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The Impact of Knowledge Management Capabilities of Maternal and Child Healthcare Institutions in China on Physicians' Job Satisfaction: An Empirical Study in Shenzhen

JIN Shuyan

Doctor of Management

Supervisors:
PhD Alexandra Fernandes, Associate Professor,
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Abstract

Objective: This study examines solutions to challenges in Chinese maternal and child healthcare institutions (MCHIs) through the perspectives of knowledge management capability.

Method: A conceptual model of knowledge management capability specifically for Chinese hospitals was developed by summarizing existing research models. A preliminary knowledge management capability scale was created using international scales and expert opinions, tailored to Chinese hospitals. The scale was refined through Delphi expert consultation, a pre-survey, and focus group discussions. Its reliability and validity were tested with large-scale surveys. Grounded in the two-factor theory of job satisfaction research and related conceptual models, the study forms a model and hypotheses on the impact of knowledge management competence on physicians' job satisfaction. The scale was applied to empirical research in three MCHIs in Shenzhen.

Result: The scale showed strong reliability and validity, effectively evaluating Chinese hospitals' knowledge management capability. Results from three MCHIs in Shenzhen indicated that knowledge management capability of MCHIs in China significantly affects physicians' job satisfaction.

Conclusion: The developed Knowledge Management Capability scale for Chinese hospitals addressed the research gap regarding knowledge management capabilities within these institutions and offered practical implications for improving knowledge management capabilities in Chinese hospitals. Based on the developed scale, the knowledge management capabilities in Chinese hospitals could be evaluated, facilitating targeted capacity enhancement. Furthermore, it provided a perspective for improving the job satisfaction of physicians in MCHIs in China through enhanced knowledge management capabilities.

Keywords: Maternal and Child Healthcare Institutions in China; Knowledge Management Capabilities; Physician; Job Satisfaction

JEL: D83; J28

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Resumo

Objetivo: Este estudo pretende encontrar soluções para os desafios das Instituições de Saúde Materno-Infantil (ISMIs) da China e tem como quadro de concetual a gestão do conhecimento (GC).

Método: O modelo concetual desenvolvido nesta investigação baseou-se em estudos recentes sobre a capacidade de GC aplicado aos hospitais chineses. Foi desenvolvido um questionário preliminar, adaptado a hospitais chineses, sobre a capacidade de GC baseando-se em escalas internacionais e opiniões de especialistas. O questionário foi melhorado a partir da opinião de especialistas no método de Delphi. Para tal, realizou-se um pequeno questionário e um focus grupo. A fiabilidade e validade do instrumento foram testadas aplicando-o a uma amostra largada. Baseando-se na teoria dos dois fatores da pesquisa sobre satisfação no trabalho e modelos conceituais relacionados, o estudo originou um modelo e hipóteses sobre o impacto da competência em GC na satisfação no trabalho dos médicos. A escala foi aplicada empiricamente em três ISMIs em Shenzhen.

Resultado: O questionário demonstrou ter uma forte fiabilidade e validade, o que permite avaliar a capacidade de GC nos hospitais chineses. Os resultados obtidos nas ISMIs em Shenzhen indicaram que a capacidade de GC das ISMIs na China afeta significativamente a satisfação dos médicos nos seus trabalhos.

Conclusão: O questionário desenvolvido neste estudo é relevante para compreender a capacidade de GC nos hospitais chineses, permitindo que as ISMIs avaliem o seu nível de competência em GC. Além disso, com base nas questões específicas do instrumento, essas instituições podem implementar iniciativas direcionadas para o desenvolvimento de capacidades para melhorar as suas práticas de GC.

Palavras-chave: Instituições de Saúde Materno-Infantil na China; Capacidades de Gestão do Conhecimento; Médicos; Satisfação no Trabalho

JEL: D83; J28

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摘要

【目的】本研究旨在从知识管理能力视角探索解决中国妇幼保健机构困境的途径。

【方法】研究根据现有知识管理能力的研究模型，形成中国医院知识管理能力的概念模型。通过借鉴国外商业机构知识管理能力测量量表条目，结合中国医院的实际情况和专家意见，初步建立中国医院知识管理能力量表。通过德尔菲法专家咨询、预调查和专家焦点小组讨论，构建中国医院知识管理能力量表。通过大规模调查验证量表的信度和效度。研究基于工作满意度研究的双因素理论结合相关研究所提出的概念模型，形成知识管理能力影响医师工作满意度的概念模型和研究假设，将研究开发的中国医院知识管理能力量表应用于深圳市3家妇幼保健机构开展实证研究。

【结果】研究证明中国医院知识管理能力量表具有较好的信效度，适用于评价中国医院知识管理能力。通过深圳市3家妇幼保健机构的实证研究，结果证明中国妇幼保健机构知识管理能力对医师工作满意度有影响。

【结论】研究开发的中国医院知识管理能力量表，弥补了中国医院知识管理能力的研究空白，对提升中国医院知识管理能力亦具有实践指导意义。基于研究开发的知识管理能力量表，可以评价中国医院的知识管理能力，开展针对性能力提升。其次是提供了从知识管理能力提高中国妇幼保健机构医师工作满意度的视角。

关键词：中国妇幼保健机构；知识管理能力；医师；工作满意度

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Initially, I imagined that completing my doctoral dissertation, after overcoming numerous challenges, would leave me overwhelmed with tears. However, when the moment arrived, I experienced a profound sense of calm and joy. This tranquility and confidence symbolize the personal growth I have achieved. Pursuing a PhD. was a challenge I set for myself, testing my courage to pursue my dreams at any stage. Moreover, it was an expectation of personal growth, anticipating that I would become more resilient and self-assured.

I could not have grown during my doctoral studies without the guidance, help and support of many people, and for all of this, my heart is full of gratitude.

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致谢

原本想象中，历经曲折完成博士论文时，我会泪流满面。但真到了这一刻，我内心平静而喜悦。这份淡定和笃定，正是我收获的成长。攻读博士学位，是我给自己设定的挑战，挑战自己是否敢于随时出发追逐梦想；攻读博士学位，更是我对自己成长的期待，期待自己更加坚韧、更加自信。

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List of Abbreviations

CFA - Confirmatory Factor Analysis

CFI - Comparative Fit Index

ERG - Existence-Relatedness-Growth

ES - Extrinsic Satisfaction

GFI – Goodness of Fit Index

GS - General Satisfaction

IFI - Incremental Fit Index

IS - Intrinsic Satisfaction

IT - Information Technology

KIC - Knowledge Infrastructure Capability

KM – Knowledge Management

KMC - Knowledge Management Capability

KPC - Knowledge Process Capability

MCHI - Maternal and Child Healthcare Institution

NFI - Normal Fit Index

OJS - Overall Job Satisfaction

RMSEA - Root Mean Square Error of Approximation

SEM - Structural Equation Modeling

TLI - Tucker-Lewis Index

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Chapter 1: Introduction

Nonaka and Takeuchi (1995) suggested that in an economic environment where uncertainty is the only determinable factor, the source of competitive advantage for a firm or organization is undoubtedly knowledge. The challenges of globalization, intense competition, advances in communication and information technology (IT), among others, have led to a shift from a resource-based economy that controls tangible resources to a knowledge-based economy that creates value through the use of knowledge (Mikkawi et al., 2017; Yeh et al.,2006). The emergence of the knowledge economy has forced organizations to deviate from the traditional way of dealing with human resources by adopting a knowledge management (KM) approach (Al-Busaidi & Olfman, 2017; B. Obeidat et al., 2017; Trivellas et al., 2015). A high level of KM has a constructive impact on the quality of work, business performance, employee performance, internal processes, strategic positioning, and organizational competitiveness (Abdollahbeigi & Salehi, 2021; Al-Hakim et al., 2016; Bloodgood et al., 2021; Gold, 2001; Iqbal et al., 2019; Kavalic et al., 2021);. Therefore, the ability to manage knowledge is increasingly important in today's knowledge economy (Mila Kavali et al., 2023).

