Chuang, 2016); The relationship between certain leadership behaviors and outcome variables is strengthened by the influence of HCM, which impacts leadership(Yun, 2013). Training, learning, and development activities in HCM can influence the behavior style of leaders, and they can adapt and choose the most appropriate behavior pattern. Strategies for Taking Charge, Bennis (1985)emphasized how leaders can motivate and utilize human capital through effective leadership(Bennis & Nanus, 1985). The research and perspectives of these scholars together constitute a comprehensive understanding of the relationship between HCM and leadership. Their contributions help us understand how leaders effectively manage and develop talent in organizations to drive organizational success. From the above theory, this study believes that HCM positively and indirectly affects the leadership behavior style.

2.6.3.3 Hypothesis 3: Leadership style has a significant indirect affect on teachers' career success

2.6.3.3.1 Meaning of Hypothesis

Leadership affects the level of motivation and engagement of employees, and the improvement of motivation and engagement can lead to higher work performance, which is crucial to teachers' career success.

2.6.3.3.2 Reason of Hypothesis

Different leadership styles all influence teachers' career success by influencing their working environment, personal growth and career development opportunities.

Transformational leadership is significantly improves the performance and growth of individuals and organizations by stimulating their intrinsic motivation, inspiration, and promoting innovation and personal development. Transformational leadership significantly impacts their career success by motivating teachers' personal growth, enhancing innovation, providing clear career direction and support, influencing their behavior, attitudes and ability, promoting their development and achievement in the organization, as well as improving their job satisfaction and organizational commitment.

Transactional leadership style is a style of leadership based on explicit goal setting, task assignment, and performance rewards. By setting clear goals and performance standards, teachers can clarify their job requirements and expectations. This clarity helps teachers better plan their work and career development and reduce uncertainty. By meeting expectations and achieving goals, teachers can be rewarded and recognized, thus promoting career success.

2.6.3.3.3 Hypothesis's Supporting Theory or Research

In Self-Determination Theory, when the three basic psychological needs of individual autonomy, competence, and relationship are met, they will directly affect their inner motivation, job performance, and career success. Leaders who adopt a transformation or transactional leadership style can effectively stimulate their intrinsic motivation for more tremendous career success. Judge (2004) found that transformational leaders could improve employee job satisfaction and positively affect motivation(Judge, 2004). Therefore, from the perspective of the organizational situation, this study introduces two styles of transactional and transformational leadership as mediating variables between HCM and teachers' success, assuming that leadership style indirectly affects teachers' career success.

Universities have program-responsible mentors, and mentors are generally seen as leaders. Dougherty and Dreher (2007) mentioned that Types of Mentoring

Relationships mainly includes two main functions: Career Development: This includes sponsorship, coaching, protection, providing challenging assignments, and exposure; Psychosocial Support: Mentors also provide emotional support, role modeling, counseling, and encouragement, helping mentees build confidence and adjust to the work environment(Dougherty & Dreher, 2007).

Chapter 3
Research Methodology

This study employs quantitative research methods to analyze the causal model HCM that influences teachers' career success at Science and Technology Universities in China with leadership style as a mediator. Quantitative research methods can provide rigorous, reliable, and comparable results in studying the influence of HCM on teachers' career success. By offering a scientific basis for decision-makers, this research helps organizations better understand and manage teachers' human capital.

This study's primary data collection method is a questionnaire survey. The sample focuses on teachers from Science and Technology Universities in China. Through quantitative analysis, this research establishes a model to assess the influence of HCM on teachers' career success. Leadership style is introduced as a mediating variable to explore how it influences the relationship between HCM and career success. Ultimately, the study provides valuable recommendations for improving organizational performance and fostering sustainable development through effective HCM.

This chapter outlines the methodology, including population and sampling methods, data collection procedures, variable operationalization, questionnaire pretesting, and statistical analysis methods. This study will describe the research methods in seven parts: research design, population and sample, research tools, data collection strategy and procedure, data analysis, research ethics, and reporting.

3.1 Research Design

3.1.1 Documentary Research

This research uses academic documents, articles, journals, theses, dissertations, research reports, and information from the internet. The main research object of this paper is Science and Technology Universities in China, so there is still much basic information derived from the website data collection of the Chinese government,

Chinese education departments, and universities. Through extensive collection and review of the Documentary, this study has a clear and comprehensive understanding of HCM, leadership, and career success and their research variables, related background, influencing factors, the relationship between each other and other related theories, which has laid a theoretical foundation for the research design and implementation of this study.

3.1.2 Empirical Research

They are studying data from field research to study phenomena in the field from samples selected to study HCM and career success. This study selected 400 teachers from 36 Science and Technology Universities in China as empirical data samples. This study will get quantitative data from these questionnaires to obtain the critical variables of HCM, including the teachers' education level, training experience, work experience, innovation, and creative dimensions, the influence of the teachers' career success, measuring career success criteria includes the teachers' salary level, job promotion, job satisfaction and so on.

In conclusion, this study examines the influence of human capital on career success to obtain quantitative, scientific conclusions to provide practical guidance and suggestions for organizational management, policy-making, etc.

3.2 Population and Sample

3.2.1 Population

In order to enhance the quality and scientific rigor of this study, two aspects of sample selection must be fully considered. First, the study focuses on the management aspects of science and technology universities in China. The main research object is the teachers at Science and Technology Universities in China. Teachers include professors, associate professors, assistant professors, lecturers, etc., excluding administrators, faculty members, administrative personnel, and other jobs.

The population for this study includes Science and Technology Universities in China. According to the website of the Ministry of Education of the People's Republic

of China, there are 36 Science and Technology Universities in China. By the end of 5 July 2023, there were about 62,403 teachers at Science and Technology Universities in China (source: the data comes from the official websites of each Science and Technology University). So, the population of this study is 62,403.

Determine the sample size from the total population of 62403 using Taro Yamane's ready-made table with a 95% confidence level and a 5% error, resulting in a sample size of 400 people. To determine the sample size of the population in this study, the researchers used a determination method based on opening a form completed by Taro Yamane (Taro Yamane, 1967), $n=N/(1+Ne^2)$, e=0.05, was used to determine the confidence level and sampling error.

$$n = \frac{N}{1+Ne^2}$$

where n = sample size

N = population size

e = Probability of allowable error

$$n = \frac{62403}{1+62403*(0.05)^2}$$

n =397.5

According to the formula, the minimum sample size of participants in the final survey was 397.5, so 400 teachers were taken as the sample size. This study adopted a sampling survey approach.

This research selected a representative sample to improve the quality of the data. They consider regional differences in the development and size of Science and Technology Universities in China. Therefore, this research selects several representative universities with the most significant number of teachers as representatives of Science and Technology Universities in each province or municipality. The population and specific sample were collected using purposive sampling. 400 Questionnaires were distributed according to about 1% of the number (more than 1,000) teachers in the large-sized Science and Technology Universities from different provinces or municipalities in China. 400 questionnaires were returned.

3.2.2 Sample for Quantitative Research

This study mainly uses the structural equation modeling statistical tools to test the hypotheses and the validity of the proposed model. My election sample is 36 Science and Technology Universities in China, totaling 62403 teachers. These teachers should have similar educational backgrounds, innovation abilities, and human capital, so this selection method can better control the difference of sample variables. The sample group used the total number of teachers at Science and Technology Universities, distributed in different provinces or municipalities.

By learning Gallup's statistical sampling method, the sample statistics select the universities with the highest number of teachers from each province or municipality, adopt a small sample approach, and ensure that these samples are all teachers at Science and Technology Universities. The questionnaires were distributed to Science and Technology Universities teachers, representing the overall target of the research.

All other things being equal, the greater the number of subpopulations analyzed, the larger the sample size required. Otherwise, explaining whether the differences between each subgroup are natural or caused by sampling error is impossible.

When the study finally determined the appropriate sample size, it was also necessary to consider the incidence and response rate of the survey method; not every questionnaire could be collected. The response rate of traditional telephone surveys is about 10%, and the response rate of online surveys conducted through online channels such as email may only be 1 in 10,000. The study made direct contact with the human resources departments of the universities to communicate by telephone whether the universities could provide sufficient numbers to participate in the questionnaire filling work to ensure that 400 questionnaires were collected.

3.3 Research Tools

This questionnaire first passes a preliminary survey of a small sample of 40 people and then conducts a large sample of formal research. In the small sample stage,

the recovered small samples pass the reliability test to purify the scale. Then, the factor analysis method is used to conduct the validity test and the common method deviation test again, and the scale is adjusted and revised for large sample research.

This study will use a questionnaire as the primary data collection tool. Questionnaires are essential for gathering factual information from respondents. The researchers paid special attention to the surveyed population, which included all teachers specializing in teaching or research, not administrators and others. An organization is a group that plays a critical role in advancing the mission of the organization. The organization has a direct influence on organizational culture. Suppose the informant has been in the organization for a sufficiently long period. There is a sufficient understanding of the values and behavior patterns of the organization, and it can measure their consistency. The research instrument is a questionnaire that measures the variables in this study. It features a 5-level assessment scale. The questionnaire is divided into five parts from most agreeable (5 points) to most disagree (1 point).

Part 1 The general personal characteristics questionnaire, comprising six items, is a checklist format that includes gender, age, educational level, seniority, annual income, professional and technical title. This questionnaire was developed by the researcher.

Part 2 All the questionnaires in this study used more mature measurement scales. The questionnaire, informed by the seminal work of Allen and Meyer (1993), operates as a diagnostic tool to evaluate the congruence between an organization's learning capacity and sustainable performance, including knowledge management practices. The research instrument is a structured questionnaire using a 5-point Likert scale, ranging from "Strongly Agree" (5 points) to "Strongly Disagree" (1 point). The questionnaire is divided into five parts, with five items in total, designed to assess the variables in this study. The scoring criteria are as follows.

5	score	means	Strongly agree
4	score	means	Agree
3	score	means	Neutral

2	score	means	Disagree
1	score	means	Strongly Disagree

However, the researcher tested the difference between the expected and actual data. Using statistical methods for analysis, the researcher used a Paired-Sample T-test. In the analysis, the researcher determined the hypothesis for testing as follows.

Strongly Agree (5): This rating indicates a high level of agreement with the statement. It indicates that the respondents believe that HCM is entirely in line with the principles of career success and effectively promotes the personal career development of teachers.

Agree (4): A score in this category suggests that the respondent generally concurs with the statement. Recognize the existence of HCM characteristics and their positive influence on career success despite slight reservations or recognized areas of improvement.

Neutral (3): This midpoint score indicates ambivalence or uncertainty about the statement, meaning respondents neither agree nor disagree with the existence of HCM characteristics and their influence on career success.

Disagreeing (2): This category of responses reflects a disagreeing position, indicating that respondents believe that the existence of HCM characteristics will negatively influence career success.

Strongly disagree (1): This rating indicates a strong disagreement with the statement, indicating that respondents believe that the presence of HCM characteristics will make a big difference to career success, potentially harming individual teachers' career development.

Cumulative scores for different structures such as learning, education, attainment, experience, expertise, innovation, and creativity provide a comprehensive picture of HCM as a guide to career success. Therefore, aggregate data inform strategic adjustments and interventions necessary to enhance HCM in line with guiding principles for career success.

3.4 Questionnaire Data Collection Strategy and Procedure

In pursuing quantitative data, the researcher used a specific tool, “Questionnaire Star,” to facilitate data collection. “Questionnaire Star” is a widely used platform for online questionnaire surveys, data collection, and analysis in China, through which various types of questionnaires can be designed, published, and collected. The construction of the questionnaire was meticulously refined to align with the research goals and conform to the operational definitions and theoretical concepts of the variables under study. This process was conducted with the guidance and approval of the dissertation advisor. Additionally, the questionnaire was presented to experts to assess its content validity and the clarity of its language, ensuring that the research instruments were comprehensive and pertinent to the study's objectives.

3.4.1 IOC Test

In testing for content validity by measuring the consistency of questions in the questionnaire with the objectives (Index of item-Objective Congruence: IOC), which has the following verification steps:

1)Experts specializing in IOC analysis first compared the question construction diagram with the questionnaire crafted by the researcher, ensuring alignment in their design and purpose.

2)In this validation process, the researcher sought feedback from 5 specialists, employing the IOC method as a robust tool to verify the Content Validity of the research instruments.

3)The experts then evaluated each question's specific measurement objectives using the following rating scale. The scores provided by these experts were then utilized to calculate the IOC value for each questionnaire item using an average formula.

A score of + 1 means that you are sure the question is consistent with the measurement objectives.

A score of 0 means that you are not sure the question is consistent with the measurement objective.

A score of - 1 means that you are sure the question is inconsistent with the measurement objective.

IOC needs to be between 0.8-1.00 for every question.

4) Find the mean of the IOC and use the following judgment:

Between 0.8-1.00 means “the measurement is passing the criteria from experts.”

Below 0.8 means “the measurement needs to make change or correction.”

Less than 0 means “the measurement is failing the qualify from experts.”

5) This questionnaire first examines 40 small samples of pre-research. The whole questionnaire shows that the result of Cronbach's Alpha is 0.882, larger than 0.7. The reliability of the whole questionnaire is accepted.

6) Respondents were asked to provide suggestions for the questionnaire. This survey's main target is teachers at Science and Technology Universities in China. Based on the feedback from the respondents, the initial questionnaire was moderately adjusted, and sentences prone to difficulty in understanding and bias were adjusted.

The updated questionnaire was prepared for distribution in the study following these adjustments. In addition to content changes, the questionnaire's layout was also restructured. This comprehensive feedback incorporation and redesign process culminated in the questionnaire's finalization.

3.4.2 Data Collection

Probability sampling is the basis of sampling inference in statistics. This study used a random sampling method.

This study was contacted with the relevant human resources department managers of the sample unit, explained the purpose and content of the study in detail, and assigned special personnel to receive and arrange the distribution of electronic questionnaires. In the research process, all electronic questionnaires were used “questionnaires star” for distribution, and communication was strengthened to ensure

the matching filling and the authenticity and anonymity of the questionnaire information to ensure accurate recovery and unify the data input matching.

At the time of data collection, the researchers will receive the questionnaire by email (E-mail), send it to each university's human resources department, and distribute it to a designated sample group. After that, the HR department will collect them. The number of questionnaires determined by the researchers was forwarded only to a purposeful sample of teachers. Data collected were a sample of universities belonging to China's Science and Technology Universities list and distributed in different provinces or municipalities. That is, the sample group, according to the number of specified samples, there are a total of 400 questionnaires collected at Science and Technology Universities in China. The data collection period is from March 2024 to July 2024, after which the researchers bring back the information received from the questionnaire. A total of 400 documents were processed and analyzed using computer programs. The statistic used in data analysis is frequency. Mean percentage and standard deviation (S.D.), analyze the relationship between factors that affect organizational efficiency, examine the assumptions, relationships, structure, and causal relationships of the model through structural equation modeling, and estimate the path coefficient by using the path analysis maximum likelihood (ML) using the following principles. To study a variable's direct and indirect effects and how it affects the dependent variable. It is an analysis of the causal pathways that affect the effectiveness of an organization.

3.4.3 Data methods

After collecting all the data from the questionnaire, the researcher has prepared the data for analysis as follows.

1) Check the completeness of the answers in each questionnaire.

2) For each question, a specific coding scheme was established, and corresponding scores were allocated to the answers, facilitating a structured approach to data interpretation.

The instrument is structured around a 5-point Likert scale for coding statistics based on the scores of questionnaire responses: strongly agree is a 5 score, agree is a 4 score, neutral is a 3 score, disagree is a 2 score, and strongly disagree is a 1 score.

3) Proceed with coding and scoring each answer until all questionnaires are complete.

4) The fully coded and scored questionnaires were digitally transferred and securely stored on a computer system, setting the stage for the next phase of detailed data analysis.

3.5 Data Analysis

This study used structural equation modeling (SEM) as the data analysis technique. This method can deal with the relationship between multiple causes and multiple results simultaneously or encounter latent variables (i.e., variables that cannot be directly observed). It allows the independent and dependent variables, including measurement error, and estimates the fitting degree of the whole model.

Data analysis involves processing the collected data. In order to bring about answers to hypotheses and answer research questions. This stage involves selecting appropriate statistics and analyzing the results from the received data. With statistical programs SPSS Version 26.0 and statistical programs AMOS Version 24.0, the researcher has laid out the data analysis guidelines as follows.

1) Analysis of general characteristics of respondents Using frequency and percentage statistics.

2) Analysis of opinions on various factors Using statistics, the arithmetic mean and standard deviation (S.D.).

3) Analysis to determine the relationship between factors that influence organizational effectiveness. Moreover, it examines the model's assumptions, relationships, structure, and causality. It is an analysis of advanced statistics. Structural equation modeling is done by analyzing paths (path analysis) with techniques using the principle of maximum likelihood (ML) to estimate path

coefficients. To study the direct and indirect influence of a variable, how does it affect the dependent variable? It is an analysis of the causal relationship path that influences organizational effectiveness with AMOS Version 24.0

Guidelines for testing hypotheses

Data were analyzed using structural equation modeling and path analysis, using the principle of maximum likelihood (ML) to estimate path coefficients. The goal was to study variables' direct and indirect influence to see how much they affect the dependent variable. With AMOS 24.0, the model of relationship path analysis of the studied variables was built, as shown in Figure 3.1.

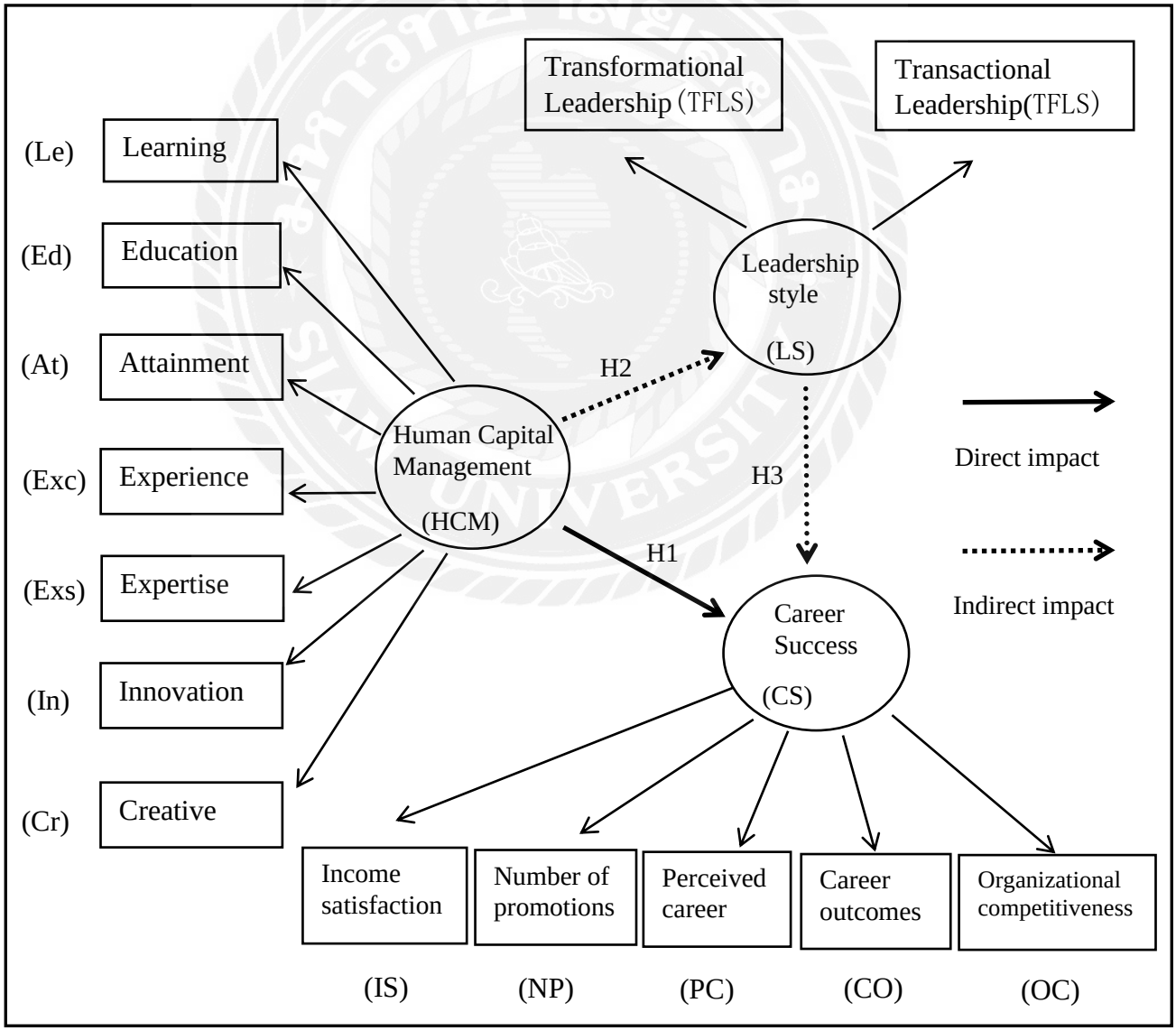


Figure 3.1 Model of Relationship Path Analysis of the Studied Variables.