The healthcare sector is characterized by its knowledge-intensive nature, encompassing a substantial array of intangible assets and intellectual capital (Y. Chen et al., 2011). Knowledge manaegment capabilities (KMCs) significantly enhance the quality of healthcare, improve organizational performance, strengthen collaboration, reduce costs, stimulate innovation, and increase competitiveness (Y. Y. Chang et al., 2011; Epaminonda et al., 2021; Estrada, 2009; Fadime Çınar, 2015; Y. Tsai, 2014).Knowledge in the healthcare industry was characterized by high dispersion, information overload, and clearly defined professional boundaries. Chinese maternal and child health institutions (MCHIs) were types of hospitals primarily serving women and children, focusing on obstetrics, neonatology, and pediatrics. The decline in China's birth rate posed challenges to the survival and development of MCHIs, compelling them to improve service quality and patient satisfaction to enhance their competitiveness.

Job satisfaction enhances employee productivity (Alrawahi et al., 2024) .Physicians are a crucial component of the healthcare system, and their job satisfaction serves as the foundation for delivering high-quality healthcare services (Kader et al., 2021; Y. Li, 2021) This satisfaction is positively related to patient satisfaction (Z. Wang et al., 2019), and is an important factor in

the effective functioning of healthcare institutions (Verulava, 2024). The job satisfaction of healthcare personnel influenced the quality of care and patient satisfaction. In the context of declining birth rates, the job satisfaction of physicians in MCHIs was crucial for enhancing the quality of care, patient satisfaction, and competitiveness. However, the job satisfaction of healthcare personnel in China was not optimistic, particularly in MCHIs, where there was an urgent need to enhance job satisfaction. Currently, there was a lack of systematic research on the KMCs of Chinese healthcare institutions, along with studies examining the relationship between the KMCs of these institutions and the job satisfaction of healthcare professionals.

To propose a new perspective for enhancing physicians' job satisfaction and to explore solutions to the current developmental challenges faced by MCHIs from the viewpoint of KM. Based on the latest research on KM and job satisfaction, this study posed a research question, specifically whether the job satisfaction of physicians in Chinese MCHIs could be enhanced by improving KMCs. This study was further subdivided into two research questions: first, how to measure the KMCs of Chinese hospitals? Second, how do the KMCs of Chinese MCHIs influence the job satisfaction of physicians?

1.1Background

1.1.1 Knowledge management capabilities are essential for healthcare institutions

The global economy has shifted from an industrial manufacturing/product-oriented model to a knowledge and service-based economy, where information and knowledge constitute the primary commodities (Walczak, 2005). The growing importance of knowledge in contemporary society calls for a change in the way we think about organizational innovation, whether it is technological innovation, product innovation, or strategic organizational innovation (Nonaka, 1994). Nonaka and Takeuchi (1995) suggest that knowledge serves as a source of competitive advantage for organizations. The society we live in is gradually transforming into a "knowledge society" (D. Bell, 1973; P. Drucker, 1968; Toffler, 1990). The shift from the Industrial Age to the Knowledge Age leaves room for the creation, collection and application of knowledge (Johannessen & Olsen, 2010). Supported by organizational assets and skilled labor, knowledge work is increasingly recognized in the marketplace (Shahrah & Al-Mashari, 2021). The process of globalization has introduced new economic conditions that compel firms to emphasize innovation and differentiation in their strategies. Consequently, within this framework, institutions across both the private and public sectors have developed new innovation processes

to enhance their competitive advantage. The challenges of globalization, intense competition, and advancements have led to a shift from a resource-based economy that controls tangible resources to a knowledge-based economy that creates value through the utilization of knowledge (Mikkawi et al., 2017; Yeh et al., 2006). Many economists and management scientists have embraced the concepts of "knowledge economy" and "knowledge management" (Fadime Çınar, 2015). The emergence of the knowledge economy has compelled organizations to move away from traditional human resource management practices and adopt a KM approach (Al-Busaidi & Olfman, 2017; B. Obeidat et al., 2017; Trivellas et al., 2015). In today's globalized and information-driven economy, the effective management of intellectual capital is a critical issue for organization (Walczak, 2005). Proactively managing, protecting, and nurturing intellectual resources is necessary for enhancing organizational performance (Caputo, 2017; Santo, 2005).

KM is a management function that serves to locate, create and manage knowledge flows within an organization (Mila Kavali et al., 2023). KM ensures that knowledge is effectively utilized to achieve long-term business goals (Darroch & McNaughton, 2002), KM is increasingly recognized as an innovative model for sustaining organizational success. According to Knowledge-Based View (KBV) theory, knowledge within organizations is considered as an important, unique and scarce tactical asset, essential for creating value and sustaining a competitive advantage (Grant, 1996; Seleim & Khalil, 2007). Knowledge enhances competitiveness, making KM a preferred enabler for problem solving (Gupta et al., 2000). Nonaka and Takeuchi (1995) argued that in the modern society, nearly everyone has, to some extent, become a knowledge worker. Thus, KM also contributes to employee benefits (Tiwari & Lenka, 2017).

KM refers to the process of creating, sharing, utilizing, and managing knowledge and information in an organization (Girard & Girard, 2015). The KM process is a systematic organizational activity deemed vital for operational success (Alaarj et al., 2016; T. C. Chang & Chuang, 2011). KM encompasses practices such as knowledge creation, knowledge codification, knowledge acquisition, knowledge sharing, and knowledge retention (Pruzinsky & Milhalcova, 2017). Information and communication technology tools, especially the Internet, facilitate the creation, storage, and sharing of both tacit and explicit knowledge (Alavi & Leidner, 2001; Sousa & Rocha, 2019).

Knowledge creation refers to an organization's ability to develop new and valuable ideas and solutions across all aspects of its activities, including product and technology processes as well as management practices (Abubakar et al., 2019; Balde et al., 2018; Mehralian et al., 2018;

Nonaka, 1994). This process is essential, as current knowledge may not suffice in addressing future problems (Awad & Ghaziri, 2007). Knowledge codification encompasses activities necessary to convert tacit knowledge into explicit forms, store documented knowledge and provide up-to-date documentation to others within the organization (Filius et al., 2000). Knowledge acquisition involves organizational practices aimed at gathering information from external sources (Darroch, 2005; Zahra & George, 2002). Knowledge sharing is the systematic dissemination of knowledge throughout the organization (J. Yang et al., 2005). This sharing includes activities such as informal communication, brainstorming, coaching, and mentoring (Akram et al., 2020; Borges et al., 2019; Filius et al., 2000; Goel et al., 2010; M. Kumar, 2005). This sharing provides opportunities for interpersonal collaboration and is increasingly vital for organizational success (M. Lin & Zhang, 2019). In many cases, knowledge sharing is crucial for most employees to achieve sustainable competitive advantage (Cabrera & Cabrera, 2002). KM emphasizes the importance of knowledge sharing within the organization (Gil & Carrillo, 2016). Knowledge retention refers to the activities associated with managerial turnover of managers and the consequent loss of expert knowledge, representing a key strategic resource (Levallet & Chan, 2019; Motshegwa, 2017).it serves as a platform for regular updating of knowledge (Gil & Carrillo, 2016). Knowledge retention is not only a strategy but also a cycle that shows the percentage of knowledge that can be extracted from experienced employees (Levallet & Chan, 2019). Finally, knowledge utilization pertains to applying knowledge to organizational operations and processes to generate valuable outputs in terms of products and services (Iqbal et al., 2019). Knowledge utilization ultimately facilitates smoother workflow (Singh & Sharma, 2011).

The creation, acquisition, storage, sharing and utilization of knowledge over time are essential for the longevity of any organization (Ballantyne, 2000). Studies have shown that a high level of KM significantly impacts work quality, business performance, and consequently the competitiveness of the organization (Kavalic et al., 2021). Additionally, G. Santoro et al. (2019) found that KM positively and significantly influences innovation and performance. KM practices enhance organizational performance (Abubakar et al., 2019; Meher & Mishra, 2019; Shujahat et al., 2017), drive organizational innovation practices (Bloodgood, 2019; Matricano et al., 2019; Nonaka, 1994) and improve strategic decision-making (Cabrilo & Dahms, 2018; Peruffo et al., 2018). Ultimately, KM practices activities enhance the competitive advantage of the organization (Barley et al., 2018; Iqbal et al., 2019; Kongpichayanond, 2009; Sahibzada et al., 2020; Teixeira et al., 2018). Kavalic et al. (2021) argued that effective KM is a necessary condition for the competitive sustainability of organizations. Furthermore, KM promotes

innovative behavior among employees (S. Tsai, 2018) and contributes to the enhancing employee motivation (Da Silveira, 2019) .Bloodgood et al. (2021) posited that the power of knowledge affects the degree of strategic positioning of the organization, which, in turn, affects employee performance. Additionally, the determinants of knowledge impact non-financial performance metrics, such as learning, growth and all internal processes (Abdollahbeigi & Salehi, 2021). Numerous studies have demonstrated that KM has a constructive impact on the performance or efficiency of organizations (Gold, 2001; Iqbal et al., 2019). Ultimately, KM enables organizations to achieve high levels of organizational performance (Al-Hakim & Hassan, 2016; Iqbal et al., 2019).