Explain the dimensions: Income satisfaction (IS) means salary, benefits, etc. Number of promotions (NP), mainly the professional titles and skills promotions. Perceived career (PC), mainly career goals, teaching and academic expectations, etc. Career outcomes (CO) are mainly obtained through teaching and academic achievements, awards and honors, etc. Organizational competitiveness (OC), both inside and outside the organization competitiveness. Learning (Le) means learning new technology and knowledge. Education (Ed), educational background. Attainment (At), support environment, and platform obtained. Experience (Exc), teaching, and research experience. Expertise (Exs) and professional skills come into effective play. Innovation (In), change innovation. Creative (Cr), creation of value. Transformation Leadership (TFLS) is a people-oriented leadership style. Transactional leadership (TSLS), performance-based leadership style.

The equation model used to measure the external latent variables is HCM, and the observed variable is a subvariable on the latitude of HCM. There are 7 variable characteristics to measure the HCM for Science and Technology Universities in China. They are learning, education, attainment, experience, expertise, innovation, and creative. Structural equation modeling is used to measure the causal relationship between two internal potential variables.

HCM includes not only the management of teachers but also the management of leaders. This study introduces situational factors affecting career success as mediating variables and discusses the influence of transformational and transactional leadership on teachers' career success. The key to transformational leadership is change, multidimensional and variable, and more spiritual motivation for teachers. Trading leaders focus on trading and reward teachers more on material terms. These two different leadership styles can play the role of HCM, affect the basic psychology of teachers, and then affect the teachers' career success. Structural equation modeling or structural analysis variables is a complex statistical analysis method designed to explore and verify relationships between variables while considering observational errors. Structural equation modeling is often used to test complex theoretical models that contain multiple latent and observed variables. This model can capture direct and

indirect relationships between variables while considering measurement errors and covariance between observed variables.

Structural equation modeling primarily represents the relationships between latent variables. It integrates measurement and structural models to analyze the correlations between latent and observable variables, while also capturing the relationships among the latent variables.

$$\eta = \mathrm{B}\eta + \Gamma\xi + \zeta$$

1) Internal latent variables (Exogenous; η = eta) The variable is the dependent term within a solitary equation.

2) External latent variables (Endogenous; ξ=ksi) are the independent variables in each equation.

3) B: Direct influence of variables η on variables η other

4) Γ: Direct influence of variables ξ on variables η

5) ζ = zeta: structural tolerances

The structural equation model offers several advantages. First, it allows for the simultaneous analysis of multiple dependent variables, unlike traditional regression analysis, which requires calculations for each variable individually. Second, Structural equation modeling accounts for measurement error in independent variables, whereas traditional methods require error-free measurements. Third, Structural equation modeling permits correlations among the error terms of observed variables, enabling the estimation of factor structures, relationships, and model fit in a single analysis.

In this study, statistical software AMOS Version 24.0 will be used to construct structural equation models and perform confirmatory factor analysis. The research hypotheses will be tested through model fitting, revision, and evaluation of the fit index, which will provide an objective analysis of the relationship between HCM and career success. If the fit index does not meet the standard, the model will be adjusted until it reaches an acceptable level. A key criterion here is that the P-value should be greater than 0.05, which indicates a satisfactory alignment between the two models.

Consistency evaluation includes a variety of statistical indicators, including Chi-square probability level (CMIN-P value), relative Chi-square (CMIN/DF), goodness of fit index (GFI), and approximate root-mean-square error (RMSEA). These indicators are mainly used to evaluate the overall fitting effect of the model, that is, whether the model can explain the data well. For example, in general, the Goodness of Fit index GFI is above 0.9 as the standard for pattern adaptation, and the closer the value of (GFI) is to 1, the stronger the explanatory ability of this model and the more appropriate the configuration; on the contrary, if the GFI pointer is closer to 0, the lower the explanatory ability of this model and the more inappropriate the configuration. Root Mean Square Error of Approximation (RMSEA) value less than 0.08 is a perfect fit. The smaller, the better, etc. The criteria used in the conformance assessment are summarized in Table 3.1, providing a comprehensive overview of model alignment with empirical data.

Table 3.1 Summarizes the Criteria Used to Check the Congruence of the Model with the Empirical Data

Goodness of Fit Index (Statistic Abbreviation)	**Goodness of Fit Index**	**Level of Acceptance**	**Interpretation**
CMIN-P	Chi-square Probability Level	P-value >0.05	Pass
CMIN/DF	Relative Chi-square	<5	Pass
(A)GFI	(Adjusted) Goodness of Fit Index	GFI≧0.95 AGFI≧0.90	Pass
(N)NFI	(Non) Normed-Fit Index	NFII≧0.95 NNFII≧0.95	Pass
CFI	Comparative Fit Index	CFI≧0.90	Pass
RMSEA	Root Mean Square Error of Approximation	<0.08	Pass
AVE	Average Value Explained	AVE≧0.50	Pass

Source:(Sincharu, 2014)

Reliability is the degree to which a research tool can provide consistent and stable measurement results under the same conditions. If the reliability analysis results

fail to reach the ideal standard, it is not reliable to use the index system to build the structural equation model. In order to solve the problem of low reliability of the overall index and the reliability of each potential variable, it is necessary to evaluate the structural equation model, which means forming a new index system by removing some measurement indicators, modifying and adjusting the parameters of the model. There is a certain credibility between the index system and the potential variables, and then the new index system is used to build the structural equation model.

In order to improve the stability and accurate and reliable statistical results of the model, we need to do the following:

1) Simplify the model as much as possible, use the statistical software AMOS (Analysis of Moment Structures) to reduce the number of variables, and consider using the modification index (MI) of the model to improve the fit. Check the error value associated with the dependent variable.

2) The strategy also includes merging some potential variables to form new potential influencing factors, thus refining the structure of the model. The use of multiple observation dimensions can capture multiple aspects of potential variables, which can improve the stability and reliability of measurements and reduce the influence of measurement errors.

3) Another key step is establishing a bidirectional relationship between the dependent variables (represented by a double-headed arrow). This condition is often called a "regression relationship" or "interaction effect." This means changing one dependent variable can affect another and vice versa. In constructing a structural equation model using software AMOS, each dependent variable should have a corresponding measurement model and structural model. If necessary, additional analysis, such as model comparison, revised indicators, etc., will be required to assess the quality of the model more fully.

The level of variable measurement in general, it can be divided into 4 levels. This is classified according to the measurement level or scale of the variable. These four levels have different properties and characteristics according to the increasing order of measurement levels.

1) Group level (nominal) Variables can only be classified at the nominal level, with no order or size. It can only indicate whether the variables are the same or different. For example, gender (male, female) is a nominal variable with no order between the categories.

2) Rank level (ordinal) Variables have an order relationship and are classified. For example, professional ranks and titles (Associate Professor, Assistant Professor, lecturer, etc.) are ordinal variables.

3) Interval level horizontal variables have classification and order, and the interval between variables is fixed and meaningful.

4) The ratio level is the highest measurement level. Variables have classification, order, fixed intervals, and an absolute zero point, representing a complete absence or non-existence. For example, height, weight, income, etc., are variables of the ratio level.

These four levels are essential for researchers to choose appropriate statistical analysis methods and interpret research results. When building a structural equation model, the variable's measurement level needs to be considered to ensure proper interpretation and analysis of the data. But want to measure variables at the ratio level to analyze the data using multiple regression analysis. This can be done by measuring variables on a ratio scale. The ratio level provides a more comprehensive and detailed data capability because it contains features that nominal, ordinal, and interval scales do not. The ratio level has an absolute zero point, meaning the zero point is truly missing or absent. The spacing between the values in the ratio level is fixed and meaningful, which makes it possible to represent the relative sizes and differences between variables accurately. The ratio level allows for ratio operations, that is, the ratio of one value to another, which is important for understanding the comparative relationship between variables. Since the ratio level provides more information, it is suitable for a broader range of statistical analysis methods. Various descriptive statistics, inferential statistics, and advanced statistical methods can be used, including regression analysis, variance analysis, etc. In structural equation model modeling, data provided by ratio level is more suitable for accurate parameter estimation and interpretation. In research design and data collection, the variable measurement level

should be weighed according to the nature of the research question and variable, and the applicability of using group level, rank level, interval level, and ratio level should be seriously considered.

3.6 Research Ethics

When conducting research on the influence of HCM on career success, it is necessary to seriously consider ethical issues to ensure the legitimacy, impartiality, and respect of the research. First, informed consent is required to ensure that participants give informed consent to participate in the study before conducting the study and clearly state the purpose, process, risks, and benefits of the study. Second, it is necessary to protect the privacy and confidentiality of the participants, ensure that the personal data collected in the study is properly handled, and adopt anonymization to prevent the disclosure of personal identity. Third, it is necessary to be fair and impartial, avoid discriminatory questions that cause trouble to others, and pay particular attention to excluding any factors that may lead to bias in statistical analysis. Fourth, before conducting research, it needs to be reviewed and approved by an ethics review committee to ensure that the research complies with ethical standards and regulations and follows best practices in research ethics. In order to ensure that the research is ethically reliable and legitimate, following these principles helps to protect the rights and interests of participants while enhancing the scientific and social responsibility of the research.

This research has been approved by the PIM-REC committee as the Review.

Approval No: PIM-REC 040/2567

3.7 Research Reporting

The reporting for this research is separated into 5 chapters as follows.

Chapter 1: Introduction. This chapter mainly introduces the research background, research questions, research objectives, research Scope, limitations, and expected benefits of this research. It briefly states the main research content and expounds on the value and significance of the causal model study on the influence of

HCM and leadership style on the teachers' career success at Science and Technology Universities in China.

Chapter 2: Literature review. This chapter mainly reviews and evaluates the existing literature on Self-Determination Theory, HCM, leadership style, and career success. It also reviews the theories and literature on their structural dimensions and influencing factors. At the same time, it also combs the relationship between HCM and transformational leadership, transactional leadership, and career success. Finally, the theoretical model and research hypothesis of this paper are presented.

Chapter 3: Research methodology. This chapter mainly describes the research design, population and samples, data collection, and analysis methods. This study adopts quantitative research methods to clarify the representativeness and reliability of the sample and elaborates on the tools and techniques used for data collection.

Chapter 4: Research result. This chapter mainly carries out descriptive statistical analysis of the sample data collected Using SPSS and AMOS software, evaluates the sample data through reliability and validity testing and confirmatory factor analysis, and analyzes the research data results in tables and figures. Then, it constructs SEM, verifies the hypothesis, and deeply discusses the role of HCM in influencing teachers' career success with the leadership style as the mediating variable.

Chapter 5: Research Conclusion, Discussion, and Recommendation. First, the research conclusions of this study are drawn based on the data analysis in Chapter 4. Second, Questions and answers to these questions are provided, and variables and their relationships are discussed. Then, according to the research conclusions, several suggestions on HCM are put forward to help teachers achieve career success, thus achieving a win-win situation for teachers and organizations. Finally, it looks forward to future research.

Chapter 4
Research Result

This study aims to examine the factors of HCM and the influence of leadership style on career success at Science and Technology Universities in China. This chapter is mainly based on the literature review in Chapter 2 and the sample data collected for the analysis and tests this study's theoretical framework and hypothesis. It details the design of the questionnaire administered to the teachers of these universities. Through collecting questionnaire data and using structural equation modeling for quantitative research, exploratory and confirmatory analyses were conducted, establishing a structural equation model. The model's fit was evaluated, and conclusions were drawn regarding the validity of the research hypotheses.

Before the extensive sample survey, a detailed survey plan was formulated, and the survey areas, the list of universities, and the questionnaire filling requirements were defined. This survey used the tool "questionnaire star" (Online questionnaire survey, data collection, and analysis platform tools commonly used in China), to compile the electronic version of the questionnaire for data collection, and the questionnaire through the form of "questionnaire star" sent to the human resources department of the university and distribute it to a designated sample group. A total of 400 sample data were collected.

This section analyzes the study data using statistical programs SPSS Version 26.0 and AMOS Version 24.0, described in eight sections.

4.1 Basic Information of Questionnaire Respondents

4.2 Percentage Distribution of Factors

4.3 Reliability Analysis

4.4 Extraction and Validation of The Structural Dimensions of the Key Variables

4.5 Correlation Analysis

4.6 Structural Equation Modeling Fitting, Hypothesis Testing and Analysis

4.1 Basic Information of Questionnaire Respondents

The study carried out quantitative analysis using questionnaire tools to collect data from the sample group, which is 400 teachers at the Science and Technology Universities in China.

In the study, the actual sample data obtained met the research requirements from the perspective of the respondents' basic information statistics. The samples of this survey are mainly Science and Technology Universities. From the sample statistics, different levels of the different categories were more evenly distributed: slightly more men than females. According to the demographic characteristics of the sample, generally mainly male, most senior personnel with master's and doctorate degrees at a higher cultural level. The new generation of teachers aged 30-50, under the age 41-50, accounted for a large proportion, up to 52%, and professional and technical titles are mainly deputy senior. This may be related to the age of the delegate subject; they are easy to choose people of their age and professional title. At the academic level, there are more samples with Master's (58%) and Doctor's (25.5%); the reason is that Science and Technology Universities chosen by the author concentrate more on high-level talents. The respondents have an excellent structural distribution and represent the studied group better. The sample population of this survey presents the following characteristics, as shown in Table 4.1.

1. Sex: The proportion of men in the survey was higher than that of female, at 63%;

2. Age: Most people are between 31-40 years and 41-50 years, 28% and 52%;

3. Seniority: Mainly concentrated between 11-20 years and 21-30 years, with 45.5% and 37%;

4. Professional and technical title: Mainly by Associate Professor, accounting for 73%;

5. Degree: The majority of universities received Master's and Doctorate degrees, accounting for 58% and 25.5%;

6. Annual income: Revenue remained between 80,001-150,000 yuan and 150,001-200000 yuan, 47% and 47.8%.

Table 4.1 Descriptive Statistical Analysis

(n=400)

Personal information of respondents	Item	Quantity	percentage(%)	Accumulative perception(%)
Sex	Male	252	63.00	63.00
	Female	148	37.00	100.00
Age	26 - 30 years	4	1.00	1.00
	31 - 40 years	112	28.00	29.00
	41 - 50 years	208	52.00	81.00
	51 - 60 years	76	19.00	100.00
Seniority	1-5 years	2	0.50	0.50
	6-10 years	38	9.50	10.00
	11-20 years	182	45.50	55.50
	21-30 years	148	37.00	92.50
	31 years or more	30	7.50	100.00
Professional and technical title	Junior	1	0.25	0.25
	Intermediate	29	7.25	7.50
	Associate Professor	292	73.00	80.50
	Professor	78	19.50	100.00
Degree	Bachelor	66	16.50	16.50
	Master’s	232	58.00	74.50
	Doctor	102	25.50	100.00
Annual income	Under 80,000 yuan	3	0.8	0.8
	80001-150,000 yuan	188	47.0	47.8
	150,001-200,000 yuan	191	47.8	95.5
	200,001 yuan or more	18	4.5	100.00
	Total	400	100.0	100.0

4.2 Percentage Distribution of Factors

In order to understand the distribution of data samples, we used SPSS26 software to quantify the dependent variable career success (CS), independent variable HCM and mediating variable leadership style (LS) in the questionnaire. We conducted descriptive statistical analysis on 63 questions in 14 dimensions.

Here, the corresponding dimensions and questions are coded accordingly:

The career success (CS) consists of 16 questions in 7 dimensions.

IS means income satisfaction (IS), including salary and benefits.

NP means number of promotions (NP), mainly the professional titles and skills promotions.

PC means perceived career (PC), mainly career goals, teaching and academic expectations, etc.

CO means career outcomes (CO), mainly obtained through teaching, academic achievements, awards and honors, etc.

OC means organizational competitiveness (OC), both inside and outside the organization competitiveness.

The Human Capital Management (HCM) consists of 25 questions in 7 dimensions:

Le means learning (Le), learning new technology and knowledge.

Ed means education (Ed), educational background.

At means attainment (At), support environment, and platform obtained.

Exc means experience (Exc), teaching, and research experience.

Exs means expertise (Exs), professional skills to come into effective play.

In means innovation (In), change innovation.

Cr means creative (Cr), the creation of value.

The leadership style (LS) includes 22 questions in 2 dimensions:

TFLS means transformational leadership (TFLS), a people-oriented leadership style.

TSLS means transactional leadership (TSLS), a performance-based leadership style.

Table 4.2 shows the number and percentage of Strongly Disagree, Disagree, Neutral, Agree, and Strongly Agree, as well as the corresponding statistics of mean values and standard deviations (S.D.). The mean values of all factors range between 3.675 and 3.96, all items being above average.