The ability to manage knowledge is increasingly critical in today's knowledge economy (Mila Kavali et al., 2023). KM can be viewed as an organization's ability to create, acquire, distribute and transform knowledge into market competitiveness (Walters, 2002). Modern organizations must generate and share knowledge to remain competitive (Davenport & Prusak, 2000). For KM to be both efficient and effective, specific capabilities are required (Almajali & Al-Lozi., 2019). G. Santoro et al. (2018) argued that internal KMCs can be enhanced through KM systems, which facilitate the creation of open and collaborative ecosystems, and leverage both internal and external knowledge flows, thereby enhancing the organization's innovation capacity. Nielsen (2006) states that organizations operating in dynamic environments must possess robust KMCs to develop and support work practices, respond to changing conditions and maintain a competitive advantage. KMCs are the organizational mechanisms that continuously create knowledge and encourage its acquisition, storage, protection, and sharing (H. Lin, 2013). KM processes are commonly defined as actions related to knowledge acquisition, sharing, and utilization to improve organizational competitiveness (Barley et al., 2018; Iqbal et al., 2019; Teixeira et al., 2018). Researchers have defined the KMCs of organizations in the context of KM processes (Gold, 2001; Iqbal et al., 2019). Gold (2001) argues that KMCs can be categorized into two key aspects: knowledge infrastructure and knowledge processes, and that the knowledge infrastructure encompasses technology, structure, and culture, while knowledge processes include knowledge acquisition, transformation, and utilization. Facilitating KM depends on these capabilities, which help create knowledge by integrating and combining various resources and activities, positively impacting competitive advantage, KM effectiveness, and organizational effectiveness (Aujirapongpan et al., 2010; Masa Deh et al., 2017). KM competencies promote organizational performance (Chiu & Chen, 2016). They have recognized that KMCs consist of both knowledge infrastructure capabilities and knowledge process capabilities (Chiu & Chen, 2016).

In an environment of complexity, risk, uncertainty, and intense competition, organizations must leverage all of their capabilities, including both tangible resources and intangible resources, to invest in human capital that fosters continuous learning and knowledge development, ultimately enhancing performance and create value (María Díez et al., 2010). Hospitals, as complex and sociologically rich institutions, present unique challenges due to their intricate structure and the difficulty of implementing change (Rowley, 2006). They are seen as complex systems that blend technological, industrial and scientific processes, involving individuals with diverse educational, cultural, and social backgrounds (Kannampallil et al., 2011). Hospitals face numerous challenges, including the adoption of new technologies, continuity of learning, subsequent medical development, patient safety, organizational management, and the need to invest in capital and human resources (Durrah & Allil, 2018). As populations grow and age, and with the rising prevalence of chronic diseases, the demand for long-term care increases. Additionally, as income levels rise, so does the demand for higher-quality healthcare (Fadime Çınar, 2015). In the changing environment of national health insurance and health policies, hospitals must provide excellent services, efficient processes, and high-quality medical care to establish long-term, stable relationships with patients. The morbidity and mortality of chronic diseases such as malignant tumors and cardiovascular and cerebrovascular diseases, remain high, while infectious diseases, including AIDS, SARS, and 2019-Ncov, continue to challenge humanity. Medical professionals must consistently strive to conquer these diseases. The advancement of science and technology has vigorously promoted medical progress, and medicine has entered the era of chromosome and gene research from organ, tissue, and cell research. The development of evidence-based medicine, integrative medicine, precision medicine and other fields has changed the diagnosis and treatment mode, new treatment modalities such as stem cells and immunotherapy have entered medical research and clinical practice, and intelligent medicine and mathematical medicine based on big data and cloud computing have begun to become spotlight (Lang, 2022). The expansion of medical disciplines continues to generate new interdisciplinary knowledge, broadening the scope of medical science.

The "competitive advantage" of hospitals lies in their ability to successfully apply the latest evidence-based research and technology to clinical practice, thereby improving patient care. As knowledge-intensive organizations, hospitals must be continuously updated with the best available evidence and the latest healthcare information technologies (Soklaridis, 2014). Healthcare professionals require up-to-date knowledge since their practice necessitates lifelong learning to enhance competencies and deliver effective, high-quality medical care (Y. Tsai,

2014). The healthcare industry is distinct from other sectors due to its knowledge-intensive nature, its substantial intangible assets, and its intellectual capital (Y. Chen et al., 2011). As a knowledge-intensive industry, the healthcare industry can implement KM and thus build a competitive advantage. In the context of responding to changes in the healthcare environment under a global budget system, hospital decision makers must remain flexible in policy adjustments to optimize operations. In 2005, the World Health Organization (WHO) clarified the objectives of the KM strategy (WHO, 2005), focusing on three main areas -Strengthening national health systems through better KM , building KM in public health and making the WHO a better learning organization. WHO confirmed several strategic directions (WHO, 2005):- Improving access to global health information; Translating knowledge into policy and action; Creating enabling environments; Sharing and reapplying knowledge from past experiences; Developing e-health in countries.

KMCs have a significant impact on healthcare quality and continuous improvement of operational procedures. In the face of changes in the external environment, hospitals must introduce KM to prioritize continuous improvement priorities (Y. Y. Chang et al., 2011). As highly knowledge-intensive organizations, healthcare institutions require ongoing education to realize their potential (Y. Tsai, 2014). The intellectual capital of healthcare institutions is becoming increasingly important as society evolves (Estrada, 2009; Y. Tsai, 2014). The implementation of KM in healthcare institutions can offers several advantages, including improved decision-making; enhanced collaboration among healthcare professionals; higher quality of care; reduced medical errors; cost reductions; stimulation of innovation; increased efficiency in healthcare delivery; promotion of evidence-based practices; dissemination of best practices; improved organizational performance; and greater responsibility in the use of public resources. Continuous learning, adaptability, and openness to new developments are key to thriving in an environment rich in knowledge, technology, and services (Fadime Çınar, 2015). In recent years, healthcare institutions have increasingly adopted information and communication technologies (ICTs), which have significantly impacted healthcare in areas such as data management, healthcare delivery, communication, training, and KM (Epaminonda et al., 2021).

Healthcare institutions face significant challenges in the field of KM. KM in these institutions is particularly complex due to their structure as multilevel, multisite networks with centralized management and strong local institutions (French et al., 2009). Moreover, the vast and fragmented nature of information, the rapid expansion of knowledge, and contextual dependencies make it impossible for one person to access all the available knowledge in the

domain (Estrada, 2009; French et al., 2009). In addition, the healthcare sector in many developed and developing countries suffers from widespread staff shortages (Buchan & Aiken, 2008) and faces an aging population. Significant loss of intellectual capital has been attributed to the retirement of experienced and knowledgeable nurses in various institutions (Clauson et al., 2011). These issues are concerning due to their potential impact may on the practice of healthcare professionals and on the access, safety, and quality of healthcare services (Clauson et al., 2011; Estrada, 2009). In this context, healthcare institutions must focus on seeking innovative solutions, as well as developing new work practices aimed at designing and managing knowledge (Davies et al., 2011; W. Zheng et al., 2010).

KMCs are increasingly important, for both healthcare institutions and individual practitioners. As China's economic level rises, so does the public's demand for healthcare, prompting health authorities to enforce higher standards of hospital assessment. This creates a need for healthcare institutions to continuously acquire new knowledge, technologies, and service concepts to address emerging challenges and maintain a competitive edge in an increasingly competitive hospital environment. In such a context, knowledge becomes a crucial strategic asset in an organization, and KM enables institutions to acquire and manage this knowledge more effectively. However, there remains a significant gap in research on KM in Chinese hospitals.