Table 4.2 Percentage, Mean Values, and Standard Deviations of the Factors

(n=400)

Factors	**Item**	**code**	**Strongly Disagree (n&%)**	**Disagree (n&%)**	**Neutral (n&%)**	**Agree (n&%)**	**Strongly agree (n&%)**	**Mean Value**	**Standard Deviation**
Career Success (CS)	1	CO1	5(1.25)	6(1.5)	111(27.75)	207(51.75)	71(17.75)	3.833	0.775
	2	CO2	5(1.25)	6(1.5)	122(30.5)	182(45.5)	85(21.25)	3.840	0.816
	3	CO3	4(1)	7(1.75)	100(25)	203(50.75)	86(21.5)	3.900	0.785
	4	IS1	3(0.75)	8(2)	116(29)	178(44.5)	95(23.75)	3.885	0.815
	5	IS3	8(2)	3(0.75)	125(31.25)	175(43.75)	89(22.25)	3.835	0.848
	6	IS2	3(0.75)	8(2)	119(29.75)	177(44.25)	93(23.25)	3.873	0.814
	7	NP1	3(0.75)	8(2)	102(25.5)	203(50.75)	84(21)	3.893	0.776
	8	NP3	5(1.25)	6(1.5)	110(27.5)	184(46)	95(23.75)	3.895	0.822
	9	NP2	7(1.75)	4(1)	105(26.25)	177(44.25)	107(26.75)	3.933	0.851
	10	OC1	1(0.25)	7(1.75)	105(26.25)	207(51.75)	80(20)	3.895	0.738
	11	OC2	5(1.25)	3(0.75)	119(29.75)	189(47.25)	84(21)	3.860	0.795
	12	OC3	3(0.75)	5(1.25)	104(26)	208(52)	80(20)	3.893	0.753
	13	PC1	7(1.75)	6(1.5)	114(28.5)	180(45)	93(23.25)	3.865	0.848
	14	PC2	8(2)	5(1.25)	100(25)	179(44.75)	108(27)	3.935	0.865
	15	PC3	11(2.75)	2(0.5)	103(25.75)	188(47)	96(24)	3.890	0.869
	16	PC4	7(1.75)	6(1.5)	105(26.25)	194(48.5)	88(22)	3.875	0.828
Human Capital Management (HCM)	17	At1	4(1)	15(3.75)	94(23.5)	180(45)	107(26.75)	3.928	0.860
	18	At2	4(1)	21(5.25)	81(20.25)	175(43.75)	119(29.75)	3.960	0.895
	19	At3	7(1.75)	12(3)	107(26.75)	169(42.25)	105(26.25)	3.882	0.892
	20	At4	4(1)	25(6.25)	86(21.5)	183(45.75)	102(25.5)	3.885	0.894
	21	At5	4(1)	17(4.25)	89(22.25)	183(45.75)	107(26.75)	3.930	0.864
	22	At6	4(1)	22(5.5)	89(22.25)	177(44.25)	108(27)	3.908	0.892
	23	Cr1	4(1)	15(3.75)	100(25)	184(46)	97(24.25)	3.888	0.849
	24	Cr2	3(0.75)	15(3.75)	86(21.5)	190(47.5)	106(26.5)	3.953	0.835
	25	Cr3	7(1.75)	14(3.5)	106(26.5)	171(42.75)	102(25.5)	3.868	0.896

Factors	Item	code	Strongly Disagree (n&%)	Disagree (n&%)	Neutral (n&%)	Agree (n&%)□	Strongly agree (n&%)	Mean Value	Standard Deviation
Human Capital Management (HCM)	26	Cr4	5(1.25)	20(5)	86(21.5)	177(44.25)	112(28)	3.928	0.897
	27	Ed1	6(1.5)	17(4.25)	99(24.75)	187(46.75)	91(22.75)	3.850	0.871
	28	Ed2	7(1.75)	14(3.5)	115(28.75)	175(43.75)	89(22.25)	3.813	0.880
	29	Ed3	7(1.75)	15(3.75)	93(23.25)	188(47)	97(24.25)	3.882	0.878
	30	Exc1	6(1.5)	22(5.5)	101(25.25)	180(45)	91(22.75)	3.820	0.897
	31	Exc2	4(1)	25(6.25)	108(27)	173(43.25)	90(22.5)	3.800	0.893
	32	Exc3	5(1.25)	19(4.75)	112(28)	186(46.5)	78(19.5)	3.783	0.856
	33	Exs1	5(1.25)	23(5.75)	118(29.5)	181(45.25)	73(18.25)	3.735	0.867
	34	Exs2	7(1.75)	18(4.5)	124(31)	162(40.5)	89(22.25)	3.770	0.905
	35	Exs3	3(0.75)	26(6.5)	119(29.75)	182(45.5)	70(17.5)	3.725	0.852
	36	In1	4(1)	25(6.25)	116(29)	176(44)	79(19.75)	3.752	0.876
	37	In2	5(1.25)	27(6.75)	120(30)	172(43)	76(19)	3.717	0.891
	38	In3	6(1.5)	23(5.75)	136(34)	160(40)	75(18.75)	3.688	0.893
	39	Le1	9(2.25)	23(5.75)	123(30.75)	172(43)	73(18.25)	3.692	0.911
	40	Le2	5(1.25)	26(6.5)	134(33.5)	164(41)	71(17.75)	3.675	0.884
	41	Le3	9(2.25)	25(6.25)	128(32)	156(39)	82(20.5)	3.692	0.941
Leadership Style (LS)	42	TFLS1	7(1.75)	11(2.75)	105(26.25)	190(47.5)	87(21.75)	3.848	0.852
	43	TFLS2	5(1.25)	15(3.75)	108(27)	184(46)	88(22)	3.837	0.853
	44	TFLS3	7(1.75)	7(1.75)	110(27.5)	198(49.5)	78(19.5)	3.833	0.819
	45	TFLS4	9(2.25)	11(2.75)	104(26)	180(45)	96(24)	3.857	0.891
	46	TFLS5	5(1.25)	12(3)	108(27)	181(45.25)	94(23.5)	3.868	0.850
	47	TFLS6	5(1.25)	12(3)	104(26)	185(46.25)	94(23.5)	3.877	0.845
	48	TFLS7	8(2)	9(2.25)	118(29.5)	173(43.25)	92(23)	3.830	0.876
	49	TFLS8	7(1.75)	11(2.75)	103(25.75)	172(43)	107(26.75)	3.902	0.886
	50	TFLS9	3(0.75)	13(3.25)	105(26.25)	183(45.75)	96(24)	3.890	0.830
	51	TFLS 10	4(1)	10(2.5)	114(28.5)	180(45)	92(23)	3.865	0.830
	52	TSLS1	6(1.5)	7(1.75)	114(28.5)	165(41.25)	108(27)	3.905	0.868
	53	TSLS2	3(0.75)	11(2.75)	112(28)	192(48)	82(20.5)	3.848	0.801
	54	TSLS3	6(1.5)	9(2.25)	82(20.5)	207(51.75)	96(24)	3.945	0.818
	55	TSLS4	6(1.5)	8(2)	117(29.25)	179(44.75)	90(22.5)	3.848	0.843
	56	TSLS5	5(1.25)	9(2.25)	105(26.25)	183(45.75)	98(24.5)	3.900	0.838
	57	TSLS6	7(1.75)	8(2)	109(27.25)	188(47)	88(22)	3.855	0.843
	58	TSLS7	6(1.5)	7(1.75)	109(27.25)	186(46.5)	92(23)	3.877	0.833
	59	TSLS8	5(1.25)	9(2.25)	106(26.5)	194(48.5)	86(21.5)	3.868	0.816
	60	TSLS9	5(1.25)	7(1.75)	109(27.25)	179(44.75)	100(25)	3.905	0.835
	61	TSLS 10	5(1.25)	9(2.25)	101(25.25)	183(45.75)	102(25.5)	3.920	0.840
	62	TSLS 11	4(1)	11(2.75)	97(24.25)	194(48.5)	94(23.5)	3.908	0.819
	63	TSLS 12	6(1.5)	8(2)	104(26)	174(43.5)	108(27)	3.925	0.861

4.3 Reliability Analysis

In this study, SPSS 26.0 software and then reliability analysis using Cronbach's Alpha to describe the overall reliability of the questionnaire by using Cronbach's Alpha to evaluate the scale's internal consistency, using Corrected Item Total Correlation (CITC) purification items. If the CITC index is lower than 0.5, and there is no particular reason, the standard item should be deleted. Cronbach's Alpha and Corrected Item Total Correlation (CITC) tests were conducted on the collected data. The conditions for satisfying internal consistency and reliability are that Cronbach's Alpha is above 0.7, and the CITC needs to be above 0.5. This study's total number of questions is 63, and the whole Cronbach's Alpha is 0.963. See each dimension and overall reliability and meet demand. As shown in Table 4.3.

Table 4.3 Reliability Test

Dimension	Cronbach's Alpha	Number of Items
CO	0.862	3
IS	0.872	3
NP	0.839	3
OC	0.8	3
PC	0.889	4
At	0.925	6
Cr	0.894	4
Ed	0.861	3
Exc	0.862	3
Exs	0.857	3
In	0.862	3
Le	0.878	3
TFLS	0.951	10
TSLS	0.957	12
Item Total	**0.963**	**63**

In this study, Cronbach's Alpha and Corrected Item Total Correlation (CITC) were calculated for each variable career success (CS), Human Capital Management (HCM), leadership style (LS), and then the internal consistency reliability of each

scale was analyzed. The analysis results showed that each dimension's reliability values are above 0.7. Corrected Item Total Correlation (CITC) values are higher than 0.5. Therefore, it can be seen that the reliability of each dimension is reasonable. As shown in Table 4.4.

Table 4.4 Dynamic Capabilities Scale Reliability Analysis

Variable	Dimension	Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Cronbach's Alpha
Career Success (CS)	CO	CO1	7.74	2.183	0.719	0.825	0.862
		CO2	7.73	1.996	0.767	0.78	
		CO3	7.67	2.136	0.731	0.813	
	IS	IS1	7.71	2.353	0.749	0.825	0.872
		IS3	7.76	2.224	0.769	0.807	
		IS2	7.72	2.357	0.747	0.827	
	NP	NP1	7.83	2.334	0.68	0.8	0.839
		NP3	7.82	2.16	0.709	0.771	
		NP2	7.79	2.057	0.723	0.758	
	OC	OC1	7.75	1.896	0.637	0.735	0.800
		OC2	7.79	1.742	0.65	0.722	
		OC3	7.76	1.845	0.648	0.723	
	PC	PC1	11.7	5.103	0.756	0.857	0.889
		PC2	11.63	4.991	0.771	0.851	
		PC3	11.68	4.992	0.765	0.853	
		PC4	11.69	5.257	0.73	0.866	
Human Capital Management (HCM)	At	At1	19.56	14.542	0.787	0.912	0.925
		At2	19.53	14.32	0.786	0.912	
		At3	19.61	14.394	0.776	0.913	
		At4	19.61	14.294	0.791	0.911	
		At5	19.56	14.563	0.778	0.913	
		At6	19.59	14.329	0.787	0.911	
	Cr	Cr1	11.75	5.447	0.762	0.866	0.894
		Cr2	11.68	5.531	0.754	0.869	
		Cr3	11.77	5.191	0.783	0.858	
		Cr4	11.71	5.235	0.768	0.864	
	Ed	Ed1	7.7	2.598	0.731	0.811	0.861
		Ed2	7.73	2.537	0.749	0.794	
		Ed3	7.66	2.58	0.731	0.811	
	Exc	Exc1	7.58	2.55	0.744	0.801	0.862
		Exc2	7.6	2.581	0.734	0.809	
		Exc3	7.62	2.687	0.736	0.808	

Variable	Dimension	Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Cronbach's Alpha
	Exs	Exs1	7.5	2.566	0.735	0.796	0.857
		Exs2	7.46	2.46	0.733	0.798	
		Exs3	7.51	2.632	0.724	0.806	
	In	In1	7.4	2.693	0.725	0.818	0.862
		In2	7.44	2.628	0.735	0.809	
		In3	7.47	2.586	0.754	0.791	
	Le	Le1	7.37	2.86	0.755	0.834	0.878
		Le2	7.38	2.924	0.764	0.827	
		Le3	7.37	2.729	0.773	0.819	
Leadership Style (LS)	TFLS	TFLS1	34.76	41.326	0.789	0.946	0.951
		TFLS2	34.77	41.175	0.803	0.946	
		TFLS3	34.78	41.749	0.782	0.947	
		TFLS4	34.75	40.83	0.797	0.946	
		TFLS5	34.74	41.271	0.798	0.946	
		TFLS6	34.73	41.305	0.799	0.946	
		TFLS7	34.78	40.95	0.801	0.946	
		TFLS8	34.71	40.875	0.798	0.946	
		TFLS9	34.72	41.677	0.777	0.947	
		TFLS10	34.74	41.731	0.772	0.947	
	TSLS	TSLS1	42.8	56.964	0.804	0.953	0.957
		TSLS2	42.86	58.079	0.781	0.954	
		TSLS3	42.76	57.853	0.782	0.954	
		TSLS4	42.86	57.458	0.789	0.954	
		TSLS5	42.8	57.552	0.786	0.954	
		TSLS6	42.85	57.493	0.786	0.954	
		TSLS7	42.83	57.719	0.777	0.954	
		TSLS8	42.84	57.893	0.78	0.954	
		TSLS9	42.8	57.595	0.785	0.954	
		TSLS10	42.78	57.344	0.802	0.953	
		TSLS11	42.8	57.838	0.782	0.954	
		TSLS12	42.78	57.071	0.802	0.953	

According to Table 4.4, Cronbach's Alpha and Corrected Item Total Correlation (CITC) values of the above scale are higher than 0.5 for each item and Cronbach's Alpha is higher than 0.7 for each dimension, indicating that each scale has high reliability.

4.4 Extraction and Validation of The Structural Dimensions of Key Variables

The sample data quality can be evaluated through exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). This study conducted EFA on all 400 questionnaire responses using SPSS 26.0, followed by CFA using the structural equation modeling software AMOS 24.0. This analysis focused on validating the constructs of career success (CS), Human Capital Management (HCM), and leadership style (LS). In addition to assessing the reliability, validity, and significance level of the observed and potential variables, we need to build the structural equation model and evaluate the model's fit as a whole.

4.4.1 Career Success (CS)

4.4.1.1 Explorative Factor Analysis (EFA)

Explorative Factor Analysis (EFA) is mainly used to explore the factor composition of variables. It measures the factor number of variables by means of mathematical statistics based on literature reading and data analysis. The measurement of career success (CS), Human Capital Management (HCM), and leadership style (LS) dimensions are mature statements of existing studies; since the various measurement statements come from different scales, the measurement effect of the questionnaire formed by their combination remains to be verified. Therefore, an EFA in the career success (CS), Human Capital Management (HCM), and leadership style (LS) questionnaires is necessary.

In general, the adequacy of the survey sample and data is primarily assessed using the Kaiser-Meyer-Olkin (KMO) value and Bartlett's test of sphericity. According to Kaiser's (1974) criteria, a higher KMO value indicates stronger commonalities among variables(Kaiser, 1974), making the data more suitable for EFA. Specifically, KMO values are categorized as follows: KMO > 0.9 is considered "very suitable," 0.9 ≧ KMO > 0.8 is "suitable," 0.8 ≧ KMO > 0.7 is "adequate," 0.7 ≧ KMO > 0.6 is "marginally suitable," and KMO < 0.5 is "unsuitable."

In this study, the KMO for career success was 0.898, with a value above 0.8, indicating that the data is highly suitable for factor analysis. Additionally, Bartlett's Test of Sphericity produced a P-value less than 0.05, confirming that the data meets

the prerequisites for factor analysis. These results are presented in Table 4.5.

Table 4.5 KMO and Bartlett's Test of Career Success

.

KMO		0.898
Bartlett's Test of Sphericity	**Approx. Chi-Square**	3492.784
	df	120
	P-value	.000

The extraction sums of squared Loading cumulative rate represent the overall explanatory power of the extracted factor for the raw data. The larger the variance interpretation rate, the more information the factor contains about the raw data. Generally, the cumulative variance interpretation rate above 60% is accepted, while reaching 85% to 95% indicates a better effect of the factor analysis.

The variance interpretation rate is the amount of information extracted by the factor, and the factor analysis usually needs to focus on the variance interpretation rate after rotation. The total variance interpretation rate is obtained from the cumulative variance interpretation rate, also known as the cumulative variance interpretation rate, which is generally considered appropriate to be greater than 60%. In this study, principal component analysis was used to extract factors and the maximum variation orthogonal rotation to observe the factor of characteristic value greater than 1. The 16 problems involved in the career success scale showed a clear 5 factors structure, which can explain 76.348% of the total variance, which means that the 5 factors can extract 76.348% of the original index. The greater the variance interpretation rate, the greater the factor contains more information and the stronger the explanatory ability of the original index. The load of each item is above 0.757 and more than 0.5, and there is no cross load (the conclusion shows that no item is deleted), indicating that the 16 problem items are in a reasonable range. There is no serious deviation of standard methods. As shown in Table 4.6.

According to Table 4.6, it can be seen that factor 1 includes 4 items of PC1, PC2, PC3, and PC4, and the project load is above 0.796, and the cumulative variance explained is 18.784%, less than 40%. Factor 1 mainly examines teachers' evaluation

of self-potential, new skill goals, problem-solving ability and self-planning, which is named perceived career.

According to Table 4.6, factor 2 includes 3 items of IS 1, IS 2, and IS 3. With the project load above 0.823, the cumulative variance explained is 33.771%. Factor 2 mainly examines teacher evaluation and is named income satisfaction.

According to Table 4.6, factor 3 includes 3 items of CO1, CO2, and CO3, the project load is above 0.793, and the cumulative variance explained is 48.5%. Factor 3 mainly examines the evaluation of teachers in terms of career status and professional achievements, including teachers' teaching and research achievements, contributions, and teaching and research awards, which is named career outcomes.

According to Table 4.6, factor 4 includes 3 items of NP1, NP2, and NP3, with a project load above 0.757; the cumulative variance explained is 62.469%. Factor 4 mainly examines teachers' evaluation of career promotion, support, and working environment, which is named number of promotions.

According to Table 4.6, it can be seen that factor 5 includes three items of OC1, OC2, and OC3, and the project load is above 0.795; the cumulative variance explained is 76.348%. Factor 5 mainly examines the evaluation of teachers' internal and external competitiveness and independent ability. The possibility for teachers moving to a similar university and the value of the school includes being seen as an asset of the school, a growing resource, and easy access to other career choices at or after leaving, which is called organizational competitiveness.

Table 4.6 Rotated Component Matrix and Total Variance Explained of

Career Success

Index	Items	factor 1	Items	factor 2	Items	factor 3	Items	factor 4	Items	factor 5
	PC1	.805	IS1	.843	CO1	.793	NP1	.813	OC1	.795
	PC2	.803	IS3	.823	CO2	.841	NP3	.802	OC2	.801
	PC3	.802	IS2	.829	CO3	.827	NP2	.757	OC3	.816
	PC4	.796								
characteristic value	3.005		2.406		2.36		2.229		2.216	
variance percentage %	18.784		15.038		14.748		13.93		13.848	
Cumulative Variance Explained %	18.784		33.822		48.57		62.5		76.348	

4.4.1.2 Confirmation Factor Analysis

Convergent validity refers to the consistency of different problems (measurement items) measuring the same concept. The validity indicators generally include standard factor load (standardized factor loading), mean average variance extracted (AVE), composite reliability (CR) for each of the three indicators, standardized factor loading>0.5, AVE>0.5, and CR>0.7. These requirements are met, it can be said that the questionnaire has good structural validity.

In this study, a measurement model was established by AMOS 24.0 software and tested by confirmatory factor analysis. According to the analysis, the average variance extracted (AVE) of number of promotions (NP), career outcomes (CO), organizational competitiveness (OC), income satisfaction (IS), perceived career (PC) were 0.636,0.678,0.572,0.694, and 0.666, respectively, all greater than 0.5. At the same time, the composite reliability (CR) of the above 5 dimensions are 0.840, 0.863, 0.8, 0.872, and 0.889, which are greater than 0.7, indicating that the data of this analysis have good convergence (convergence) validity, as shown in Table 4.7.

Table 4.7 Validity Analysis of Career Success

Dimension	Item	Standard Load Factor	AVE	CR
NP	NP1	0.750	0.636	0.840
	NP2	0.852		
	NP3	0.788		
CO	CO1	0.807	0.678	0.863
	CO2	0.854		
	CO3	0.808		
OC	OC1	0.75	0.572	0.800
	OC2	0.767		
	OC3	0.751		
IS	IS1	0.817	0.694	0.872
	IS2	0.823		
	IS3	0.86		
PC	PC1	0.818	0.666	0.889
	PC2	0.837		
	PC3	0.827		
	PC4	0.782		

4.4.1.3 Assessment of The Model Overall

The variable of career success has 16 problem items and 5 dimensions, and its structure factor has been obtained by exploratory factor analysis. In addition to the exploratory analysis, a confirmatory factor analysis (CFA) is needed to evaluate the fit of the proposed hypothesis model. CFA can encourage researchers to consider the research's theoretical conception and variable structure carefully and seriously, making the research more rigorous and theoretically significant.

The overall model fit evaluates the fit of the whole model to the observed data and is the external quality of the model. That is to say, whether a theoretical model can be accepted must be judged in the confirmatory cause analysis by analyzing the degree of model fit. The degree of fit of the model as a whole is accepted following a confirmatory factor analysis of 400 samples using AMOS 24.0.

A confirmatory factor analysis of the 5 dimensional structures of career success was obtained from the analysis results presented in Table 4.8, after analyzing the variables to fit the indicators. We can see the Model CMIN is 122.845, the CMIN/DF value of the initial model in this study is 1.241, the closer the

subjective index CMIN/DF is to 0, the better the observed data fit the model, CMIN/DF<3, suggesting an excellent overall fit, the model is good: CMIN/DF <5, suggesting that the overall model is also accepted. The value of the remaining adaptation indicators GFI (Goodness of Fit Index) is 0.963, the value of adjusted goodness of fit index (AGFI) is 0.949, the value of normed fit index (NFI) is 0.965, the value of non normed fit index (NNFI) is 0.992, the value of the comparative fit index (CFI) is 0.993, the range of GFI, AGFI, NFI, NNFI, and CFI varied between 0 and 1, the closer to 1, the better the fit is, more significant than 0.90, the model is considered to fit well. The Root Mean Square Error of Approximation (RMSEA) value is 0.025. The change range of RMSEA is also between 0 and 1, and the closer to 0, the better. Following the standard criteria, RMSEA <0.08, the observed data fit well with the model. Therefore, the fitting coefficient of the path relationship model is good.

Table 4.8 Indicator Fitting Indices of Career Success Confirmatory Factor Analysis

Goodness of Fit Index	**CMIN**	**DF**	**CMIN /DF**	**GFI**	**AGFI**	**NFI**	**NNFI**	**CFI**	**RRMSEA**
Test Result	22.845	99	0.241	0.963	0.949	0.965	0.992	0.993	0.025
Level of Acceptance			**<5**	**≧0.95**	**≧0.90**	**≧0.95**	**≧0.95**	**≧0.90**	**<0.08**
Interpretation	**Acceptance**								

Model setting is the first step in the application of structural equation modeling, as the main purpose is to explicitly state the mode of initiation before the estimation. That is, the assumptions of the model and the relationship between variables according to previous theories. Before conducting the confirmatory factor analysis, it is necessary to consider the theoretical rationality of the model. A model without theoretical significance is useless, even if it has the best fit. According to the results shown in Table 4.8, the five-dimensional structure model of career success is an excellent fit for the data. They are income satisfaction (IS) 3 items, number of

promotions (NP) 3 items, perceived career (PC) 4 items, career outcomes (CO) 3 items, organizational competitiveness (OC) 3 items, specific confirmatory factor analysis of the model is shown in Figure 4.1. All the fitting indicators have reached an excellent fitting level. This shows that the observational data well support the conceived model and the exploratory study results are verified.

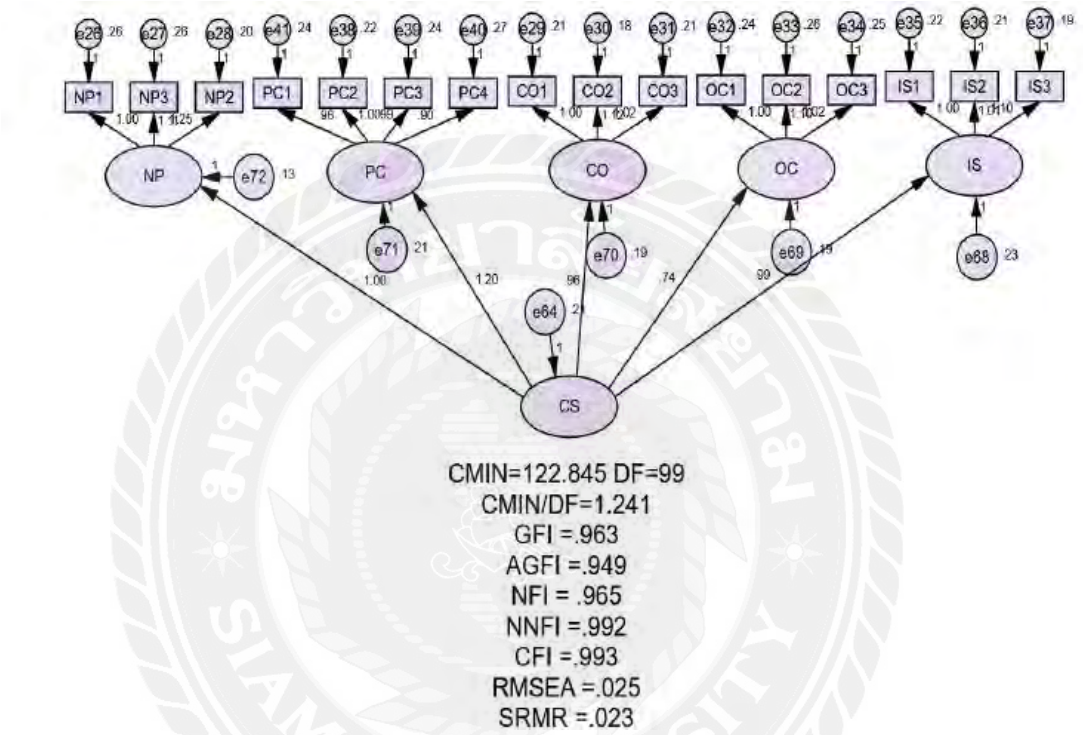


Figure 4.1 Confirmatory Factor Analysis Model of Career Success

Based on the career success Regression Weights. The path coefficients between career success and the dimensions are 1.0, 0.96, 1.737, 0.989, 1.204, and the standard error of regression weight estimation (S.E.) is between 0.051 and 0.117. The standard error (S.E.) is higher than zero. All path coefficients are between career success and dimensions, and all regression weights are positive, indicating a positive effect between career success and 5 dimensions, as shown in Table 4.9.

Table 4.9 Confirmatory Factor Analysis Results of Career Success

path			Estimate	S.E.	C.R.	P-value
NP	<---	CS	1.000			
CO	<---	CS	.961	.103	9.373	***
OC	<---	CS	.737	.092	8.044	***
IS	<---	CS	.989	.106	9.341	***
PC	<---	CS	1.204	.117	10.301	***
NP1	<---	NP	1.000			
NP3	<---	NP	1.114	.074	15.123	***
NP2	<---	NP	1.246	.080	15.568	***
CO1	<---	CO	1.000			
CO2	<---	CO	1.115	.063	17.660	***
CO3	<---	CO	1.015	.061	16.752	***
OC1	<---	OC	1.000			
OC2	<---	OC	1.102	.085	12.939	***
OC3	<---	OC	1.022	.079	12.950	***
IS1	<---	IS	1.000			
IS2	<---	IS	1.007	.056	17.856	***
IS3	<---	IS	1.096	.059	18.538	***
PC2	<---	PC	1.000			
PC3	<---	PC	.994	.053	18.914	***
PC4	<---	PC	.896	.051	17.697	***
PC1	<---	PC	.959	.051	18.948	***

Note: * * * indicates the level of significance 0.001

4.4.2 Human Capital Management

4.4.2.1 Explorative Factor Analysis (EFA)

Exploratory Factor Analysis (EFA) of Human Capital Management (HCM) was conducted, and the results showed that the KMO for HCM was 0.932, well above 0.7. Additionally, Bartlett's Test of Sphericity produced a P-value of 0.000, less than 0.05, confirming that the data meets the prerequisites for factor analysis. These results indicate that the data is suitable for further factor analysis. The detailed values are presented in Table 4.10.

Table 4.10 KMO and Bartlett's Test of HCM

KMO		0.932
Bartlett's Test of Sphericity	**Approx. Chi-Square**	6470.096
	df	300
	P-value	.000

Among the 25 questions involved in the HCM scale in this study, characteristic value showed a clear 7 factors structure, which can explain 77.244% of the total variance, which means that the 7 factors can be extracted 77.244% of the original index, the greater the variance interpretation rate, indicating that the more information the factor contains, the stronger the interpretation ability of the original index. The load of each item is above 0.765 and more than 0.5, and there is no cross load (the conclusion shows that no item is deleted), indicating that the 25 problem items are in a reasonable range. There is no serious deviation from standard methods. As shown in Table 4.11.

According to Table 4.11, factor 1 includes 6 items of At1, At2, At3, At4, At5 and At6. The project load is above 0.785, and cumulative variance is explained at 18.315%, less than 40%. Factor 1 mainly examines the sense of career gain, the ability of resource integration, the sense of achievement, and the balance between family and work, which is named attainment.

According to Table 4.11, factor 2 includes 4 items of Cr1, Cr2, Cr3, Cr3, and Cr4. The project load is above 0.803, and the cumulative variance explained at 31.317%. Factor 2 mainly examines the creativity ability of teachers. It demonstrates that teachers can think creatively about problems and discover new solutions using cutting-edge knowledge, which is named creative.

According to Table 4.11, factor 3 includes 3 items of Ed 1, Ed 2, and Ed 3, with the project load above 0.795, and the cumulative variance explained at 40.913%. Factor 3 mainly examines the educational background of teachers and the ability to continue further study, which is named education.

According to Table 4.11, factor 4 includes 3 items of Exc 1, Exc 2, and Exc 3. The project load is above 0.766, and the cumulative variance explained at 50.135%.

Factor 4 mainly examines teachers' work experience and work process, which is named experience.

According to Table 4.11, factor 5 includes 3 items of Exs 1, Exs 2, and Exs 3, with the project load above 0.772, and the cumulative variance explained at 59.314%. Factor 5 mainly examines the skill level of teachers, which is named expertise.

According to Table 4.11, factor 6 includes 3 items of In1, In2, and In3, with a project load above 0.778,and the cumulative variance explained at 68.455%. Factor 5 mainly examines the ability of teachers to reform and innovate, and the ability to engage in challenging work, which is named innovation.

According to Table 4.11, factor 7 includes 3 items of Le1, Le2, and Le3, with the project load above 0.765, and the cumulative variance explained at 77.244%. Factor 5, which is named learning, mainly examines the learning ability and willingness of teachers, which is named learning.

Table 4.11 Rotated Component Matrix and Total Variance Explained of HCM

Index	Items	Factor 1	Items	Factor 2	Items	Factor 3	Items	Factor 4	Items	Factor 5	Items	Factor 6	Items	Factor 7
	At1	.821	Cr1	.803	Ed1	.813	Exc 1	.797	Exs 1	.772	In1	.800	Le1	.765
	At2	.814	Cr2	.808	Ed2	.831	Exc 2	.804	Exs 2	.785	In2	.778	Le2	.765
	At3	.796	Cr3	.841	Ed3	.795	Exc 3	.766	Exs 3	.804	In3	.779	Le3	.768
	At4	.810	Cr4	.821										
	At5	.785												
	At6	.814												
characteristic value		4.579		3.25		2.399		2.306		2.295		2.285		2.197
variance percentage %		18.315		13.001		9.596		9.223		9.179		9.141		8.789
Cumulative Variance Explained %		18.315		31.317		40.913		50.135		59.314		68.455		77.244

4.4.2.2 Confirmation Factor Analysis

In this paper, a measurement model was developed by AMOS 24.0 software

and tested using confirmatory factor analysis. Based on the results of the analysis, Human Capital Management (HCM) all 25 questions with standardized factor loading> 0.5, the average variance extracted (AVE) of learning (Le), education (Ed), attainment (At), experience (Exc), expertise (Exs), expertise (Exs), innovation (In), creative (Cr) were 0.706, 0.675, 0.675, 0.676, 0.668, 0.676, and 0.680. Respectively, all cases are greater than 0.5. Meanwhile, the composite reliability (CR) of the above seven dimensions were 0.878, 0.862, 0.926, 0.862, 0.858, 0.862, and 0.895, all greater than 0.7, indicating good convergent validity of the data from this analysis, as shown in Table 4.12.

Table 4.12 Validity Analysis of HCM

Dimension	Item	Standard Load Factor	AVE	CR
Le	Le1	0.828	0.706	0.878
	Le2	0.84		
	Le3	0.853		
Ed	Ed1	0.811	0.675	0.862
	Ed2	0.832		
	Ed3	0.821		
At	At1	0.823	0.675	0.926
	At2	0.821		
	At3	0.813		
	At4	0.83		
	At5	0.817		
	At6	0.824		
Exc	Exc1	0.828	0.676	0.862
	Exc2	0.809		
	Exc3	0.829		
Exs	Exs1	0.828	0.668	0.858
	Exs2	0.822		
	Exs3	0.801		
In	In1	0.798	0.676	0.862
	In2	0.821		
	In3	0.846		
Cr	Cr1	0.824	0.680	0.895
	Cr2	0.811		
	Cr3	0.84		
	Cr4	0.824		

4.4.2.3 Assessment of the Overall Fit of The Model

The evaluation and analysis of the overall fit of the 7 dimensions of HCM

yielded the analysis results in Table 4.13. After analyzing the variables, it can be seen that the Model CMIN is 294.011, the CMIN/DF value of the initial model in this study is 1.097, and the CMIN/DF <3 indicated a good overall fit and a better model. The GFI value is 0.947, the AGFI value is 0.935, the NFI value is 0.956, the NNFI value is 0.995, and the CFI value is 0.996. The values of GFI, AGFI, NFI, NNFI, and CFI are very close to 1, the fit was perfect. The RMSEA value is 0.016, RMSEA <0.08, and the observed data fit well to the model. Therefore, the fitting coefficient of the path relationship model is good.

Table 4.13 Indicator Fitting Indices of HCM Confirmatory Factor Analysis

Goodness of Fit Index	CMIN	DF	CMIN/DF	GFI	AGFI	NFI	NNFI	CFI	RRMSEA
Test Result	294.011	268	1.097	0.947	0.935	0.956	0.995	0.996	0.016
Level of Acceptance			<5	≧0.95	≧0.9	≧0.95	≧0.95	≧0.9	<0.08
Interpretation	Acceptance								

According to the results shown in Table 4.13, the seven-dimensional structure model of HCM has an excellent fit to the data, learning (Le) 3 questions, education (Ed) 3, attainment (At) 6, experience (Exc) 3, expertise (Exs) 3, innovation (In) 3, creative (Cr) 4 items, specific confirmatory factor analysis model is shown in Figure 4.2. All the fitting indicators have reached an excellent fitting level. This shows that the observational data support the conceived model and the exploratory study results are verified.

Based on the HCM Regression Weights. The path coefficients between HCM and the dimensions were 1.000, 0.750, 0.733, 0.800, 0.784, 0.860 and 0.751, and the standard error of regression weight estimation (S.E.) was between 0.047 and 0.075, and the standard error (S.E.) was above zero. All path coefficients are between HCM and dimensions, and all regression weights are positive, indicating a positive effect between HCM and 7 dimensions, as shown in Table 4.14.

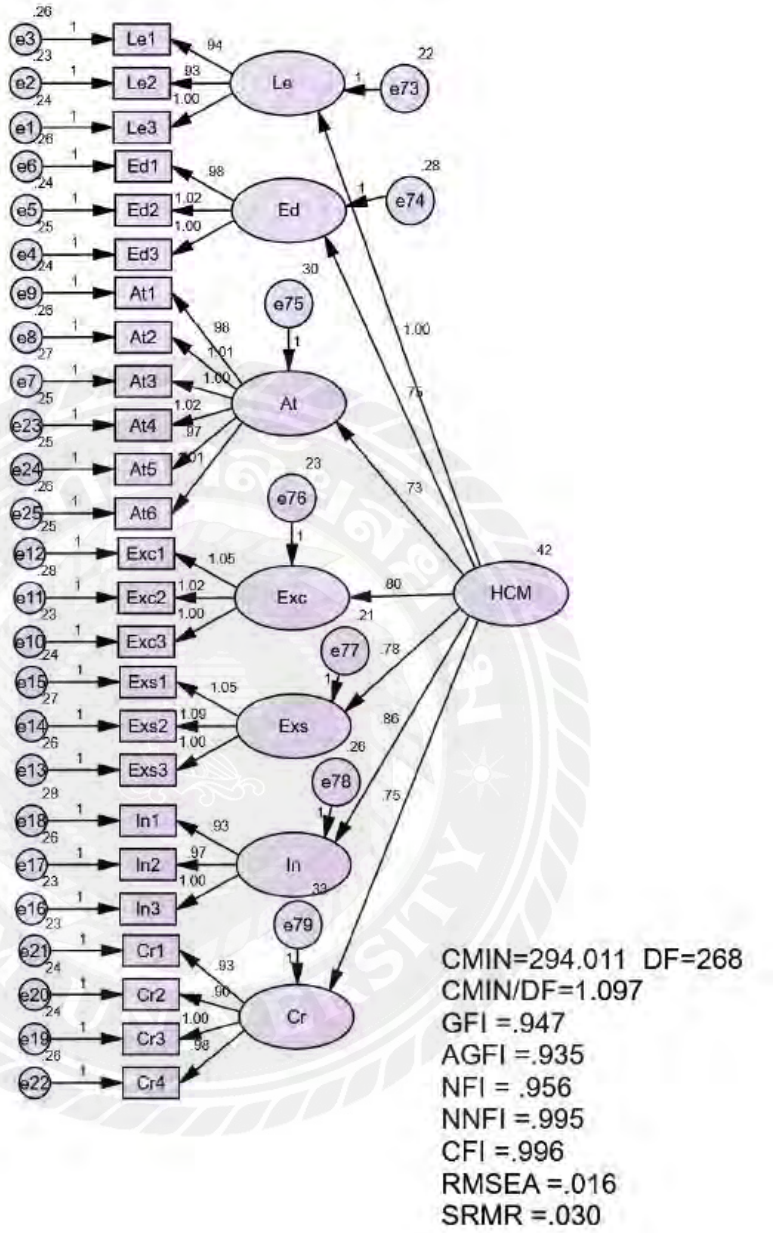


Figure 4.2 Confirmatory Factor Analysis Model of HCM

Table 4.14 Confirmatory Factor Analysis Results of HCM

path			Estimate	S.E.	C.R.	P-value
Le	<---	HCM	1.000			
Ed	<---	HCM	.750	.072	10.430	***
At	<---	HCM	.733	.070	10.514	***
Exc	<---	HCM	.800	.072	11.147	***
Exs	<---	HCM	.784	.069	11.337	***
In	<---	HCM	.860	.075	11.416	***
Cr	<---	HCM	.751	.071	10.554	***
Le3	<---	Le	1.000			
Le2	<---	Le	.925	.047	19.697	***
Le1	<---	Le	.940	.049	19.297	***
Ed3	<---	Ed	1.000			
Ed2	<---	Ed	1.016	.058	17.516	***
Ed1	<---	Ed	.980	.058	17.010	***
At3	<---	At	1.000			
At2	<---	At	1.013	.053	19.017	***
At1	<---	At	.975	.051	18.989	***
Exc3	<---	Exc	1.000			
Exc2	<---	Exc	1.018	.059	17.357	***
Exc1	<---	Exc	1.048	.059	17.691	***
Exs3	<---	Exs	1.000			
Exs2	<---	Exs	1.090	.064	17.046	***
Exs1	<---	Exs	1.053	.062	17.117	***
In3	<---	In	1.000			
In2	<---	In	.969	.054	18.015	***
In1	<---	In	.925	.053	17.613	***
Cr3	<---	Cr	1.000			
Cr2	<---	Cr	.900	.048	18.731	***
Cr1	<---	Cr	.930	.049	19.121	***
Cr4	<---	Cr	.982	.051	19.352	***
At4	<---	At	1.022	.053	19.312	***
At5	<---	At	.973	.052	18.736	***
At6	<---	At	1.013	.053	19.123	***

Note: * * * indicates the level of significance 0.001

4.4.3 Leadership Style

4.4.3.1 Explorative Factor Analysis (EFA)

The EFA of leadership style (LS) revealed KMO value of 0.980, which is well

above the 0.7 threshold, indicating excellent sample adequacy. Additionally, Bartlett's Test of Sphericity produced a P-value of 0.000, significantly less than 0.05, confirming that the data meets the prerequisites for factor analysis. These results suggest that the data is highly suitable for factor analysis studies. The detailed results are presented in Table 4.15.

Table 4.15 KMO and Bartlett's Test of Leadership Style

KMO		0.980
Bartlett's Test of Sphericity	**Approx. Chi-Square**	7241.878
	df	231
	P-value	.000

Among the 22 questions involved in the leadership style (LS) scale in this study, when observing the factor of characteristic value greater than 1, the region showed a clear 2-factor structure, which can explain 68.860% of the total variance, which means that the 7 factors can extract 68.860% of the information of the original index, indicating that the explanatory ability of the original index is relatively strong. The load of each item in the factor dimension is above 0.738 and more than 0.5, and there is no cross load (the conclusion shows that no item is deleted), indicating that the 25 problem items are in a reasonable range. There is no serious deviation from standard methods. As shown in Table 4.16.

As can be seen from Table 4.16, factor 1 contains the 12 items of the TSLS 1-TSLS12, the project load is above 0.738, and the cumulative variance explained at 36.338%, less than 40%. Factor 1 mainly considers the effect of transactional leadership on career success, with emphasis on process monitoring and correcting teachers' standard behavior, reward and punishment are clear, giving teachers material and spiritual rewards, named as transactional leadership.

According to Table 4.16, it can be seen that factor 2 includes 10 items of TFLS 1-TFLS10, the project load is above 0.751, and the cumulative variance explained at 68.860%, more than 60%. Factor 2 mainly considers the influence of transformational leaders on career success, pays attention to the personalized care

of teachers, and stimulates the sense of mission and potential of teachers through organizational culture and vision, which is named transformational leadership.