1.1.2 Challenges and opportunities for survival and development in China's maternal and child health care institutions

China initiated the establishment of specialized MCHIs in 1950, focusing on strengthening human resources and gradually constructing professional services to protect the health of women and children. This initiative laid the foundation for the development of maternal and child healthcare. MCHIS at all levels are public welfare entities organized by the government, operating on a non-profit basis, and serve as professional organizations that provide public health and basic medical services for women and children. Their primary objective is to enhance healthcare by safeguarding reproductive health, integrating healthcare with clinical care, and prioritizing preventive measures for target groups at the grassroots level. MCHIS are responsible for delivering public health services to women and children, including health education, preventive health care, family planning technical services, screening for common diseases, and managing maternal and child health information. They are also expected to offer basic medical services closely related to women's and children's health as needed. They must fulfill the responsibilities and requirements of public health and basic medical care. In terms of

the scope of their practice, the setting up of their departments and divisions, the organization of their personnel, and the construction of their rules and regulations, these institutions must give prominence to the functions of mother and child health care services, avoiding the transition to a general hospital model. Higher-level MCHIS are tasked with providing operational training, technical guidance and service management to lower-level institutions. Furthermore, they leverage the technical strength of obstetrics and gynecology, pediatrics and other relevant departments within comprehensive medical institutions to enhance the health services available to women and children under their jurisdiction.

China has gradually established a three-tier maternal and child healthcare system adapted to national conditions. This system has developed a unique working mechanism that connects provincial, municipal, and county-level MCHIS, ensuring coordination and division of labor. The higher-tier institutions provide guidance and assessment to lower-tier institutions, while grassroots maternal and child healthcare facilities implement projects. Within this three-tier network system, institutions at the provincial, municipal and county-level undertake different responsibilities. Provincial-level MCHIS, at the top of the network, lead the system by conducting scientific research, developing new technologies, offering training, and promoting appropriate technological practices. They also handle regional business planning and analyze maternal and child health data. Municipal MCHIS, serving as the network's middle level, are responsible for improving maternal and child healthcare service capacity in their regions. In addition, they organize specific services based on their technical strengths and service characteristics. As the base of the three-tier network, county-level MCHIS manage basic maternal and child health work within their own jurisdictions. They provide health education and services to specific groups and may establish departments similar higher-level institutions. Additionally, maternal and children's healthcare institutions at all levels are tasked with providing operational guidance, supervision and evaluation to lower-level institutions. They also receive advanced training and personnel development from higher levels. These institutions serve as nodes for the collection of national maternal and child health data, forming an information reporting network. This network ensures timely and accurate reporting of maternal and child health data to national authorities, creating the foundation for policy formulation and evaluation of their implementation.

Unlike China's relatively independent maternal and child health service system, maternal and child health services system, most countries around the world integrate MCH services into their general healthcare systems, each with distinct characteristics and advantages. For instance, in Japan, MCH care is mainly provided by professional MCG institutions, hospitals, childcare

facilities, and civil organizations. Health care clinics or centers focus on women's and children's health testing, health promotion, disease screening, follow-ups, and health consultation. Hospitals handle medical care and impatient deliveries for women's and children, while childcare institutions and civil organizations focus on health consultation and health education. In the United States, maternal and child health care providers (Ji & Duan, 2000) are divided into two categories: individual physician clinics, which include private clinics and polyclinics, and service complexes, which consist of public hospitals, private hospitals, and hospitals affiliated with medical schools and colleges. The first point of contact for MCH care in the U.S is often the family doctor. Patients who require specialized care are referred to specialists, such as obstetricians, gynecologists, and pediatricians, in accordance with established procedures. These specialists are generally located in public hospitals, private hospitals, or hospitals affiliated with medical schools. This creates a service network centered on the family doctor and with the participation of various types of hospitals, medical schools, and scientific research institutes.

According to the 2022 Statistical Bulletin on the Development of China's Health and Wellness Services (Department of National Planning, 2023), by the end of 2022, there were a total of 3,031 maternity and child healthcare institutions across the country, of which 26 were at the provincial level, 377 at the prefectural (municipal) level, and 2,561 at the county (district and county level) level, with a total number of 273,477 beds.

In recent years, one of the dilemmas that China has had to face is the decline in the fertility rate and the number of births. According to data from China's National Bureau of Statistics, 9.02 million births were recorded nationwide in 2023, resulting in a birth rate of 6.4 per thousand. This decline in birth rate has been a consistent trend in recent years. Detailed data can be found in Figure 1.1 below.

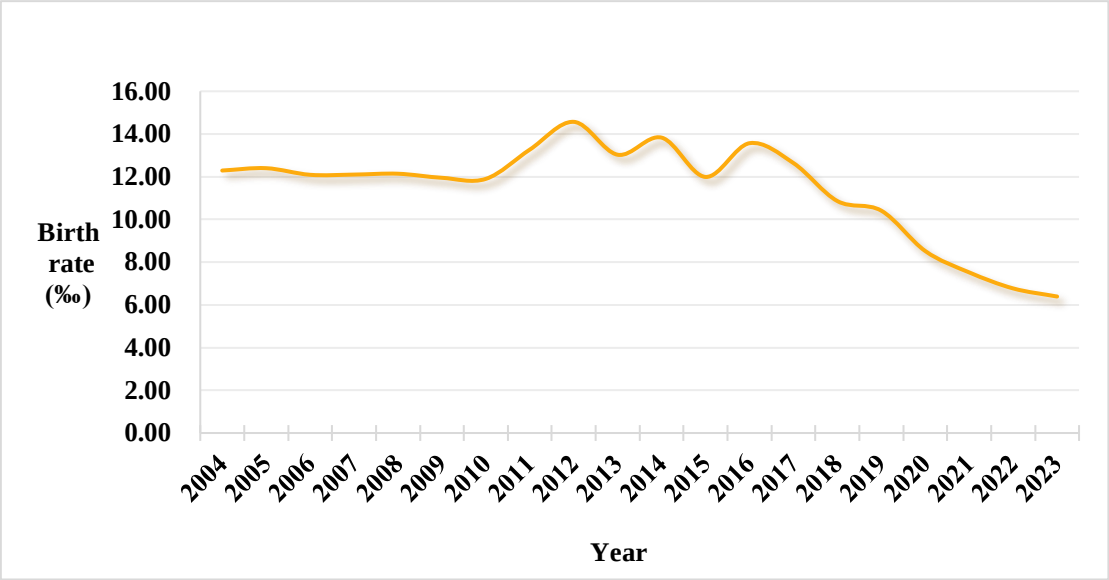

Figure 1.1 The birth rate in China

The birth rate decline in China has become a significant challenge for hospitals that rely on obstetrics and maternity services as a core part of their operations. Obstetrics and maternal healthcare face multiple dilemmas due to the falling birth rate (L. Huang, 2023), thereby presenting substantial challenges to the survival and growth of MCHIs in China. Simultaneously, the proportion of elderly pregnant women has increased, resulting in constant changes in the business structure, technical difficulty, and risk factor, which has challenged the survival and development of maternal and child healthcare hospitals and forced them to innovate to improve their technical capacity and service level (W. Liu, 2023), compelling MCHIs to elevate service quality and patient satisfaction to enhance their competitiveness.

Located in the south of Guangdong Province, China, Shenzhen is one of the 10 mega-cities in China at present, with a total area of 1,997 square kilometers and a resident population of about 17 million. Shenzhen is the window of China's reform and opening and an emerging city of immigrants, creating the world-renowned "Shenzhen Speed", and is one of the four major central cities in the Guangdong-Hong Kong-Macao Greater Bay Area, a national logistics hub, an international comprehensive transportation hub, an international innovation center for science and technology industries, and one of the three major national financial centers in China. Shenzhen has 9 administrative districts (Futian District, Luohu District, Nanshan District, Yantian District, Bao'an District, Longgang District, Longhua District, Pingshan District, Guangming District) and 1 functional district (Dapeng New District). There are 1 municipal MCH and 10 district MCHs in Shenzhen, which together are projected to account for 40% of the city's deliveries in 2023. Shenzhen is also experiencing a decline in the number of deliveries, as illustrated by the data presented in Figure 1.2. Competitions among MCH institutions is

becoming increasingly serious, as is competition between MCH institutions and other medical institutions.