Table 4.16 Rotated Component Matrix and Total Variance Explained of Leadership Style

Index	Items	factor 1	Items	factor 2
	TSLS1	.774	TFLS1	.751
	TSLS2	.781	TFLS2	.783
	TSLS3	.738	TFLS3	.783
	TSLS4	.762	TFLS4	.783
	TSLS5	.773	TFLS5	.771
	TSLS6	.738	TFLS6	.766
	TSLS7	.737	TFLS7	.791
	TSLS8	.776	TFLS8	.783
	TSLS9	.759	TFLS9	.773
	TSLS10	.781	TFLS10	.776
	TSLS11	.777		
	TSLS12	.800		
characteristic value	7.994		7.155	
variance percentage %	36.338		32.522	
Cumulative Variance Explained %	36.338		68.860	

4.4.3.2 Confirmation Factor Analysis

This study established a measurement model using AMOS 24.0 software and tested using confirmatory factor analysis. According to the analysis results, the standardized factor loading of all 22 questions in leadership style (LS) was> 0.5, and the transactional leadership (TSLS), transformational leadership (TFLS) of the average variance extracted (AVE) was 0.662 and 0.649, respectively, all greater than 0.5. Meanwhile, the composite reliability (CR) of the two dimensions is 0.952 and 0.953, both greater than 0.7, indicating that the data of this analysis have good convergence (convergence) validity, such as Table 4.17.

Table 4.17 Validity Analysis of Leadership Style

Dimension	Item	Standard Load Factor	AVE	CR
TFLS	TFLS1	0.814	0.662	0.952
	TFLS2	0.826		
	TFLS3	0.802		
	TFLS4	0.82		
	TFLS5	0.821		
	TFLS6	0.824		
	TFLS7	0.822		
	TFLS8	0.82		
	TFLS9	0.797		
	TFLS10	0.792		
TSLS	TSLS1	0.824	0.649	0.953
	TSLS2	0.798		
	TSLS3	0.803		
	TSLS4	0.807		
	TSLS5	0.805		
	TSLS6	0.808		
	TSLS7	0.797		
	TSLS8	0.797		
	TSLS9	0.805		
	TSLS10	0.821		
	TSLS11	0.799		
	TSLS12	0.819		

4.4.3.3 Assessment of the overall fit of the models

Through the evaluation and analysis of the overall fit of the 2 dimensional models of leadership style (LS), the analysis results in Table 4.18 were obtained. After analyzing the variable fit indicators, it can be seen that the Model CMIN is 294.011, CMIN/DF value of the initial model in this study is 1.067, CMIN/DF <3, indicating that the overall fit was good, and the model was good. The value of the remaining adaptation indicators GFI value is 0.952, the AGFI value is 0.94, the NFI value is 0.97, the NNFI value is 0.998, the CFI value is 0.998, the value of GFI, AGFI, NFI, NNFI, and CFI are very close to 1, the fit perfect. The RMSEA value is 0.013, RMSEA <0.08, and the observed data fit well to the model. Therefore, the fitting coefficient of the path relationship model is good.

Table 4.18 Indicator Fitting Indices of Leadership Style Confirmatory Factor Analysis

Goodness of Fit Index	CMIN	DF	CMIN/ DF	GFI	AGFI	NFI	NNFI	CFI	RRMSEA
Test Result	221.833	208	1.067	0.952	0.941	0.97	0.998	0.998	0.013
Level of Acceptance			**<5**	**≧0.95**	**≧0.9**	**≧0.95**	**≧0.95**	**≧0.9**	**<0.08**
Interpretation	**Acceptance**								

According to the results shown in Table 4.18, the 2 dimensional structure model of leadership style (LS) has an excellent fit to the data. There are 12 items for transactional leadership, there are 10 items transformational leadership. A specific confirmatory factor analysis model is shown in Figure 4.3. All the fitting indicators have reached an excellent fitting level. This shows that the observational data well support the conceived model and the results of the exploratory study are verified.

Based on leadership style regression weights, the path coefficients between leadership style dimensions are between 0.894 and 1.053, the standard error of regression weight estimation (S.E.) is between 0.048 and 0.054, and the standard error (S.E.) is higher than zero. All path coefficients are between leadership style and dimensions, and all regression weights are positive, indicating a positive effect between leadership style and 2 dimensions, as shown in Table 4.19.

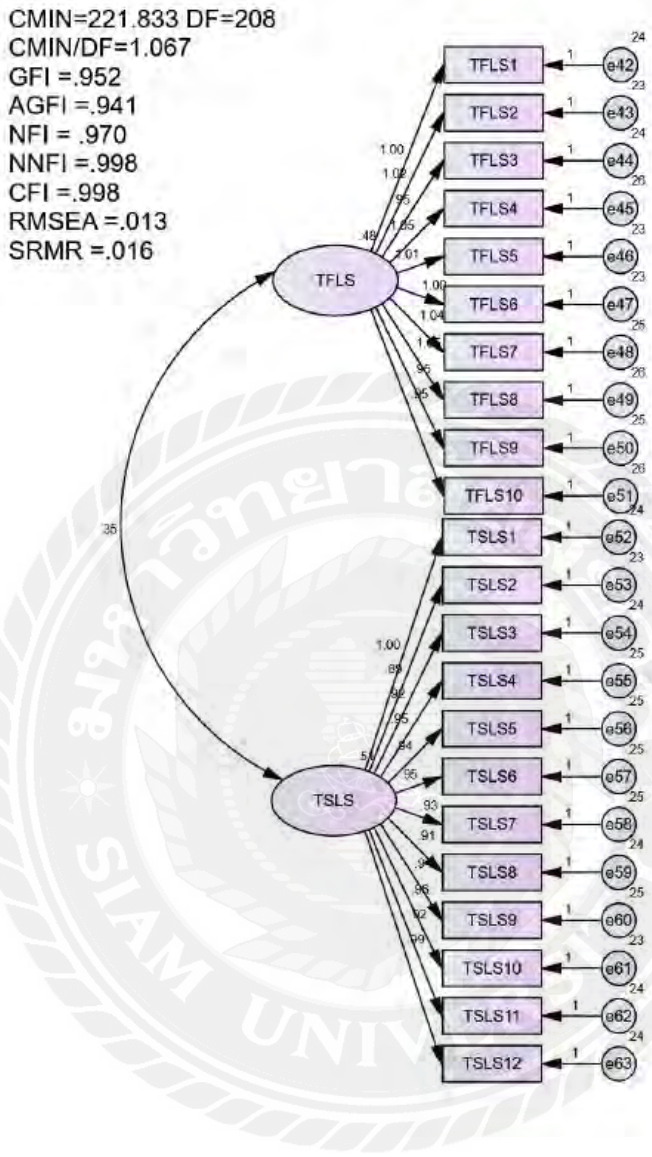


Figure 4.3 Confirmatory Factor Analysis Model of Leadership Style

Table 4.19 Confirmatory Factor Analysis Results of Leadership Style

path			Estimate	S.E.	C.R.	P-value
TFLS1	<---	TFLS	1.000			
TFLS2	<---	TFLS	1.015	.052	19.644	***
TFLS3	<---	TFLS	.947	.050	18.839	***
TFLS4	<---	TFLS	1.053	.054	19.341	***
TFLS5	<---	TFLS	1.006	.052	19.482	***
TFLS6	<---	TFLS	1.004	.051	19.567	***
TFLS7	<---	TFLS	1.039	.053	19.499	***
TFLS8	<---	TFLS	1.047	.054	19.420	***
TFLS9	<---	TFLS	.954	.051	18.674	***
TFLS10	<---	TFLS	.947	.051	18.494	***
TSLS1	<---	TSLS	1.000			
TSLS2	<---	TSLS	.894	.047	19.036	***
TSLS3	<---	TSLS	.919	.048	19.298	***
TSLS4	<---	TSLS	.953	.049	19.385	***
TSLS5	<---	TSLS	.943	.049	19.273	***
TSLS6	<---	TSLS	.953	.049	19.455	***
TSLS7	<---	TSLS	.929	.049	19.068	***
TSLS8	<---	TSLS	.910	.048	19.038	***
TSLS9	<---	TSLS	.940	.049	19.343	***
TSLS10	<---	TSLS	.965	.048	19.897	***
TSLS11	<---	TSLS	.915	.048	19.081	***
TSLS12	<---	TSLS	.987	.050	19.831	***

Note: * * * indicates the level of significance 0.001

4.5 Correlation Analysis

This study, the correlation analysis of the dimensions of each variable and the correlation coefficient describe the correlation and direction between the two variables. The correlation coefficient does not accurately represent the degree of correlation between the two variables. Values are taken between-1 and 1, as shown in Table 4.20.

Table 4.20 Result of The Correlation Degree

value	observed result	indicate
-1< r < 0	Non	Negatively correlated
r=0	Non	Not related
0 < r < 1	0.191-0.684	Positively correlated

In this study, AMOS 24.0 software was used to analyze the correlation of the 14 dimensions of the three variables. The specific results are shown in Table 4.21; we can see that the correlation coefficient "r" for the 14 dimensions ranged from 0.191 to 0.684, indicating a positive relationship between the variables ($p < 0.01$). These significant results provide preliminary support for the hypothesis testing conducted in this study.

Table 4.21 Results of Pearson's Correlation Analysis For Each Dimension

Items	1	2	3	4	5	6	7	8	9	10	11	12	13	14
CO	1													
IS	0.388**	1												
NP	0.475**	0.444**	1											
OC	0.398**	0.426**	0.369**	1										
PC	0.487**	0.458**	0.549**	0.336**	1									
At	0.304**	0.320**	0.281**	0.337**	0.231**	1								
Cr	0.284**	0.362**	0.287**	**0.191****	0.401**	0.278**	1							
Ed	0.332**	0.330**	0.301**	0.227**	0.313**	0.415**	0.312**	1						
Exc	0.275**	0.272**	0.198**	0.253**	0.268**	0.462**	0.459**	0.389**	1					
Exs	0.278**	0.297**	0.338**	0.279**	0.397**	0.402**	0.454**	0.473**	0.467**	1				
In	0.256**	0.320**	0.271**	0.223**	0.338**	0.490**	0.436**	0.456**	0.462**	0.434**	1			
Le	0.317**	0.349**	0.328**	0.259**	0.384**	0.486**	0.501**	0.480**	0.496**	0.531**	0.491**	1		
TFLS	0.365**	0.286**	0.322**	0.242**	0.323**	0.321**	0.248**	0.334**	0.233**	0.285**	0.261**	0.282**	1	
TSLS	0.358**	0.283**	0.302**	0.245**	0.279**	0.351**	**0.191****	0.355**	0.230**	0.294**	0.266**	0.260**	**0.684****	1

*P-value<0.05 ** P-value<0.01

4.6 Structural Equation Modeling Fitting, Hypothesis Testing and Analysis

4.6.1 Structural Equation Modeling Introduction

Structural equation modeling can integrate factor analysis and path analysis statistical technology to test the hypothesis model based on theory. Structural equation modeling using validation factor analysis (CFA) rather than traditional exploratory factor analysis (EFA) is more meaningful. It can also explore the relationship between multiple variables, prediction, and causal model between variables path analysis. Structural equation modeling has no strict putative constraints, allows measurement error for independent and dependent variables, and can analyze structural relationships between underlying variables, especially the structural equation modeling model, which can accept correlations between independent variables.

4.6.2 Basic Composition of The Structural Equation Modeling

The structural equation model has two basic models: (1) Measurement model, composed of latent variable and observed variable, indicates by which observed variables a latent variable is measured. A simple measurement model test is a confirmatory factor analysis; (2) Structural model, also known as the causal model, is an illustration of the causal relationship model between the latent variables, used to describe the correlation degree between the latent variables. It is a set of models that describe the quantitative relationship between exogenous and endogenous variables.

4.6.3 Structural Equation Model Fitting

The structural equation modeling process can be divided into the following steps.

(1) Model specification. Before the model estimation, the initial theoretical model of the hypothesis is set according to the theoretical and previous research results. That is, the structural equation modeling form is used to show the research hypothesis obtained according to the theory and previous research results.

(2) Model identification. This is the key step to distinguish whether the model is solvable; it is the model to estimate parameters that can effectively estimate, to

determine whether the model can be the only solution for parameter estimation using the structure equation model. Always hope to model as comprehensively as possible describe the relationship between objectives, but a more complex model structure may lead to estimate parameters too much, even incorrect estimation. Model identification is the model to estimate parameters can effectively estimate, model to estimate parameters determined by model structure variance, covariance.

(3) Model assessment estimation. After obtaining the parameter estimate, it is necessary to evaluate the fit between the model and the data, and compare it with the fitting index of the alternative model. In the evaluation of the model estimation path coefficient, load coefficient significance test, and the degree of model fit, in a variety of indicators used to assess the model fit degree, no one can accurately determine the success of modeling alone; there is no "ideal" fitting index, should consider multiple different indicators, not only rely on the towel one of the indicators. In this study, the fitting index was considered mainly: CMIN, DF, CMIN/DF, P-value, GFI, AGFI, NFI, NNFI, CFI, RMSEA, etc.

(4) Model modification. If the model can not fit the data well, it is necessary to modify the model and set it again. The parameters and estimate can improve the fitting degree of the model. According to the software output provided in the model correction index and the path of the initial model to determine the model, and the analysis results and model fitting evaluation results, the model necessary correction, to make the model to the best.

Through the mediating effect of leadership style, this study analyzes the impact of HCM on career success. Model-fitting analysis was performed using AMOS 24.0. Moreover, by explaining the relationship between the variables through structural equation modeling, we concluded that Table 4.22. It can be seen that the CMIN / DF value was 2.012, the AGFI value was 0.927, the NNFI value was 0.954, the CFI value was 0.963, the RMSEA value was 0.05. These fit coefficients have fully reached the standard. Thus, the fitting coefficients of the path relation model are excellent. However, the value of GFI is 0.948, and the value of NFI is 0.929. Although more significant than 0.9, it has not reached the best-fit effect above 0.95. The P-value is 0.000, which does not reach the standard of P-value > 0.05, which

requires adjustment and revision.

Table 4.22 Results of Initial Model Fitness Judgment

Goodness of Fit Index	CMIN	P-value	**DF**	**CMIN /DF**	**GFI**	**AGFI**	**NFI**	**NNFI**	**CFI**	**RRMSEA**
Test Result	148.874	0.000	74	2.012	0.948	0.927	0.929	0.954	0.963	0.05
Level of Acceptance		>0.05		< 5	≧0.95	≧0.90	≧0.95	≧0.95	≧0.90	<0.08
Interpretation		Not Passing		Passed	Not Passing	Passed	Not Passing	Passed the criteria		

Table 4.23 Path Coefficient Analysis of Initial Model

Path			**Non-Standardized Estimate**	**S.E.**	**C.R.**	**P**	**Standardized Estimate**
LS	<---	HCM	.483	.061	7.970	***	.497
CS	<---	HCM	.400	.053	7.536	***	.524
CS	<---	LS	.227	.051	4.451	***	.290
Le	<---	HCM	1.000				.754
In	<---	HCM	.866	.067	12.899	***	.680
Exs	<---	HCM	.870	.065	13.333	***	.695
Exc	<---	HCM	.840	.066	12.657	***	.664
Ed	<---	HCM	.805	.066	12.170	***	.640
Cr	<---	HCM	.757	.064	11.821	***	.616
At	<---	HCM	.779	.064	12.120	***	.637
CO	<---	CS	1.000				.671
IS	<---	CS	1.012	.095	10.627	***	.646
NP	<---	CS	1.063	.092	11.570	***	.703
OC	<---	CS	.753	.080	9.458	***	.549
PC	<---	CS	1.133	.096	11.785	***	.723
TFLS	<---	LS	1.000				.843
TSLS	<---	LS	.932	.083	11.227	***	.812

Note: * * * indicates the level of significance 0.001

According to the structural equation modeling output of AMOS 24.0 (shown in Table 4.23 and Figure 4.4) path analysis model, HCM influence on career success is 0.497(S.E.=0.053, C.R.=7.536). Therefore, HCM has a significant positive influence on the teachers' career success.

The influence of HCM on leadership style is 0.524 (S.E.=0.061, C.R.=7.970).

Therefore, HCM has a significant positive influence on leadership style.

The influence of leadership style on career success is 0 .290 (S.E.=0.051, C.R.=4.451). Therefore, leadership style has a significant positive influence on teachers' career success.

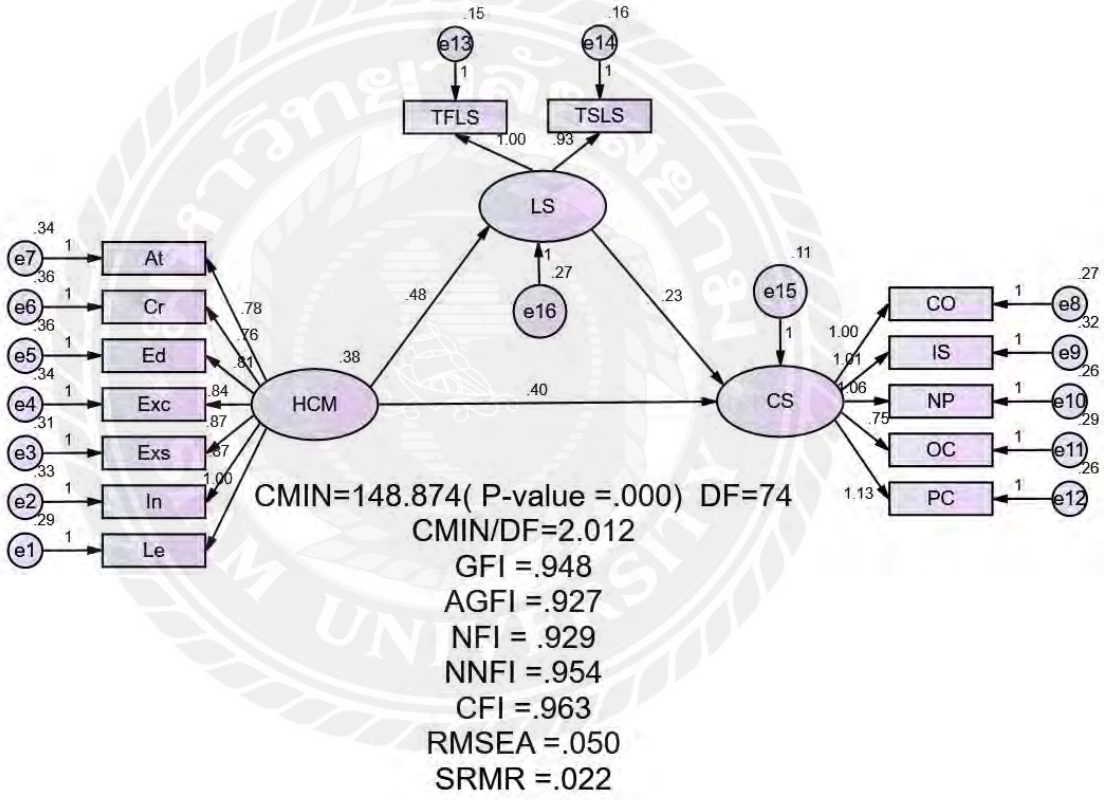


Figure 4.4 The Initial Model of the Relationship Path Analysis

Modified Structural Equation Model Reasons

In the structural equation model analysis, modification is the critical step to ensure the model's scientific nature and theoretical explanatory power. Although all indicators meet the requirements, the revised fitting of the structural equation

modeling can enhance the theoretical rationality, interpretation and applicability of the model, and ensure the accuracy and reliability of the research results. The following are several reasons for the model modified in this study: 1) Ensure the theoretical rationality of the model. Although the indicators meet the criteria, whether the structure and path of the model reflect the theoretical expectations still needs to be verified. Modified model can help identify and correct possible inconsistencies between the theoretical model and the actual data. 2) Find potential model problems. Sometimes, although the initial fitting index of the model reaches the target, the actual data may have complex relationships or missing important variables. The revision process can reveal the causality or potential interference factors not captured in the model, thus improving the model's applicability and validity. 3) Adapt to different samples or situations. The modified fit can adapt the model to the characteristics of the new data, ensuring its universality and adaptability. 4) Provide a more reliable conclusion. The revised model provides more accurate pathway coefficients and effect estimates, helping to form more reliable research conclusions, which can support applications in decision-making and practice.

As mentioned earlier, some inconsistencies were still found when testing the structural equation model. According to the statistical values in Table 4.22, the researcher checked again between the theoretical model and the empirical model, and the researcher considered adjusting the parameters in the new hypothetical model and tested the results. The model is adjusted to provide better statistics so that the model can be accepted for modifying the variables. Better statistical values are given by trimming the components of some observed variables that are latent, using criteria that eliminate some of the observed variables according to statistical principles. Consider removing variables with smaller weights from the model and connecting two-headed arrows between the error values of the dependent variable. (Modified index: MI) to view the error value of the dependent variable. (Modified index: MI) to make the model consistent with the empirical statistics.

From the effect of the model fitting, taken together, significant improvement in the revised model goodness-of-fit index, P-value values at 0.080(> 0.05), DF value is 68, with the CMIN/DF values is 1.23, down from the previous 2.012, the value of

RMSEA decreased from 0.05 to 0.025, the GFI value was 0.972, the AGFI value was 0.956, the NFI value is 0.959, the NNFI value was 0.989, the CFI value was 0.992, comparing the values of GFI, AGFI, NFI, NNFI, and CFI all rise, as shown in Table 4.24 and Figure 4.5. After modifying, all the numerical indicators met the acceptance level, so the results passed the criteria. Therefore, all the revised models are within the acceptable range, indicating that the conceptual model fits the data relatively well, and the fitting degree of the modified model is greatly improved compared with the initial model.

In addition, from the perspective of the coefficient size and significance, the magnitude and significance of the path coefficient have not changed much, and all the relevant research hypotheses are still strongly supported by the model. Based on the above analysis, all the fitting indexes of the modified model meet the requirements, as does the fitting index of the initial model. Therefore, the modified model was identified as the final structural model in this study, as shown in Figure 4.5.

Table 4.24 Results of Modified Model Fitness Judgment

Goodness of Fit Index	CMIN	P-value	DF	CMIN /DF	GFI	AGFI	NFI	NNFI	CFI	RRMSEA
Modified Result	84.977	0.080	68	1.25	0.972	0.956	0.959	0.989	0.992	0.025
Initial Result	148.874	0.000	74	2.012	0.948	0.927	0.929	0.954	0.963	0.05
Change		↑		↓	↑	↑	↑	↑	↑	↓
Level of Acceptance		>0.05		< 5	≧0.95	≧0.90	≧0.95	≧0.95	≧0.90	<0.08
Interpretation	All passed the criteria									

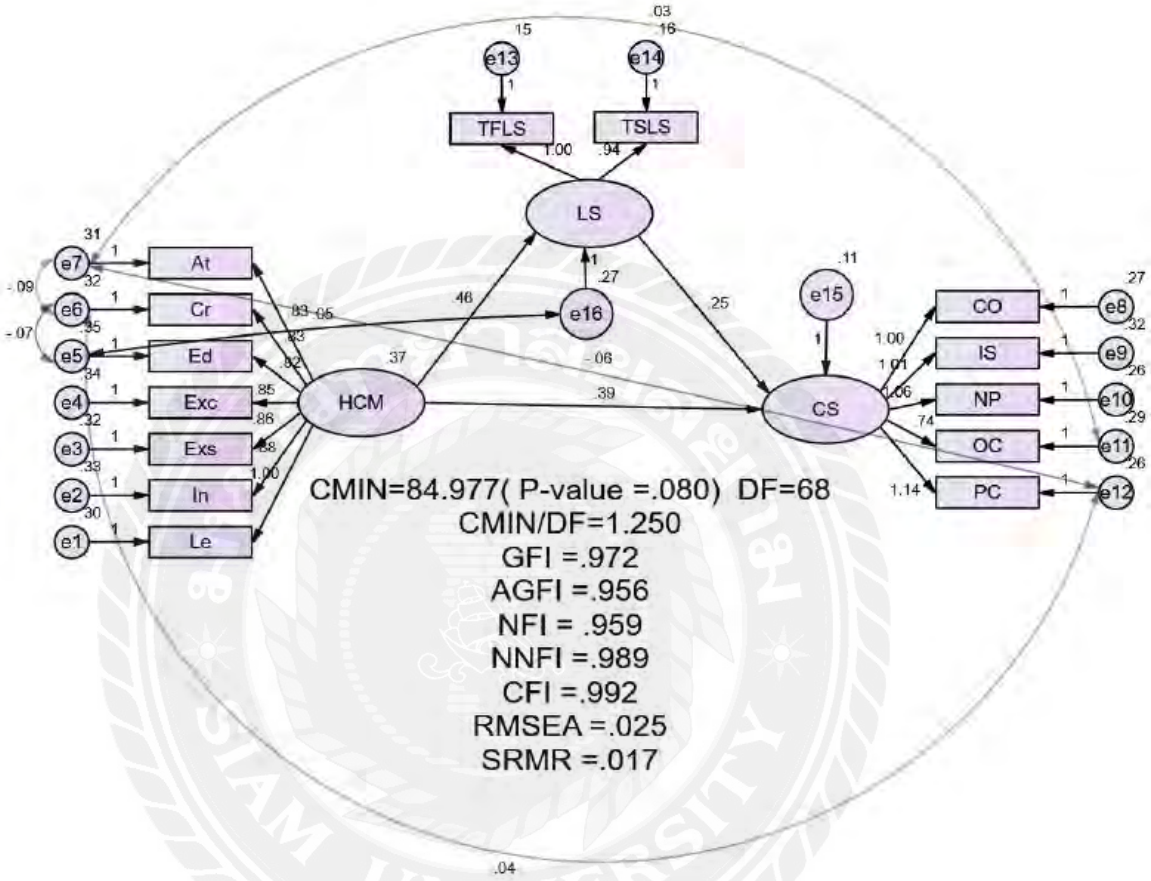


Figure 4.5 The Modified Structural Equation Model Result

According to the structural equation modeling output from Figure 4.5 and Table 4.25, we obtained the following results.

1) In the modified path analysis model, the path value of "CS <- - -HCM" is 0. 510, the regression weight is estimated to be 0.052 (SE), the regression weight is estimated to be 7.568(C.R.), Non-Standardized Estimate is 0.394, the regression weight of HCM has a strong predictive effect on Teachers' career success ($p<0.001$) (double tail). Career success has many dimensions, such as income level, job promotion, competitiveness, perceived career (PC), etc. Although all these factors can influence career success, the impact is limited. For example, high but lower than average income may also have a strong lousy sense for career success. Moreover,

compared with academic achievement and professional titles, the sense of career success brought about by salary income is not so strong. This study demonstrated that the perceived career (PC) is the most powerful dimension in measuring career success. The high loading of Perceived career is 1.14; it is a kind of subjective career success. When teachers take the initiative, constantly tap their potential, and reach the expected standards, compared with the growth of their career, it is relatively easy to feel career success, so they have a strong interpretation of career success, which has a high loading. HCM through training, incentives, performance management, and other ways to stimulate teachers to take the initiative and help them succeed in their careers. HCM has a direct influence on career success. The higher the level of HCM, the greater positive the influence on teachers' career success.

2) HCM impact on leadership style, "LS<---HCM" is 0.476. The regression weight is estimated to be 0.061 (SE), the regression weight is estimated to be 7.631(C.R.), Non-Standardized Estimate is 0.465, the regression weight of HCM has a strong predictive effect on leadership style ($p<0.001$) (double tail). The results show that among the seven dimensions of HCM, the high loading indicates that "Learning" is the most critical dimension to measure the latent variable of "HCM" (1). Learning (Le) is the most powerful dimension in HCM that affects career success. A high level of HCM includes teachers' efficient learning ability, such as the mastery of new knowledge, new technology, new methods, adaptation to the working environment, etc. By providing teachers with learning and development opportunities and incentives, HCM helps teachers improve their learning ability and Leadership, strengthen their recognition of the organization, and promote career success. So, it is reasonable that teachers' learning ability has the highest loading in HCM. Therefore, HCM has a significant positive influence on the leadership style.

3) Leadership style impact career success "CS<---LS" is 0.312, the regression weight is estimated to be 0.051 (SE), the regression weight is estimated to be 4.835(C.R.), the non-standardized estimate is 0.246. The regression weight of leadership style has a strong predictive effect on career success ($p<0.001$) (double tail); the loading indicates that "transformational leadership" is 0.94, and "transformational leadership" (1) has a higher load on the latent variable (leadership

style), strong interpretation of leadership style, is more powerful dimensions in leadership style to affect career success. Transactional leadership values tasks, processes, and efficiency; Transformational leaders value humanistic care, care for the long-term development of the teachers, and value the realization of the organizational vision. Transformational leaders help teachers tap their potential and self-realization, and promote their career success. It is reasonable that transformational leadership should have a higher loading in the leadership style variables. Therefore, leadership style has a significant positive influence on the teachers' career success.

Table 4.25 The Modified Path Coefficient Analysis of Variables

Path			Non-Standardized Estimate	S.E.	C.R.	Standardized Estimate
Leadership Style	<---	HCM	.465	.061	7.631	.476
Career Success	<---	HCM	.394	.052	7.568	.510
Career Success	<---	Leadership Style	.246	.051	4.835	.312
Learning	<---	HCM	1.000			.746
Innovation	<---	HCM	.875	.067	13.110	.680
Expertise	<---	HCM	.862	.065	13.261	.681
Experience	<---	HCM	.847	.066	12.799	.662
Education	<---	HCM	.818	.068	12.111	.644
Creative	<---	HCM	.826	.067	12.378	.666
Attainment	<---	HCM	.827	.066	12.609	.670
Career outcomes	<---	Career Success	1.000			.671
Income satisfaction	<---	Career Success	1.009	.095	10.633	.645
Number of promotions	<---	Career Success	1.062	.092	11.598	.703
Organizational competitiveness	<---	Career Success	.745	.079	9.396	.544
Perceived career	<---	Career Success	1.140	.096	11.864	.726
Transformational leadership	<---	Leadership Style	1.000			.837
Transactional leadership	<---	Leadership Style	.944	.082	11.574	.817

Note: P-value indicates the level of significance 0.001

4.7 Assumed Test Results

This study presents a model of the theoretical assumptions in Chapter 2.

Considering the above guidance coefficients and structural models, the following conclusions about the research hypothesis can be drawn. Table 4.26 shows the hypotheses' testing results.

1) This study confirmed the relationship between HCM and teachers' career success. Figure 4.5 shows that HCM and Teachers' career success are closely related; namely, HCM has a significant positive effect on teachers' career success (accepted hypothesis).

2) This study also validated the mediating factor of leadership style between HCM and teachers' career success. Figure 4.5 shows that leadership style plays a mediating role (accepted hypothesis).

3) About the relationship between leadership style and teachers' career success. It also was validated by the present study. Figure 4.5 shows that leadership style has significant positive effects on leadership style and teachers' career success, and both the two dimensions of transformational and transactional leadership will indirectly affect teachers' career success (accepted hypothesis).

Table 4.26 Hypotheses Testing Results

No.	Hypotheses	Results	Relationship
H1	Human Capital Management has a significant direct affect on teachers' career success.	Accepted	Positive direct influence
H2	Human Capital Management has a significant indirect affect on leadership style.	Accepted	Positive indirect influence
H3	Leadership style has a significant indirect affect on teachers' career success.	Accepted	Positive indirect influence

4.8 Conclusion

This chapter explored the mechanisms and pathways through which HCM influences career success, incorporating Self-Determination Theory and human resource management theory. The mediating role of transformational and

transactional leadership was also examined. Using data from 400 questionnaires and analyzed through SPSS 26.0 and AMOS 24.0, the study employed various analytical methods such as descriptive statistics, EFA, CFA, and correlation analysis to validate the dimensions and interrelationships of career success, HCM, and leadership style. And tested the proposed hypothesis is accepted.

In conclusion, this study could produce a research outcome to answer the objectives as follows.

Objective 1: To study the status and development of HCM, leadership styles, and teachers' career success in Science and Technology Universities in China.

Research findings showed that "Learning (Le)" is the most critical dimension in measuring the latent variable of "HCM" (loading 1). " Learning can effectively compensate for another latent variable such as education (Ed), attainment (At), or expertise (Exs). Therefore, learning is the most critical dimension in measuring the potential variables of HCM.

Transformational leadership (TFLS) had the highest load in leadership style (LS) (loading 1), indicating that it explains leadership style (LS) better than transactional leadership (TSLS).

Perceived career (PC) was the most significant dimension for career success. perceived career (PC) explains career success better than other factors like income satisfaction (IS), number of promotions (NP), career outcomes (CO), organizational competitiveness (OC).

Objective 2: To analyze the influence of leadership style as a mediating variable to teachers' career success in Science and Technology Universities.

Research findings were that leadership style plays a mediating role between HCM and career success. HCM has a significant favorable influence on leadership style, and leadership style also has a significant positive impact on teachers' career success. From the results of the quantitative data analysis, the path coefficient of "LS <- - -HCM" is 0.476 (SE=0.061, C.R.=7.631) "CS <- - -LS" path coefficient up to O.312 (SE=0.051, C.R.=4.835), the results show that HCM can have a direct and significant influence on employee career success (0.51), HCM has a significant

indirect impact on leadership (0.476), leadership style has a significant indirect effect on career success (0.312), the impact of HCM on career success is 0.51> 0.476> 0.312, HCM has the strongest impact effect. This fully shows that the higher the level of HCM, the indirect effect of transformational leadership (loading 1) can stimulate the potential of teachers, cultivate their learning ability (loading 1), and help teachers achieve perceived career (loading 1.14) and achieve career success.

This study finds that HCM has a direct positive influence on career success and affects career success through the mediating role of leadership style. Its action paths are as follows: first, HCM positively affects the leadership style; second, the leadership style positively affects career success; and finally, HCM can positively affect career success through the mediating role of leadership style.

Objective 3: To discuss empirical impact of HCM on teachers' career success and provide constructive recommendations.

Research findings were that the path value of "CS<- - -HCM" is 0.51 (SE=0.052, C.R.=7.568). HCM can significantly influence teachers' career success. That is to say, teachers can significantly improve their career success opportunities through effective management and investment of their human capital.

The study shows that the teachers at Science and Technology Universities in China possess high educational qualifications, advanced professional skills, strong adaptability, and high incomes. This study can help Science and Technology Universities improve their HCM level and teachers' career success to promote organizational performance.

Many factors influence the improvement of human capital levels in Science and Technology Universities, and the most vital factor is learning ability. From the organizational management perspective, we should establish a learning organization, create an excellent atmosphere for learning, provide continuing education opportunities and cost support for teachers, and expand their skills and experience. From the individual's perspective, it is necessary to enhance the awareness of learning and constantly actively learn new knowledge and skills. Organizations can create an environment for teachers to encourage innovation and self-learning. Through these

measures, HCM can effectively improve teachers' learning ability to improve the University's overall efficiency and adaptability.

Transformational leadership has a strong influence on career success, so organizations should encourage teachers to pursue higher career goals by drawing a clear vision, showing their enthusiasm for work, paying attention to the personal development of teachers, and affirming their value and ability to the growth and development of teachers, and help teachers to improve their ability through guidance and feedback continuously, encourage subordinates to surpass their interests and realize their organizational goals. Teachers should also identify with their profession, dare to shoulder greater responsibilities and challenges, strengthen their belief in career success, maintain good relationships with leaders and teams, and gain support and confidence.

Overall Conclusion, this causal model provides valuable insights into the influence of human capital on teachers' career success at Science and Technology Universities in China. In HCM, organizations can use the above models to adjust their management strategies and support teachers' career success through the optimal combination of different factors.

Teachers are the organization's most critical asset, as organizational sustainability mostly depends on their workplace contribution. To encourage teachers and organizations to collaborate on promising career prospects, personal career growth should be aligned closely with the development path of the organization. Consequently, the study confirms the impact of HCM on teachers' career success through the mediating effect of the choice of leadership styles.

Chapter 5
Research Conclusion, Discussion, and Recommendation

This study aims to analyze the causal model of HCM on teachers' career success at Science and Technology Universities in China with leadership style as a mediator. The findings explain the relationships between HCM, career success, and leadership style. Based on the results from the literature review in Chapter 2 and the data analysis in Chapter 4, the hypothesis was accepted, supporting the rationale of the conceptual framework. To gain deeper insights into this study's theoretical contributions and potential practical implications, this chapter will further discuss the conclusions derived from the data analysis. Additionally, it will offer recommendations, propose questions for future studies to guide subsequent research efforts. This chapter is structured into the following four parts:

5.1 Research Conclusion

5.2 Discussion

5.3 Recommendations

5.4 Future Research

5.1 Research Conclusion

5.1.1 Interpretation of the Research Question

This study collected 400 survey samples from teachers at Science and Technology Universities in China. Using SPSS 26.0 and AMOS 24.0, a structural equation model was constructed, and the results demonstrated that all fitting indicators met the requirements, confirming the study's assumptions. The following are the interpretations and conclusions regarding the research questions.

Research Question 1: How the current status of Human Capital Management, leadership styles and teachers' career success at the science and technology Universities in China should be academically studied and explained?

1) It is found that influence factors of HCM include learning ability (Le), education (Ed), achievement (At), experience (Exc), expertise (Exs), innovation (In), and creativity (Cr). Studies show that learning ability (Le) is the most critical dimension (loading factor of 1). Learning ability is a kind of ability to acquire knowledge actively. Individuals with high initiative can actively adapt to and change the environment, be good at identifying and seizing opportunities, brave difficulties, and actively take action(Deiser, 2009). Under the influence of transformational leadership, these teachers are more likely to obtain professional title promotions, realize career expectations, and thus improve their career satisfaction and success.

2) The study found that the career success standard of university teachers was several promotions (NP), perceived career (PC), income satisfaction (IS), career outcomes (CO), and organizational competitiveness (OC) 5 factors. As is known from the structural equation modeling model, "perceived career (PC)" in career success has the highest load; it explains career success better than other dimensions (loading 1.14). This shows that teachers at Science and Technology Universities generally have a clear plan for their career development, a clear career development route, and take professional title promotion, salary income, papers and teaching achievements, and other career-related honors as the standard of measuring career success.

3)This paper selected the two influence factors of transformational and transactional leadership. They both positively influence career success; the result shows that transformational leadership (TFLS) has a higher load in leadership style (LS) (loading 1) than transactional leadership. This shows that transformational leadership is more conducive to teachers' career success. This leadership style encourages teachers to go beyond themselves and gain a stronger sense of professional achievement by describing the excellent vision of the University and encouraging them to take the initiative in research and teaching while providing the resources and support to develop their skills. This conclusion is consistent with the Self-Determination Theory in promoting psychological demand satisfaction.

Research Question 2: What are the effects of Human Capital Management, through leadership style, on teachers' career success?

1) This study introduces the situational factors (leadership style) at the

organizational level, as mediating variables, to explore the interaction between transformation and transactional leadership in HCM and career success, and the relationship between this interaction and career success. The research examines the relationship between these leadership styles and career success, hypothesizing that effective HCM has a significant positive influence on leadership style, positively influencing teachers' career success.

2) The results from the quantitative data analysis confirm the mediating role of leadership style between HCM and teacher career success, with transformational leadership showing a more substantial influence (loading factor= 1). Transformational leaders focus on interpersonal relationships, meeting the relational needs of teachers. By fostering a supportive working environment and encouraging teamwork, these leaders help teachers develop a sense of belonging, enhancing their self-determination and promoting career success.

3) This result is consistent with the existing theory and literature research results: the higher the level of HCM, the better the leadership level of matching managers(Baron & Armstrong, 2007). In practice, the organization gives more training and performance guidance to leaders, continuously improves leadership, and is more inclined to transformational or transactional leadership to influence the professional behavior of teachers and promote career success.

Research Question 3: What are the best approaches for managing human capital that fully support in Science and Technology Universities teachers' career success?