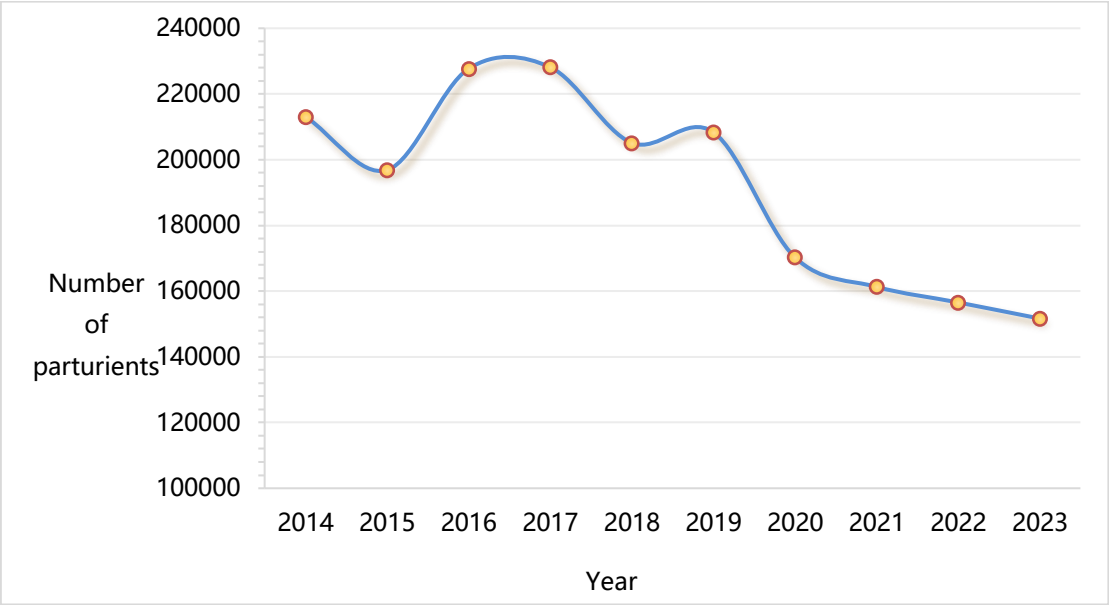

Figure 1.2 The Number of parturient in Shenzhen

1.2 Research problem

1.2.1 The job satisfaction of healthcare personnel affects service quality and patient satisfaction

Job satisfaction has long been the focus of attention in the field of organizational management and organizational behavior. Hoppock (1935), in his book "Job Satisfaction", defined employee satisfaction as "whether the employee will make a satisfactory feeling and evaluation of the work itself and the work environment from their own psychological and physiological aspects". This definition highlights job satisfaction as a subjective emotional response to the work situation, and was first explained from a phycological perspective. Researches regard job satisfaction as an employee's psychological feelings about their work and its related aspects—such as the work environment, status, style, pressure, and interpersonal relationships—within a specific organization (She, 2019). It describes the feelings of employees regarding their work (Alotaibi et al., 2023). Job satisfaction, like user satisfaction, is defined as the degree of difference between employees' psycho-emotional experience of working in a specific industry or organization and the expectations. It serves as a subjective evaluation of the extent to which an employee's needs are met (Faragher EB et al., 2013; Spector, 1997).

Job satisfaction is one of the most extensively researched concepts in organizational

behavior. Modern management science views employee job satisfaction as an indicator of organizational well-being and a "barometer" of effective organizational management (Anderson D R et al., 2010). Satisfied employees significantly enhance company performance compared to dissatisfied employees, and they contribute to increasing the value of a company's human capital, which positively affects the overall value of the company (Gottwald & Lejsková, 2023). Higher job satisfaction also leads to greater employee productivity (Alrawahi et al., 2024). To avoid the adverse effects of employee dissatisfaction, organizations must continually strive for improvement (Bakotić, 2012; B. Obeidat et al., 2016). Job satisfaction affects employee behavior, including performance and absenteeism (Venkataramani et al., 2010). Behavioral and social science research has shown that there is a correlation between job satisfaction and job performance (Judge et al., 2017). Employees who feel dissatisfied with their work may intentionally or unintentionally undermine organizational efforts (Heidari et al., 2022). Maister (2001) argued that an employee's satisfaction with their work environment helps improve company performance and optimize the business structure, thereby significantly impacting the overall company performance. W. Zheng (2001) suggested that employee satisfaction reflects the degree of individual employee contentment, and by enhancing it, organizations can improve job performance. S. Zhou and Wei (2011) found that the higher the satisfaction of knowledge workers, the higher the performance. The difference in the years of work also plays an important role in job performance. Knowledge workers are driven by challenging opportunities that stimulate their problem-solving skills, rather than by questioning expertise (Shujahat et al., 2018).

Healthcare professionals are an important component of the healthcare system and healthcare services. Compared to other industry populations, healthcare professionals possess distinct occupational characteristics that set them apart from other professions. Their roles require continual acquisition of specialized knowledge and the development of practical skills, as well as the ability to manage burdens and risks inherent in their work (Q. Zhang et al., 2019). Human resources are a key factor in the successful operation of healthcare institutions, relative to other organizational factors (Abdullahi et al., 2023). Job satisfaction is an important indicator for evaluating the psychological status and feelings of health care workers in the field of health care, as well as an important tool for evaluating the quality of health care services and assessing the improvement of hospital management systems (Ma & Huang, 1993), and it is an important basis for the provision of high quality services to patients in the health system (Alotaibi et al., 2023). Studying the job satisfaction of healthcare workers can understand the work needs and work mentality of healthcare workers, and the subjective evaluation of their work, which is

important for improving the management system of healthcare institutions and improving the quality level of healthcare services (Y. Li, 2021). In the healthcare sector, physician job satisfaction is a significant concern (Eker et al., 2004) as there is a direct correlation between physician job satisfaction and patient satisfaction (Martins & Teresa, 2012), with a positive relationship consistently observed (Deshmukh et al., 2023). A nationwide study of 136 tertiary public hospitals in China indicated (Z. Wang et al., 2019) that physician job satisfaction was significantly and positively correlated with inpatient satisfaction. Healthcare staff satisfaction is fundamental to patient satisfaction, and the improvement of healthcare staff satisfaction will promote the improvement of patient satisfaction and contribute to the virtuous circle of hospital management (Z. Wang et al., 2019). Overall, employee job satisfaction is an important factor in the effective functioning of healthcare institutions (Verulava, 2024).

Job satisfaction is a critical concern for healthcare professionals and directly affects patient safety and quality of healthcare services (Kader et al., 2021). Research has shown that nurses' job satisfaction significantly impacts the quality of care provided (Heidari et al., 2022). For example, oncology nurses with higher job satisfaction can improve psychiatric care outcomes (Manookian et al., 2023). Conversely, lower physician satisfaction is associated with a decline in healthcare quality (Boamah S A et al., 2017), and physicians with higher job satisfaction tend to provide better healthcare compared to those with low job satisfaction (Casalino & Crosson, 2015). A study of medical staff in Chinese public hospitals found (She, 2019) that employees with high job satisfaction are more inclined to high output and quality work. Satisfied physicians contribute to increased productivity (Luthans et al., 2004) and lower costs (W. Yin et al., 2006). In contrast, reduced job satisfaction among medical professionals is a significant factor leading to burnout (K. Zhang et al., 2023). Lower job satisfaction correlates with higher burnout rate (Samadi et al., 2023). Job satisfaction also plays a key role in healthcare workers' decisions to leave their jobs (Xu & Zhu et al., 2023). The global decline in the healthcare workforce, particularly in low- and middle-income countries (LMIC), is a growing concern (Abdullahi et al., 2023). Job satisfaction is inversely related to the propensity to leave a position (Q. Wang & Tan, 2019). Job satisfaction not only has a direct negative effect on burnout and turnover intention, but also has an indirect effect on turnover intention through burnout as a mediator (H. Wang et al., 2020). When physicians' job satisfaction decreases, it can result in increased turnover, disrupt the continuity of healthcare services, exacerbate tensions between doctors and patients, and lead to higher healthcare costs (Murray et al., 2001). Job dissatisfaction is a major driver behind healthcare workers seeking career changes, reducing productivity, and potentially shifting to more promising opportunities, thereby posing a threat

to regional public health (Abdullahi et al., 2023).