1) Structural equation modeling results demonstrate that HCM directly impacts teachers' career success at Science and Technology Universities in China. That is to say, the chances of teachers' career success can be significantly improved through effective management and investment of teachers' human capital. The career success of teachers is not only the goal of the individual but also the common goal of the university, teaching team, and research team. HCM helps improve teachers' abilities and realize their self-value.

2) According to the findings, teachers' career success largely depends on

increasing their human capital, such as learning knowledge, improving skills, accumulating experience, innovating working methods, etc. Managers must provide teachers with more training and development opportunities through effective paths. They must also give teachers more autonomy, meet their basic psychological needs, strengthen their career perception through reward and recognition, clarify their career goals, and provide personalized career planning.

3) Transformational leadership is a critical intermediary between HCM and teacher career success. College and university management should prioritize the cultivation and application of transformational leadership styles and comprehensively optimize the HCM system through systematic training, supporting organizational culture, effective communication and feedback mechanisms, and reasonable incentive and reward systems. These measures will effectively enhance teachers' professional ability, job satisfaction, and sense of career success.

In general, by strengthening the effective management of teachers' human capital and investment, matching the appropriate leadership style, giving teachers professional training, performance incentives, career planning, innovation cooperation, and various aspects of support, Science and Technology Universities can significantly improve the professional success rate of teachers, at the same time for the whole higher education system brings higher teaching and scientific research output.

5.1.2 Research Results

This study proposes a casual model that affects career success, which can help such universities improve HCM and teachers' career success, thus promoting organizational performance. This study introduces two leadership styles, transformational and transactional leadership, as mediating variables to analyze how HCM affects career success. Now, we can see this research results as follows.

1) According to the demographic data, 63% of the sample were men, 37% were women, and the number of men was more than women, which meets the essential statistical criteria. In terms of educational level, the sample was divided into three groups. Considering the characteristics of university teachers, most teachers need to have a master's degree or above to teach in universities, of which 58% have a

master's degree, and 25.5% have a doctorate, which aligns with the current situation. Regarding professional title level, 73% were associate professor titles, and 19.5% were professor titles, which was in line with the sample requirements of data collection. Descriptive statistics were performed on the sample data, and the mean and standard deviations were met. The means for all factors ranged from 3.675 to 3.96, and were above the average value for all items.

2) The Cronbach's Alpha and Corrected Item Total Correlation (CITS) tests were performed on the data collected in this study. The total number of questions included in this study was 63. The whole Cronbach's Alpha value is 0.963, which is above 0.7. The conditions for internal consistency and reliability are met.

3) Exploratory Factor Analysis shows the KMO of career success, HCM, and leadership style are 0.898, 0.932, and 0.980. The KMO values range from 0 to 1, if greater than 0.8, and those closer to 1 indicate a high correlation between variables and apparent factor structure in the data, suitable for exploratory factor analysis. High KMO values improve the validity and stability of the factor analysis and ensure that the extracted factors have a strong explanatory power and representativeness. This study used principal component analysis to extract factors and the maximum variant orthogonal rotation to observe the factor with a characteristic value greater than 1. The 63 questions showed a clear 14-factor structure, and the cumulative total explained variance was above 60%. The load of each item is above 0.738 and more than 0.5, and there is no cross load (the conclusion shows that no item is deleted), indicating that the 63 problem items are in a reasonable range. There is no serious deviation from standard methods.

4) The results show that the value of the correlation coefficient between the 14 dimensions is distributed from 0.191 to 0.684. This indicates a positive relationship between the variables ($p < 0.01$); the correlation coefficient does not exceed 0.9, indicating no problem with the covariance and meets the requirements. To prove that all the hypotheses of this study are accepted.

5) In this study, the impact of HCM on career success was studied with leadership style as a mediator, and explaining the relationship between various variables and dimensions through structural equation model, CMIN/DF value was

2.012, GFI, AGFI, NFI, NNFI, and CFI were all greater than 0.9, and RMSEA value is 0.05 <0.08, establishing that the data met the structural equation modeling standard and it is fitness.

5.2 Discussion

The second and fourth chapters theoretically analyze the literature and find that HCM affects teachers' career success and managers' leadership styles. At the same time, leadership style significantly regulates the influence of HCM on teacher career success.

Quantitative research methods were used in this study. The random sampling method selected full-time teachers from the Science and Technology Universities for questionnaires, using the Internet for the survey data collection method; a total of 400 valid samples were collected. The main objective of this study was to explore the influence of HCM on career success at Science and Technology Universities. It mainly includes two aspects: the influence of HCM on leadership style and the influence of HCM on the teachers' career success. The instruments included a 5-point Likert scale questionnaire measuring the factor of test HCM, leadership style, and career success.

Therefore, we discuss the variables one by one based on the results and explain the relationship between the variables.

The study formulated and tested the following hypotheses are accepted:

Hypothesis 1: Human capital management has a significant direct affect on teachers' career success.

Hypothesis 2: Human capital management has a significant indirect affect on leadership style.

Hypothesis 3: Leadership style has a significant indirect affect on teachers' career success.

The analysis was conducted using CFA via AMOS 24.0 to determine model fit indices, yielding strong goodness-of-fit results: CMIN/DF at 2.012, GFI at 0.948,

AGFI at 0.927, NFI at 0.929, NNFI at 0.954, CFI at 0.963, and RMSEA at 0.05. These results confirmed the reliability and validity of the measures; three hypotheses were verified and accepted.

5.2.1 Discussion on the Relationship Between HCM and Career Success

The results of testing hypothesis 1 demonstrated that HCM practice significantly positively influences teachers' career success. It can be seen from the results that HCM provides support and incentives for teachers through systematic and comprehensive management measures, from recruitment, training, performance evaluation, salary, and welfare to career development. This improves teachers' professional ability and job satisfaction and creates favorable conditions for their career success. When HCM plays after learning, education, and innovation value, it promotes teachers' career success. It lies in the three basic psychological demands (autonomy, competence, and relatedness) that are met after pursuing self-determination, and inspires more positive psychological experience and good behavior.

The findings corroborate with Self-Determination Theory, which states that the real potential of individuals to the maximum degree and the best functional state depends on their ability to meet internal basic psychological needs. That is the ability to meet the needs of autonomy, competence, and relatedness (Deci & Ryan, 2012). Fulfilling the teachers' psychological needs is closely linked to high levels of intrinsic motivation, leading to improved job performance and work outcomes. In this study, the process mechanism of HCM promotes teachers' basic psychological needs. When the basic psychological needs of individuals are met, there will be a stronger internal autonomous motivation to do a good job and achieve work achievements (Deci et al., 2017; Van den Broeck et al., 2016).

According to the Self-Determination Theory, when basic psychological needs are met(Deci & Ryan, 1985). Universities meet teachers' autonomy, sense of competence, and relationship by strengthening training, providing opportunities for continuing education, providing care and guidance, and providing a platform to demonstrate their professional talents. These measures can enhance the intrinsic

motivation of teacher development and promote more positive behavior and mental health, thus helping teachers achieve career success. Just as Combs (2006) and Hatch and Dyer (2004) research finds that HCM effectively motivates teachers, improves the value of human capital, and promotes career success by improving teachers' knowledge, skills, and ability(Combs et al., 2006; Hatch & Dyer, 2004).

This is consistent with the finding that HCM influences career success. Education level, work investment, work experience, and work time are significantly and positively associated with career success. Similarly, Tharenou (1995) and Dreher (1990)showed that individual investment in education and experience was the strongest predictor of career development(Dreher & Ash, 1990; Tharenou, 1995).

In organizational management, work motivation is the driving force that compels individuals to engage in work-related behaviors, shaping their efforts' nature, focus, intensity, and persistence (Pinder, 2014). High work motivation is often accompanied by high work achievement, because individuals with high work motivation will actively search for the current knowledge of the organization, and actively absorb and learn from it. Highly motivated employees often have a better understanding and expectation of the work, prompting them to work in a more willing and spontaneous psychological initiation mode to achieve career success(Gagné & Deci, 2005). Human resource management selection and training involves investing in employees to improve their comprehensive ability. This continuous investment can effectively improve employees' independent behavior and development potential (Boxall et al., 2007), which is consistent with the conclusion studied in this paper that learning ability is a significant factor in HCM. This research is similar to Boxall and Purcell's (2022) opinion that the encouragement of self-directed learning is essential to fostering a proactive and resilient workforce(Boxall & Purcell, 2022). It can be seen that strengthening the management of human capital can stimulate the energy value of individuals and contribute to career success; it promotes the motivation of individuals to feel capable and maintain autonomous control over the behavioral process(Gagné & Deci, 2005; Rich et al., 2010).

Similarly, Smith (2022) and Zhou Wenxia (2015) showed that HCM has a positive influence on employee career success (Smith, 2022; Zhou, 2015). The

development of personal potential, the satisfaction of growth needs, and the realization of self-worth are all prerequisites for career success. Individual career success results from the interaction between individual efforts and organizational support. When the individual is successful, it can further promote the growth and development of the organization(Guan et al., 2019; Potnuru & Sahoo, 2016). Exploring the relationship between HCM and career success can provide an empirical research basis for helping organizations and employees achieve a win-win situation. This result is consistent with the theory that investment in employee education, training, and development can improve their skills and productivity, thus promoting career success.

In conclusion, this study confirmed the significant positive influence of HCM on teacher career success through empirical analysis and was highly consistent with previous findings. The results of this study verify the key role of HCM in promoting teacher career success and enhance the applicability and credibility of HCM theory in education management. This finding provides an empirical basis for college administrators and policymakers, emphasizing the need to improve teacher career development by optimizing HCM practices.

5.2.2 Discussion on the Relationship Between HCM and Leadership Style

The results of this study show that HCM has a significant positive influence on leadership style, verifying the correctness of Hypothesis 2. The study found that echoing the core ideas of Self-Determination Theory, HCM, by providing training, performance feedback, and incentive mechanisms, can positively influence leaders to adopt more supportive and motivating leadership styles, focus on meeting the internal needs of subordinates, and support their growth and autonomy. Additionally, Wright, McMahan, and McWilliams (1994) highlighted that strategic HCM practices help managers acquire and develop competencies that are essential for shaping effective leadership styles and management behavior(Wright et al., 1994). Similar to the study, Gloet (2012) research results show that HCM can influence the managers' knowledge, skills, and abilities and can shape the management behavior and style of leaders(Gloet, 2012).

This research can explain the mechanisms by which HCM influences leadership style. First, by improving employee skills and abilities, leaders can trust the abilities of team members and thus become more inclined to adopt a transformational leadership style. Second, leaders' performance appraisal and development plans through HCM can more effectively stimulate the motivation of team members, thus enabling them to implement transformational leadership styles and drive organizational change and innovation. This study is also consistent with the findings of Luthans and Avolio (2003), showing that active HCM enhances leaders' confidence and makes it easier to manage employees through innovative leadership methods(Luthans & Avolio, 2003). High-level human capital can serve as a competitive advantage to help leaders adopt more efficient leadership strategies in the management process.

Leadership style is a critical organizational factor influencing the effectiveness of HCM. Systems, performance management, and training initiatives within HCM can shape the leadership approach of team managers. In turn, different leadership styles influence the utilization and development of human capital. Thus, HCM has a positive and indirect effect on leadership style. Moreover, some scholars are aware of cross-cultural differences, that is, under the influence of different national cultures, corporate cultures, and work tasks, transactional leaders and change leaders have their advantages; leadership style is one of the external environments of employees, and different leadership styles may have different effects on the basic psychological needs of employees, which may affect the success of individual careers.

Research shows that leaders in Science and Technology Universities can adopt more supportive and transformational leadership styles through effective HCM. This finding provides an empirical basis for leader management practices in higher education, demonstrating that by investing in the human capital of teachers and leaders, school management can promote more efficient leadership behavior and thus drive organizational development.

5.2.3 Discussion on the Relationship Between Leadership Style and Career Success

The results of this study show that leadership style has a significant indirect influence on teacher career success, verifying the correctness of Hypothesis 3. From these criteria for career success, it is found that teachers generally believe that the most crucial criterion for career success is perceived career (PC). This conclusion is consistent with Goal Setting Theory's view, emphasizing the individual's self-set goals and the intrinsic drive to achieve goals in career development. Teachers can obtain higher career satisfaction and a sense of achievement by setting and achieving personal career goals. Super career development theory emphasizes individual self-realization and career satisfaction in their career.

The results of Hall and Chandler(2005) show that psychological success in career development was explored. When individuals view their career as a calling, the perception of career is strengthened, that is, people believe that their work is meaningful and intrinsically rewarding. For these people, career success means not only external achievements, but also the pursuit of a sense of purpose and recognition(Hall & Chandler, 2005). As Donald Super (1980) believes, career success is not only the promotion of the position or the increase of economic income but also the sense of self-worth and accomplishment gained in the process of the career. For teachers, this means gaining students' recognition in teaching, realizing their educational ideals and personal and professional growth, and gaining social recognition in research work(Super, 1980).

People will feel successful in their careers when the expected goals are realized, accepted, and recognized. University teachers have a high recognition of career satisfaction and academic reputation. These conclusions fully show that university teachers are the most important in evaluating career success criteria by subjective success feeling, which is also consistent with the current research results. Scholars point out that the current evaluation of success criteria tends to be subjective cognitive aspects. In addition to perceived career, teachers are secondly concerned about the factors of research, teaching, and professional achievement related to the work content, which fully reflects the characteristics of university teachers' work. The

social risk of teachers' work is low, the organizational loyalty of university teachers is high, and the psychological demand for salary and welfare and organizational competitiveness is low.

The findings in this study are consistent with the Self-Determination Theory, which emphasizes the interaction between the organizational environment and individuals. The individual's basic psychological needs are influenced by external environmental factors(Deci & Ryan, 2000). Environmental factors can affect the occupational cognitive process by affecting basic psychological needs and ultimately affect individual career success(Deci & Ryan, 1985). The conclusions of this study support the conclusion that HCM enhances employees' sense of autonomy (Morgeson & Humphrey, 2006), improves their knowledge, skills, and abilities (Combs et al., 2006), and develops their sense of ability and relationship (Grant, 2007), and promotes their career success. According to this study, the satisfaction of basic psychological needs is positively associated with employee job satisfaction(Lynch Jr et al., 2005), which positively affects work engagement(Min, 2014), and improves employee emotional commitment and professional well-being(Greguras & Diefendorff, 2010).

Leadership style is one of the most important external factors affecting employees 'psychological status and work behavior, and in line with Mauno (2016) study, it believes that transformational leadership can improve employees engagement (Mauno et al., 2016). The transformational leadership theory of Bass (1985) points out that the transformational leadership style can promote the career development of employees by stimulating their internal motivation and improving their abilities(Bass & Bass Bernard, 1985). Similarly, Avolio and Bass (2001) found that leadership style indirectly improved their career success by influencing their job satisfaction and organizational commitment(Avolio & Bass, 2001). It is similar to Man Xiaoyu (2019) study, found that both transformational and transaction

al leadership can promote career satisfaction, but the transformational leadership is better predictor(Xiaoyu, 2019).

This study involves two leadership styles, namely transformational and transactional leadership. Research shows that transformational and transactional leadership positively correlate to teacher career success, among which transformational leadership has a more significant influence on career success. This study considers that transformational leaders meet the basic psychological needs of employees as much as possible, positively influence employee job satisfaction, enhance employees' professional self-efficacy and commitment to leadership (Kovjanic et al., 2012), guide the employees to think positively, promote its rapid growth, to improve the performance(Bass, 2019); It can promote employees to control their goals, such as learning, goals of developing and mastering work-related skills(Hamstra et al., 2014), actively strive to achieve career success. Transactional leaders will influence the subordinates' job satisfaction and job motivation(Judge, 2004), and the correct change reward in transactional leaders is positively correlated with the creativity of employees(Guo & Deng, 2008; Min, 2014), and positively affects individual success and organizational performance(Podsakoff et al., 1990).

This study found that the transformational leadership style has a more significant influence on career success and coincides with the theory of Self-Determination Theory(Deci & Ryan, 1985). First, transformational leaders, by motivating and supporting teacher development, improve teachers' human capital (such as skills and knowledge), thus enhancing their professional competitiveness. Secondly, transformational leaders indirectly promote the teachers' career success by creating a positive working environment and enhancing teachers' job satisfaction. In addition, through effective communication and feedback, leaders help teachers clarify their career development goals and enhance their career achievement.

In conclusion, this study's results not only verify the indirect role of leadership style in promoting teacher career success but also strengthen the applicability and effectiveness of transformational leadership theory and human capital theory in education management. This finding provides an empirical basis for university administrators, indicating that teachers' career development and success can be significantly improved by optimizing leadership styles and implementing effective HCM strategies.

5.3 Recommendations

Based on the Self-Determination Theory, this study focuses on the basic psychological needs of individuals in organizations, explores the internal mechanism of the relationship between HCM and teachers' career success, and studies the influence of different leadership styles on HCM and the basic psychological needs of individual teachers. Through theoretical model construction and hypothesis testing, some research results are obtained, which have certain enlightenment and guiding significance for the practice of HCM.

5.3.1 Recommendations according to the findings on HCM

The Finding: This paper tests the seven-dimensional structure of HCM by EFA and CFA, and the results show that the seven-dimensional structure of university teachers has good reliability and validity. Seven factors affect HCM: learning, education, attainment, experience, expertise, innovation, and creativity. Learning is the most significant influencing factor in HCM.

Recommendations:

1. HCM training, experienced guidance, improved innovation and creativity, incentives, and a series of mechanisms, policies, and activities can improve teachers' knowledge, skills, experience, and ability and positively change teacher attitudes and behavior, which can help and support career success.
2. Strengthening learning ability is an important way to promote career success, and improving learning ability is very important for teachers' teaching, research, and career growth. Teachers can integrate multidisciplinary learning to broaden their academic horizons and bring new ideas to the profession.
3. The study found that 83.5% of the teachers surveyed had master and doctoral degrees due to teachers' requirements for induction education. The educational experience is beneficial human capital for teachers to achieve career success, but teachers should not be limited to their existing self-capital. It is suggested that they develop their potential ability, improve professional competence, and adapt to career development.

5.3.2 Recommendations for Leadership Style

The finding: Leadership style plays a mediating role between HCM and teachers' career success. Transformational and transactional leadership are the two main leadership styles selected for this study. Transformational leadership influence strength is more significant than that of transactional leadership.

Recommendations:

1. The organization must select through effective HCM, cultivate the appropriate leadership style, and optimize the teacher management mode. It is suggested that leadership training, role-playing, and other ways to cultivate excellent leadership strengthen the leaders 'career planning and leadership style evaluation to ensure that the leadership style meets the needs of teachers' career development.
2. Establish the "mentor and apprentice" system in the teaching and research team, and strengthen the construction of the organizational team culture. It is suggested that an organizational culture that supports innovation, collaboration, and teacher career development be built. Take the initiative to strengthen the cultivation of teachers' emotions, attitudes, and values. Encourage two-way communication between leaders and teachers, and establish an excellent team relationship between new and old teachers, teachers and leaders.
3. Use transformational and transactional leadership styles wisely. For example, in long-term career development and personal growth, transformational leadership can provide more strategic support and guidance to improve teacher self-efficacy and identity. Transactional leaders can effectively motivate teachers to complete short-term tasks through performance rewards and clear goal setting.

5.3.3 Recommendations for Career Success

The finding: The influencing factors of teacher career success are income satisfaction, number of promotions, perceived career, career outcomes, and

organizational competitiveness. Perceived career is the most significant influencing factor.

Recommendations:

1. Teachers' career success standards with the change in society, economic and cultural development and present the trend of diversification, no longer the traditional income, title to measure professional success, and subjective feeling is becoming more and more critical, perceived career, career outcomes career success more vital, suggested to strengthen the attention of teachers' subjective professional success, as far as possible to meet the teachers' autonomy, competence and interpersonal needs.
2. Organizations' and teachers' development goals should be the same, and an excellent cultural atmosphere needs to be formed to help teachers perceive the sense of responsibility of university teaching and social service, clarify their career planning and work goals, and better experience career success.
3. Science and Technology Universities teachers generally have a strong sense of honor; suggestions to strengthen honor recognition activities, and public praise in teaching, research, and service fields contribute to teachers, can improve teachers' self-core evaluation, promote a perceived career, and can motivate other teachers to good example learning good experience, improve teachers' work enthusiasm and professional sense of accomplishment.