Job satisfaction is widely recognized as a crucial factor influencing the well-being and mental health of health workers (Alotaibi et al., 2023). Higher job satisfaction can reduce job fatigue (Danacı & Yazır, 2022), positively impacting physicians' health and career development (Stobbe et al., 2021). Additionally, there is a statistically significant negative correlation between job satisfaction and emotional exhaustion ($r=-0.394$, $p<.001$) (Heidari et al., 2022). Caregivers with high job satisfaction are better able to balance work and family life (Uzdıl et al., 2023). A study conducted in Turkey demonstrated that as nurses' job satisfaction increases, so does their quality of life and the quality of care they provide (Kiliç Barmanpek et al., 2022) Improving doctors' job satisfaction has become the key to improving the quality of healthcare services and the efficiency of resource allocation (J. Wu et al., 2020).

1.2.2 The job satisfaction of medical staff in Chinese MCHIs requires prompt enhancement

International studies have concluded (Samadi et al., 2023)that the job satisfaction of healthcare providers has not received enough attention in any of the literature, especially in healthcare systems in low- and middle-income countries. Recent studies have found (Abdullahi et al., 2023) that there are regions where healthcare providers have low overall job satisfaction of 65%. There are regions where the overall satisfaction of healthcare provider employees is only 20% (Deshmukh et al., 2023). A survey of 314 healthcare workers in Malaysia (Azmi et al., 2022) showed that the incidence of job dissatisfaction was 35.7%. The study showed (Deshmukh et al., 2023) that among the three types of healthcare providers in a healthcare organization, doctors, nurses, and support staff, the percentage of dissatisfied employees was highest among doctors (20%), nurses (6.66%), and support staff (6.67%). Support staff were significantly more satisfied compared to doctors and nurses. A study of 1,732 Swiss physicians, including general practitioners, internists, and pediatricians, demonstrated that higher levels of job satisfaction can alleviate emotional exhaustion and mental health issues among physicians (Bovier et al., 2009). Furthermore, nursing staff were found to have higher job satisfaction compared to both specialists and general practitioners (Zikusooka et al., 2021).

In China, the concept of "patient-centeredness" became the central focus of hospital reform after the 21st century began (K. Zheng, 2001). In 2015, China's National Health Planning Commission (NHPC) established a "people-centered" approach as the guiding principle for healthcare reform, emphasizing the protection of patient rights. Researchers argue that while patient satisfaction has been the focus of healthcare reforms, attention to the satisfaction of

medical staff remains insufficient (Ling, 2021; S. Zhang et al., 2018). The emphasis on patient satisfaction often came at the expense of physician job satisfaction (L. Zhou & Wang, 2018). Researchers have concluded that the job satisfaction of clinicians in Chinese hospitals is unsatisfactory (Fu et al., 2023). Studies have shown that a growing number of physicians across China are leaving or planning to leave their jobs due to dissatisfaction (Y. Zhang & Feng, 2011). Job satisfaction has been identified as a significant predictor of physicians' intention to leave (Y. Zhang & Feng, 2011). 48.51% of medical staff were dissatisfied with the professional environment in which they worked with (Yan & Su, 2015). According to D. Hu and his team (2016), the overall satisfaction level of Chinese healthcare workers was low. The 2018 "Third-party Evaluation of the National Action Plan for Further Improving Medical Services" which surveyed 136 public tertiary hospitals, found that clinicians' job satisfaction was only 34.6% (S. Wu et al., 2019). Other studies have also highlighted the high levels of occupational stress and poor subjective well-being experienced by medical professionals in China (Q. Zhang et al., 2019). A study of job satisfaction among family physicians in Guangzhou, China (S. Liu & Y. Zhang, 2020) showed low overall job satisfaction among family physicians. A survey of 30 randomly selected Beijing hospitals showed that the satisfaction of medical staff has yet to be improved (J. Liu, 2020). A study of pediatricians' job satisfaction in Nanjing, China (Zhu et al., 2020) showed that pediatricians' job satisfaction was at a generally low level. A study in Chongqing, China (B. Liu et al., 2020) concluded that pediatricians' overall job satisfaction was not high income. A study of physicians in Hangzhou, China, also found (Ma et al., 2021) that overall physician satisfaction was low. A sample survey covering eastern, central, and western China showed that physician satisfaction was at a low level (X. Li et al., 2022). Researchers emphasize that improving physician job satisfaction should be as important as improving patient satisfaction (L. Zhou & Wang, 2018).

China began to address the issue of doctors' job satisfaction more systematically in January 2019 with the release of *the Opinions of the General Office of the State Council on Strengthening the Performance Assessment Work of Three-Tier Public Hospitals* (General Office of The Council, 2019) This policy initiated a comprehensive performance assessment of three-tier public hospitals nationwide, incorporating an index system with indicators in four key areas: medical quality, sustained development, operational efficiency, and satisfaction evaluation. For the first time, the evaluation of hospital satisfaction include both patient satisfaction and medical staff satisfaction The document emphasizes (General Office of The Council, 2019) that patient satisfaction is an important manifestation of the social benefits of tertiary public hospitals, and that improving medical staff satisfaction is an important guarantee

for hospitals to provide high-quality medical services, and that the sense of patient access and the motivation of medical staff are measured through the evaluation of outpatient, inpatient and medical staff satisfaction. To facilitate this, a national satisfaction management system and survey platform were established by the National Health and Wellness Commission (NHSC). By March 2019, all three-tier public hospitals nationwide were required to be included in the NHSC satisfaction survey platform, with the results incorporated into the overall performance evaluations of these hospitals.

In May 2019, the NHSC developed the Operational Manual for Performance Assessment of National Tertiary Public Hospitals (2019 Edition)(China, 2019). The manual defines medical staff satisfaction as the overall attitude of medical personnel toward their work and the extent to which their needs are met. The dimensions of the medical staff satisfaction questionnaire as part of the NHSC satisfaction survey platform include compensation and benefits, career development and promotion, job content and environment, superior-subordinate relationship, and peer relationship. The state has incorporated medical staff satisfaction into the assessment. Hospitals are required to stay informed about medical staff's overall experience with hospital management, both operational and financial This approach aims to guide medical institutions to consider various factors from the assessment, to improve job satisfaction, boost motivation, and reduce issues like high staff turnover. By addressing these areas, the goal is to ensure that medical staff can better serve patients.

In June 2021, the Opinions on Promoting the High-Quality Development of Public Hospitals (General Office Of The Council, 2021) explicitly proposed that the resource allocation of public hospitals should shift from focusing on the material elements to focusing on the talent elements, establish a long-term mechanism for the protection of caring for and protecting the medical staff, such as improving the working environment and conditions, reducing their workload, implementing systems for paid leave, supporting the growth of young medical professionals by establishing youth learning funds, enhancing employee care and support mechanisms, establishing a professional honor system, strengthening hospital security, improving mechanisms for preventing and addressing medical disputes, last but not least, ensuring the safety of medical personnel.

The Notice on Issuing Evaluation Indicators for High-Quality Development of Public Hospitals (for Trial Implementation)(Office of the National Health Commission, 2022), issued by the General Office of the National Health and Wellness Commission in 2022 further clarified the inclusion of medical staff satisfaction in the evaluation index system for the high-quality development of public hospitals. The document reemphasized the need to establish a long-term

mechanism for the care and protection of medical staff and to improve their working environment and conditions. Simultaneously, China has conducted performance appraisals for MCHIS since 2020 (Office of the National Health Commission, 2021), following a framework similar to that of public hospitals. In these appraisals, medical staff and patient satisfaction are crucial indicators. Performance appraisal results can affect the financial allocation and reputation of hospitals, which further affects their survival and development. Consequently, healthcare institutions in China, including MCHIS, must prioritize the job satisfaction of their medical staff.

1.2.3 Investigating the influence of KM on job satisfaction among medical staff in China: a research gap

Despite a large number of studies exploring the factors influencing job satisfaction (Masa Deh et al., 2019), very few of them exanimated it from the perspective of KM (Masa Deh et al., 2019; Masa Deh et al., 2016). Since the 21st century, a limited number of studies have begun to link KM to job satisfaction (Koseoglu et al., 2010; Y. Lee & Chang, 2007; S. Almahamid & A. McAdams et al., 2010). Studies have shown (Kianto et al., 2016; Koroshnia & Forozan, 2018; T. N. Kumar, 2018; Malik & Kanwal, 2017) a direct correlation between KM dimensions and employee job satisfaction, suggesting that KM can serve as an antecedent factor for job satisfaction among knowledge workers (Chatzoudes et al., 2015; Kianto et al., 2016; Razmerita et al., 2016; Shujahat et al., 2018). The few studies exploring the relationship between KM and employee job satisfaction (Kianto et al., 2016; Koseoglu et al., 2010; Y. Lee & Chang, 2007; S. Almahamid & A. McAdams et al., 2010; Singh & Sharma, 2011) were conducted in various sectors including wire and cable, telecommunication, hospitality, and public government. Knowledge workers, whose roles rely on expertise gained through formal education or work experience, are crucial to organizational growth and development due to their problem solving abilities and capacity to develop new solutions (Masa Deh et al., 2019). Organizations should prioritize the job satisfaction of knowledge workers as only satisfied employees are motivated and productive (Masa Deh et al., 2019).

Research has demonstrated that KM generates high levels of knowledge worker satisfaction within organizations (Shujahat et al., 2018), highlighting the clear need for further studies on the relationship between KM and knowledge worker satisfaction in knowledge-intensive organizations (Shujahat et al., 2018).

Several empirical studies have explored the process of KM, particularly knowledge sharing and job satisfaction (Butt et al., 2018; Kianto et al., 2016; Shujahat et al., 2018). some studies

have specifically examined the relationship between KM and satisfaction (Chatzoudes et al., 2015). Research has shown that implementing KM process within organizations leads to increased employee satisfaction (Kianto et al., 2018; Kianto et al., 2016; Shujahat et al., 2018). KM processes in knowledge-intensive environments enable employees to build shared understanding and derive value from knowledge (Mohrman et al., 2002). Furthermore, in the knowledge age, KM processes constitute a contextual feature of the work environment, enriching work and enhancing job satisfaction (Morgeson & Humphrey, 2006).

Y. Lee and Chang (2007) studied the relationship between job satisfaction and KM among employees of a wire and cable group in Taiwan. Their findings showed the correlation between job satisfaction and KM. The findings of Koroshnia and Forozan (2018) showed that KM dimensions were significantly correlated with job satisfaction. T. N. Kumar (2018) concluded that KM practices (knowledge creation, knowledge acquisition, knowledge acceptance, knowledge storage, knowledge sharing, and knowledge application) have a significant effect on job satisfaction. Almahamid et al. (2010)focused on the effect of knowledge sharing on job satisfaction in a sample of 160 employees in Jordan, revealing that knowledge sharing practices significantly affect employees' job satisfaction. Kianto et al. (2016), Malik and Kanwal (2017) emphasized that job satisfaction is affected by knowledge sharing. Imran, Bilal, Aslam, & Rahman (2017) discussed the impact of knowledge application process on job satisfaction. Knowledge acquisition process affects employees' job satisfaction (Gangi et al., 2019; Kianto et al., 2016; G. Wang et al., 2019). Moreover, knowledge protection, as a managed aspect of KM, has been consistently found to have an impact on job satisfaction (Byrd & Turner, 2001; Y. Huang et al., 2019).

The study examined the overall impact of employees' knowledge and skills on job satisfaction (Alonso et al., 2019; Davila et al., 2019; Hendri, 2019). In addition, knowledge transformation has been shown to influence employees' job satisfaction (S. H. Han, 2018; Ibidunni et al., 2018; Karolidis & Vouzas, 2019; Serenko, 2019). Masa'deh el al. (2019) found that technological and cultural Knowledge infrastructures have a significant and positive impact on job satisfaction. Recent research also indicates that KM has a complex impact on job satisfaction (Mila Kavali et al., 2023).

Herzberg's two-factor theory, along with numerous studies, supports the positive impact of KM process on employee satisfaction (Umar et al., 2020). Health factors and motivational factors are two key components of Herzberg's two-factor theory (Herzberg, 1964, 1966). KM, especially the KM process, reduces dissatisfaction while achieving satisfaction through motivational factors (Shujahat et al., 2018). KM encourages rewards, leadership support, and

fair treatment, which helps mitigate employee dissatisfaction while aligning with hygiene factors (Donate & Guadamillas, 2015; P. F. Drucker, 1998, 1999; Kulkarni et al., 2006). Moreover, the KM process influences motivation by facilitating intrinsic factors. For example, it motivates knowledge workers by: (1) granting autonomy in work assignments; (2) promoting learning and knowledge-rich environments that have an impact on the KM process of knowledge workers; (3) allowing workers to indulge in a number of knowledge-based activities, thereby stimulating their intrinsic motivation to create and maintain knowledge (Nonaka & Takeuchi, 1995); (4) enabling workers to fulfill the obligations to acquire, share, and utilize knowledge; and (5) ensuring the provision of supportive work facilities (P. F. Drucker, 1999; C. H. Liu et al., 2017; Palvalin, 2017; Palvalin et al., 2017; Shujahat et al., 2018; Turriago-Hoyos et al., 2016).

Job satisfaction of health care providers has been recognized as an important predictor of the quality of patient care (Soriano-Vázquez et al., 2023). In the field of health care research, attention has also begun to focus on the impact of KM on job satisfaction. A study of Romanian healthcare system workers showed (Popa et al., 2018) that knowledge acquisition and utilization had a significant positive impact on employee satisfaction, while knowledge sharing was associated with decreased satisfaction, with the type of hygiene factors influencing this relationship. A study of pharmacists in a Jordanian pharmacy chain found a positive correlation between pharmacists' satisfaction and the use of ICT (Rateb et al., 2022). Additionally, research on medical staff indicated a significant positive correlation between KM processes—such as knowledge creation, retention, and application—and job satisfaction, though no significant relationship was found between knowledge transfer and job satisfaction (Fadaie et al., 2023).

Interviews from a Chinese study on the job satisfaction of doctors in tertiary public hospitals revealed (Ma et al., 2021) that most doctors view salary and benefits as only a part of fulfilling basic needs. They emphasized that having a strong platform for professional development and recognition is more important, which includes opportunities for scientific research and innovation, further training abroad, and peer-to-peer learning and exchange. As knowledge workers, doctors prioritize personal growth and development. A survey of general practitioners in Guangdong (Hao et al., 2022) found that those who regularly engaged in self-training had higher overall job satisfaction compared to those who did not have a learning habit.

However, the impact of KM on job satisfaction cannot be easily predicted (Epaminonda et al., 2021). At present, no studies have directly explored the relationship between KM and job satisfaction among Chinese physicians.

1.3 Research Aim

To propose a new perspective for enhancing physicians' job satisfaction and to explore solutions to the current developmental challenges faced by MCHIs from the viewpoint of KM.

1.4 Research questions

Building on the existing domestic and international research and addressing the survival and development challenges faced by Chinese MCHIS, this study raises the research question of whether it is possible to improve doctors' job satisfaction through KM in Chinese MCHIS, to explore new ideas to solve the current development dilemma of MCHIS. Shenzhen Maternal and Child Healthcare Institution were served as the research case, with an analysis focused on how KMC affects doctors' job satisfaction. Against the backdrop of the challenges faced by MCHIs in China regarding their survival and development, and in light of the pressing need to enhance physicians' job satisfaction, this study proposes a research question: can the improvement of KMCs elevate physicians' job satisfaction in MCHIs in China based on the latest research on KM and job satisfaction? This represents a new perspective for exploring solutions to the current developmental challenges faced by MCHIs through the lens of KM. The study is specifically divided into two research questions: first, how can the KMCs of hospitals in China be measured? Second, how do the KMCs of MCHIs in China affect physicians' job satisfaction?