5.3.4 Recommendations for Government, Science and Technology Universities and Teachers.

5.3.4.1 Recommendations for Government

The positive influence of HCM and leadership style on teachers' career success can provide various inspirations for government education departments, especially in formulating policies, optimizing resource allocation, and improving teacher management.

1. Optimizing teachers' human capital investment for teachers: It is suggested that government education departments should increase human capital investment, provide continuous vocational training and learning opportunities, and help teachers improve their professional skills, teaching level, and research ability. Improve teachers' knowledge reserve and teaching ability through further study, higher degrees, or participation in international exchanges. Establish academic exchange platforms, provide opportunities for teachers to carry out innovative research in industrial organizations, and enhance their academic influence and professional competitiveness.
2. Optimizing team leadership mode through HCM. Through training, learning, and development activities, HCM can shape leadership behaviors appropriate for teacher development. It is suggested that the education management department carry out the evaluation and scientific classification of the leadership style, which can help quickly understand it, implement systematic management, guide the managers to adopt the appropriate style, and provide external support for the teachers to achieve professional success.
3. Enhance the awareness of people-oriented and improve teachers' professional cognition and goal setting. It is suggested that the rules and regulations of teachers' professional cognition should be strengthened and improved and reasonably guide teachers to form healthy professional identities and enhance professional cognition, sense of responsibility, and work value. It is suggested that teachers' work efficiency and sense of value should be improved through honor awards, help teachers plan career development paths, and better integrate personal identity with external expectations.
4. Adhere to the people-oriented and enhance the sense of belonging in the teachers' organization. Please pay attention to teachers' learning, education, experience, professional titles, and innovation ability, and provide resource management and support for their career growth. It is suggested that effective communication between leaders and teachers be promoted, and a trusted leadership-teacher relationship be established. It is suggested that the government should introduce taxation and talent incentives, encourage

universities to cooperate with science and technology organizations, support teachers to participate in technology research and development and industrial projects, and broaden their career development opportunities.

5.3.4.2 Recommendations for Science and Technology Universities

Universities should strategically carry out career management activities, pay attention to the career development of teachers, and provide appropriate help and opportunities for teachers to stimulate their desire for growth and enthusiasm for participation. Suggest as follows.

1. To create a teacher-oriented learning organization, focus on cultivating teachers' learning abilities and creating an excellent learning atmosphere. In the era of rapid knowledge and information network development, universities should encourage teachers to conduct professional development and lifelong learning. Universities can organize skills training, establish learning organizations, support faculty participation in continuing education, and provide the necessary time and funding to improve their learning motivation and help them achieve career success.
2. Carry out career management strategically, attach importance to the career development of teachers. Conduct teacher self-evaluation activities to clarify the growth tasks of each stage; actively promote the construction of organizational culture; cultivate the team culture to support teachers' professional success; and enhance teachers' initiative in career management. At the same time, regular career satisfaction surveys, in-depth analysis, and timely feedback should be conducted. In addition, establish an effective feedback mechanism, and care about the work and life of teachers.
3. Adjust teachers' expectations through HCM to enhance their sense of professional success. Strengthen teachers 'career planning and cognition, adjust teachers' needs and expectations, and improve their work attitude to achieve better career success. HCM provides teachers with the necessary guidance to ensure that they can fully use their talents and have sufficient resources and opportunities for research and teaching. It is suggested that

teachers be provided with a value orientation to help them better integrate into the organization.

4. Actively build a training and evaluation mechanism for leaders to motivate and promote transformational leadership, and make rational use of transactional leadership. If the leaders are attractive and determined, they can win the trust of their employees and attract them to work together. Transformational leaders pay attention to the growth of employees, help teachers improve their work skills, improve their work attitude, and relieve psychological pressure, to provide positive external environment support for teachers' career success.

5.3.4.3 Recommendations for Teachers

According to the Self-Determination Theory, the individual's autonomy in the career is one of the core factors of career success. Suppose teachers can maintain career autonomy, set career goals, formulate teaching strategies, and pursue personal growth independently. Therefore, while organizations can provide resources and support for teachers, their self-drive, self-management, and initiative are critical factors in achieving career success. Therefore, the following are some suggestions for teachers.

1. Teachers should be clear about their professional cognition and enhance their sense of responsibility and innovation in their work. In addition to long-term learning and skill accumulation, it is also necessary to continue learning, adapt to the new teaching tasks and the requirements of economic and social development, and promote social development in the scientific, technological, and academic fields. Establishing long-term career development goals, and formulating feasible development paths. Positive integration of individual career goals with organizational goals contributes to career success.

2. Teachers should actively participate in skills training and learn new knowledge and skills. Facing the requirements of innovation ability in Science and Technology Universities, teachers must actively improve their innovation ability, learning ability, and adaptability to adapt to the changes of scientific

and technological innovation quickly. In addition, teachers should also take the initiative to learn and exercise in industrial organizations, and transform the research results into social services, from which to gain social recognition and a sense of achievement.

3. Strengthen communication with leaders. It is suggested that teachers should actively interact with leaders and managers in teaching, research, and life, actively give feedback on difficulties and understanding at work, and seek help and guidance. For example, teachers can share the challenges and achievements in teaching and research, and show the value of work to win recognition and support. Actively participate in the decision-making, enhance interaction with leaders, and build trust relationships by participating in discussions and sharing views.

5.3.5 Implement The Research Results

Effectively recommending research results to government departments or universities and ensuring their effective implementation requires systematic strategies and multifaceted efforts. Here are steps and recommendations to help translate research results into practical policies and practices.

1. The first step is to write the research results into a concise policy proposal, mainly introducing the research background, purpose, main findings, and suggestions. Outline the positive influence of HCM and leadership style on teacher career success. Explain the study's importance and potential influence on education departments, colleges, and universities.
2. The second step is determining the target audience for communication and promotion. Strengthen communication with the Ministry of Education, local education bureaus, and other institutions responsible for formulating and implementing education policies and recommend research results to them.
3. The third step is to select some Science and Technology Universities as pilots, implement HCM and leadership improvement measures in the research proposal, establish a monitoring and evaluation mechanism, and collect feedback and effect data.

4. The fourth step is a cooperative promotion to enhance the research influence. Seek to cooperate with government departments and Science and Technology Universities, carry out in-depth research, and expand the influence and application scope of research.

This study focuses on the three influencing factors of HCM, leadership style, and career success. It makes recommendations for organizations and teachers, forming a model to promote teachers' career success at Science and Technology Universities in China. The model mainly provides teachers' career success path, as follow Figure 5.1.

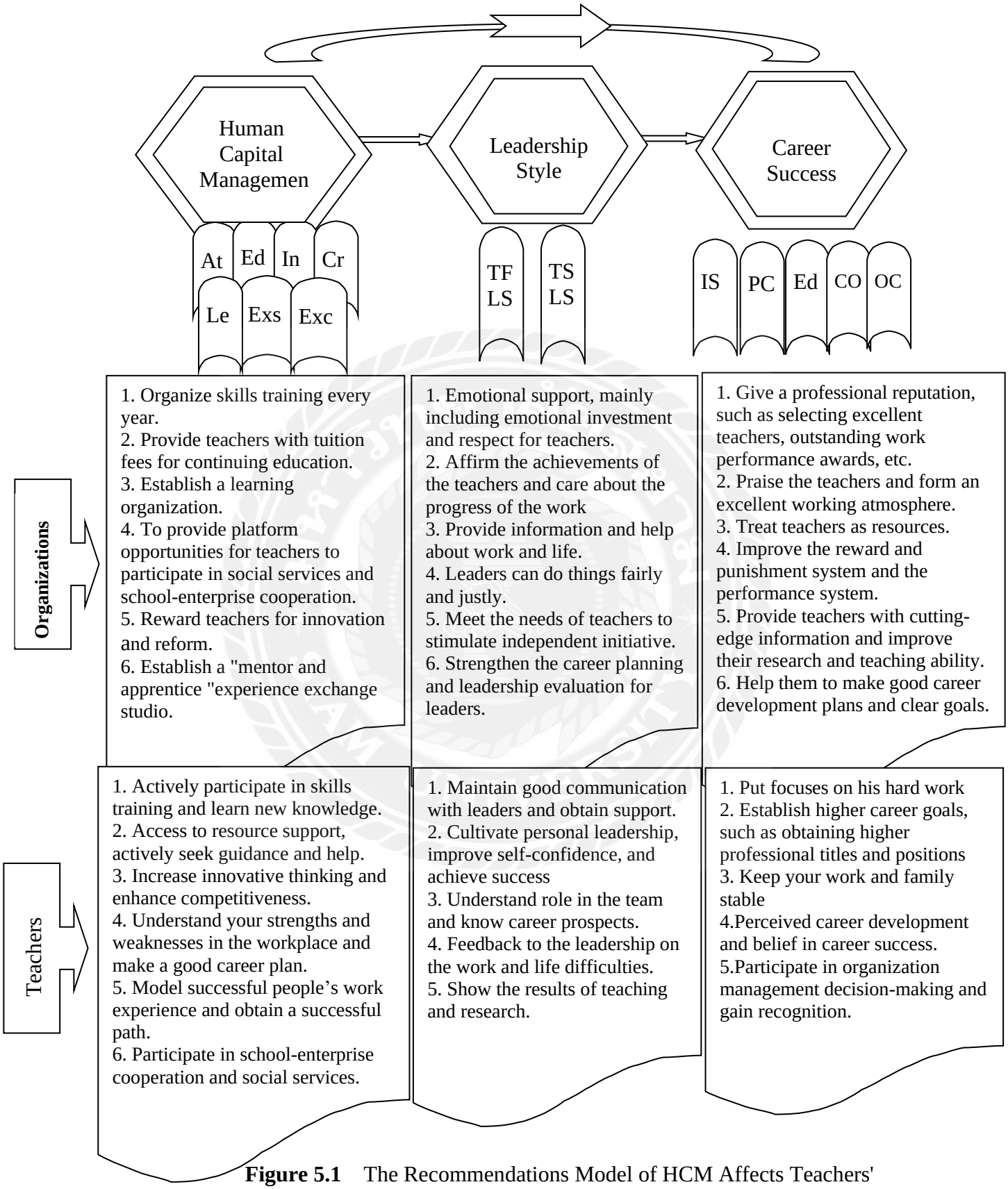


Figure 5.1 The Recommendations Model of HCM Affects Teachers' Career Success

5.4 Further Research

1. This study shows that HCM and leadership style influence teachers' career success. While HCM was examined as an independent variable and leadership style as a mediator, future research could reverse these roles, exploring leadership style as the independent variable and HCM as the mediating variable. This would offer additional insights into the interaction between these factors and their combined effect on teacher career success.
2. This research reveals the internal mechanisms through which HCM affects teacher career success, providing a novel theoretical perspective on career success, HCM, and leadership theory. However, due to time constraints, this study could not further validate its findings through qualitative analysis. Future research should consider conducting qualitative interviews to explore the nuances of these relationships in greater depth and enhance the conclusions' reliability.
3. Apply modern leadership theories. This study mainly addresses the mediating role of transformational and transactional leadership styles on teachers' career success. Future research can be further expanded to deeply study the impact of other leadership styles (such as shared leadership, authorized leadership, service leadership, etc.) on teachers' career success. Furthermore, comparing the role of these different leadership styles in promoting teacher career development will lead to a more comprehensive understanding of which leadership styles are more effective in specific situations. Through the comparative analysis of various leadership styles, future research can provide more accurate leadership strategies for university administrators to promote the improvement of teachers' career success and organizational performance.

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Appendix

A Causal Model of Human Capital Management on Teachers' Career Success at Science and Technology Universities in China

ใบรับรองจริยธรรมการวิจัยในมนุษย์
สถาบันการจัดการปัญญาภิวัฒน์

หมายเลขใบรับรอง: PIM-REC 040/2567

ข้อเสนอการวิจัยนี้ และเอกสารประกอบของข้อเสนอการวิจัยตามรายการแสดงด้านล่าง ได้รับการพิจารณาจากคณะกรรมการจริยธรรมการวิจัยในมนุษย์ สถาบันการจัดการปัญญาภิวัฒน์แล้ว คณะกรรมการฯ มีความเห็นว่าข้อเสนอการวิจัยที่จะดำเนินการมีความสอดคล้องกับหลักจริยธรรมสากล ตลอดจนกฎหมายข้อบังคับและข้อกำหนดภายในประเทศ จึงเห็นสมควรให้ดำเนินการตามข้อเสนอการวิจัยนี้ได้

ชื่อข้อเสนอโครงการ: The model of Human Capital Management Affecting to Employee's Career Success of University of Science and Technology in China

รหัสข้อเสนอการวิจัย (ถ้ามี): (ไม่มี)

หน่วยงาน: Siam University

ผู้วิจัยหลัก: Chen Yunfang

ลงนาม.....

(อาจารย์ ดร.พิเชษฐ์ มุสิกะโปดก)
ประธานคณะกรรมการจริยธรรมการวิจัยในมนุษย์
สถาบันการจัดการปัญญาภิวัฒน์

วันที่รับรอง: 25 กรกฎาคม 2567 **วันหมดอายุ:** 25 กรกฎาคม 2568

เอกสารที่คณะกรรมการรับรอง

1. โครงร่างการวิจัย
2. ข้อมูลสำหรับชี้แจงกลุ่มประชากรหรือผู้มีส่วนร่วมในการวิจัย และ ใบแสดงความยินยอมจากกลุ่มประชากรหรือผู้มีส่วนร่วมในการวิจัย
3. เครื่องมือที่ใช้ในการวิจัย/เก็บรวบรวมข้อมูล เช่น แบบสอบถาม แบบสัมภาษณ์ ประเด็นในการสนทนากลุ่ม เป็นต้น

เงื่อนไขการรับรอง

1. นักวิจัยดำเนินการวิจัยตามที่ระบุไว้ในโครงร่างการวิจัยอย่างเคร่งครัด
2. นักวิจัยรายงานเหตุการณ์ไม่พึงประสงค์ร้ายแรงที่เกิดขึ้นหรือเปลี่ยนแปลงกิจกรรมวิจัยใดๆ ต่อคณะกรรมการพิจารณาจริยธรรมการวิจัยในมนุษย์ภายในกำหนด
3. นักวิจัยส่งรายงานความก้าวหน้าต่อคณะกรรมการพิจารณาจริยธรรมการวิจัยในมนุษย์ตามเวลาที่กำหนดหรือเมื่อได้รับการร้องขอจากคณะกรรมการฯ
4. หากการวิจัยไม่สามารถดำเนินการเสร็จสิ้นภายในกำหนด ผู้วิจัยต้องยื่นขออนุมัติใหม่ก่อนอย่างน้อย 1 เดือน
5. หากการวิจัยเสร็จสมบูรณ์ ผู้วิจัยต้องแจ้งปิดโครงการตามแบบฟอร์มที่กำหนด

Questionnaire for dissertation

A Causal Model of Human Capital Management on Teachers' Career Success at Science and Technology Universities in China

Study conducted by Mrs. Chen Yunfang

PhD student, Doctor of Philosophy Program in Management,

Siam University

Notice: We would like to cooperate with you to complete the questionnaire. The information will be analyzed overall. The information will be kept confidential and not disclosed for business gain. It will only be used for research purposes.

Part 1: General information

Your gender: Male ☐ Female ☐

Your age: Under 25 ☐ 26-30 ☐ 31-40 ☐

41-50 ☐ 51-60 ☐

Your seniority: Under 5 years ☐ 6-10 years ☐ 11-20 years ☐

21-30 years ☐ 31years or more ☐

Your professional and technical title:

Junior ☐ Intermediate ☐

Associate Professor ☐ Professor ☐

Your degree: Below bachelor degree ☐ Bachelor degree ☐

Master degree ☐ Doctoral degree ☐

Your annual income:

Under 80000 yuan ☐ 80001-150000 yuan ☐

150001-200000 yuan ☐ 200,001 yuan or more ☐

Part 2 Relational factors

Please put a checkmark in the responses column to indicate your degree of agreement.

Items	Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	I am satisfied with the research and teaching achievements achieved in my career.					
2	Career success is a better research and teaching reward.					
3	Career success is contributing to the university discipline construction and academic team training.					
4	I am satisfied with the current salary and benefits.					
5	I have sufficient research time and funds to ensure the completion of the task.					
6	Income is stable, and there is plenty of time to enjoy life after work.					
7	I am satisfied with the progress and the number of promotions I have made to achieve the goal of professional title promotion.					
8	To be a leader in a high-level teaching or academic team.					
9	The promotion of the professional title can enjoy fair and just treatment.					
10	I was seen as an asset to the university and had many opportunities.					
11	Because of their skills and experience, universities see it as a growing resource.					
12	If you leave, you will be highly competitive to find a new job and get many career choices.					
13	I am satisfied with my progress in achieving my career goals.					
14	Teachers' career success should have status, decision-making power, and influence in the professional field.					
15	I have full confidence in my future career development.					
16	I can give full play to the value of my work and be recognized in all aspects.					
17	I can do the task on a freeway and on time.					
18	My working atmosphere and environment are very good.					
19	I can get clear career planning and development goals.					
20	Compensation and welfare policies are fair and just.					
21	The promotion channels of professional titles are open and consistent.					

Items	Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
22	The university provides an excellent career platform and has more organizational resources.					
23	I work enthusiastically, feel full, and try every means to solve the work problems.					
24	Universities help teachers improve their creativity and provide academic frontiers.					
25	Universities help teachers find new working methods, techniques, or tools.					
26	Teachers can create value and have more space for development.					
27	My education level matches the requirements of the job.					
28	Career success comes from the good educational background and professional knowledge the employees receive.					
29	I will invest in continuing education to get a better educational experience.					
30	My work experience makes me feel professionally successful.					
31	It is easy for me to gain new work experience and learn from the experience of my colleagues.					
32	I have rich experience in teaching and research and have been recognized by universities, leaders, and students.					
33	My professional skills meet the job requirements, and I get effective play.					
34	Universities provide a career platform for employees and opportunities to improve their professional skills.					
35	I can acquire new knowledge and skills at work.					
36	Constantly in challenging work is satisfying.					
37	Career success comes from teachers' ability to reform and innovate.					
38	I have been looking for opportunities to improve my work content and approach.					
39	Higher learning ability helps to achieve career success.					
40	Universities provide teachers with opportunities to improve themselves in their work.					
41	I take the initiative to study and actively get help from the university and leader.					
42	I have a harmonious working relationship with the leader, and the work has efficiency and results.					
43	Leaders often work with me to analyze the team's overall value goals.					

Items	Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
44	"In dealing with me, the leader will take my actual situation into consideration."					
45	The leaders often communicate with me about my work, life, and family situation.					
46	The leader's enthusiasm, dedication, and responsibility can inspire me and help me achieve career success.					
47	Leaders focus on creating conditions, giving full play to teachers' strengths, and encouraging innovation.					
48	Leaders help me to gain the value of my work.					
49	The leader is patient with me and helps solve work problems.					
50	Leaders strengthen learning and encourage employees to learn to improve job skills.					
51	Leaders often encouraged me to express views and opinions and consider my feelings before taking action.					
52	The leader offered me help to get my efforts.					
53	Leaders provide me with resources and experience to help me make progress.					
54	Leaders negotiate in a specific form about who is responsible for completing the task.					
55	The leader clearly describes what the individual teacher can expect when the performance goals are met.					
56	The leader knows all the mistakes and achievements teachers make in the work.					
57	Leaders will focus all their efforts on resolving misunderstandings, complaints, and failures.					
58	To meet the standards, the leader directed my attention to avoiding mistakes.					
59	The leaders always have high expectations to me. When I met , they expressed his satisfaction and appreciation to me.					
60	Leaders focus on irregularities, errors, exceptions, and deviations.					
61	The rules and regulations of the organization are stringent, and the leadership rewards and punishments.					
62	Leaders ask questions that prompted me to think about improving how I do things.					
63	The leader only requires the best performance, and I get a good reward when the performance is achieved.					

Thank you so much for completing the questionnaire.

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