1.5 Structure of the thesis

This thesis is consisted of six chapters.

Chapter 1 introduces the research background, dilemmas, objectives, and questions. As a knowledge intensive industry, healthcare relies heavily on KMCs to enhance the quality, innovation and performance of healthcare institutions. These capacities enable healthcare institutions to build competitive advantage. Knowledge in the healthcare industry exhibited characteristics of high dispersion, information overload, and distinct professional boundaries. Chinese MCHIs were a type of hospital primarily serving women and children, focusing on obstetrics, neonatology, and pediatrics. The decline in China's birth rate posed challenges to the survival and development of MCHIs, necessitating that these institutions improve service quality and patient satisfaction to bolster their competitiveness. The job satisfaction of medical

staff significantly affects the quality of medical care and patient satisfaction. In the context of declining birth rates, the job satisfaction of physicians in MCHIs was crucial for enhancing healthcare quality, patients' satisfaction, and competitiveness. However, the job satisfaction of medical staff in China was not optimistic, highlighting an immediate necessity to elevate the job satisfaction of medical personnel within MCHIs. To propose a new perspective for enhancing physicians' job satisfaction and to explore solutions to the current developmental challenges faced by MCHIs from the viewpoint of KM. Based on the latest research on KM and job satisfaction, this study proposed a research question, specifically, whether it is possible to enhance physician job satisfaction in MCHIs in China by improving KMCs. This was further delineated into two specific research inquiries: First, how can the KMCs of hospitals in China be measured? Second, how do the KMCs of MCHIs in China influence physician job satisfaction?

In Chapter 2, international and domestic (Chinese) studies on KMCs and job satisfaction are reviewed. Hypotheses and a conceptual model are then proposed in alignment with the research questions, leading to the development of the research framework.

Chapter 3 details the research methodology. Chapter 4 presents the findings from the two research phases. The study is divided into two phases. In the first phase, it utilizes extensive literature reading, drawing on Nonaka's (1994b;1998) theory, summarizes existing research models of KMC, such as Gold (2001), to develop a conceptual model of KMC specifically for Chinese hospitals. By drawing on the entries of KMC measurement scales of foreign commercial organizations and combining the actual situation of Chinese hospitals and experts' opinions, a preliminary KMC scale for Chinese hospitals was established. Entries were screened and modified and optimized through Delphi expert consultation. The scale entries were debugged through a small-scale pre-survey and expert focus group discussions to develop a KMC scale for Chinese hospitals. The reliability and validity of the Chinese Hospital KMC Scale were verified through a large-scale survey. The results demonstrate that the scale has strong reliability and validity, making it suitable for evaluating the KMC of Chinese hospitals. The second stage of this study is grounded in the two-factor theory of job satisfaction research (Herzberg, 1964, 1966) and incorporates the conceptual models proposed by Shujahat et al. (2018), Masa Deh et al. (2019), and Umar et al. (2020). This framework forms the basis for the study's conceptual model and research hypotheses regarding the impact of KMC on physicians' job satisfaction. Using the research-developed Chinese Hospital KMC Scale, the study was applied to Chinese MCHIs. The empirical results, gathered from three MCHIs in Shenzhen, confirmed that the KMC of MCHIs in China significantly affects physicians' job satisfaction.

Chapter 5 discusses the research findings. Chapter 6 concludes the study. In developing the KMC scale for Chinese hospitals, this study focused on the specific context of Chinese hospitals and analyzed various areas of KM, including strategic management, quality management, operations management, informationization management, medical research, and medical education. Evaluation indicators were extracted related to the technical, institutional, cultural, and process capabilities of knowledge infrastructure, as well as knowledge acquisition, transformation, application, and protection. Indicators were extracted, and scale entries were set up using clear descriptions supplemented with relevant examples. By developing the Chinese Hospital KMC Scale, we actively exploring a theoretical research methodology for hospital KM that is tailored to the specific context of China, thereby laying the groundwork for subsequent in-depth research on the relevance of KM in Chinese hospitals. The KMC scale developed in this study holds practical significance for enhancing the KMC of Chinese hospitals. Using this scale, MCHIS can evaluate their current level of KMC. Furthermore, based on the specific scale items of the KMC scale, these institutions can implement targeted capacity-building initiatives to improve their KM practices. Based on the current state of research at home and abroad and the challenges of survival and development faced by Chinese MCHIS, this study investigates the impact of KMC on physicians' job satisfaction. It further explores ways to enhance KMC by addressing both from the foundational settings and processes of KM, thereby contributing to improve physicians' job satisfaction.

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Chapter 2: Literature Review

The industrial manufacturing and production-oriented economy has been transformed into a knowledge and service-based economy in which business information or knowledge is the most important commodity (Walczak, 2005). The transition from the industrial age to the knowledge age has left room for the creation, collection and use of knowledge (Johannessen & Olsen, 2010). The increasing significance of knowledge in contemporary society necessitates a change in the way we think about organizational innovation, whether it is technological innovation, product innovation, or strategic or organizational innovation (Nonaka, 1994). Nonaka and Takeuchi (1995)suggest that in an economic environment where uncertainty is the only determinable factor, knowledge is undeniably the primary source of competitive advantage for firms and organizations. Supported by organizational assets and skilled labor, knowledge work is increasingly represented in the marketplace (Shahrah & Al-Mashari, 2021). With the constant evolution of the IT development stage, the knowledge economy came into being, and innovation and the application of new ideas or technologies in various fields or sectors are more than ever the key to success (Popa et al., 2018). The emergence of the knowledge economy has forced organizations to deviate from the traditional way of dealing with human resources and adopt a KM approach (Al-Busaidi & Olfman, 2017; B. Obeidat et al., 2017; Trivellas et al., 2015). Knowledge is now viewed as a strategic resource in the decision-making process and the goal of knowledge strategy is to create new value (Bolisani & Bratianu, 2017).

2.1 Knowledge and knowledge management

2.1.1 Knowledge

2.1.1.1 Definition of knowledge

Researchers, drawing from various perspectives including philosophical epistemology, cognitive psychology, and the relationship between information and knowledge, have proposed diverse definitions of knowledge. These definitions are organized and summarized in Table 2.1 below.

Table 2.1 Different definitions of knowledge

Scholars	Content of definitions
Jean Piaget (1981)	Knowledge is a perceptual construct resulting from the mutual exchange of subject and object.
Huber (1990)	Based on beliefs and competencies, knowledge is a state, an object, a process, both a competency and a prerequisite for information gathering.
Starbuck (1992)	Knowledge is a stock of specialized skills.
Wiig (1993)	Knowledge includes facts, beliefs, opinions, perceptions, judgments, expectations, methodologies and practical knowledge.
Nonaka and Takeuchil (1995)	Knowledge is a validated belief that increases an individual's ability to act.
Spender (1996)	Knowledge synthesizes structured experience, values, situational information, and expert level, and it is the basis for evaluating and integrating new experiences and information.
Beckman (1997)	Knowledge is a logical human reasoning about data and information, emphasizing the process of knowledge formation and behavioral uses.
Davenport and Prusak (1998)	Knowledge is a combination of structured experience, values, systematic information and expert opinion.
Liebowitz and Beckman (1998)	Knowledge is a situation, fact, example, event, rule, hypothesis, or model that enhances understanding or performance in a domain.
P. Drucker (1998)	Knowledge is information that is capable of changing people or things, both in the way that information becomes the basis for action and in the way that the use of information empowers an individual to change or to behave more effectively.
Zack (1999a)	Data is the result or fact of observation, information is meaningful contextual data, and knowledge is organized meaningful information. Knowledge can be viewed as a process.
P. M. Watson et al. (1999)	Knowledge is the ability to use information, learning and experience leads to this ability to transfer information to each other and to determine what information is needed in the decision making process.
C. R.Bell (2002)	Knowledge is the result of reasoned judgments or empirical findings presented about facts or ideas.
Steven Walczak (2005)	Knowledge is any data, skill, context, or information that enables quality decision making and problem solving.
R.T. Watson (2008)	Knowledge is an ability that can influence actions or decisions.
Cho (2011)	Knowledge is information that an individual understands and relates to facts, procedures, concepts, explanations, ideas, observations and judgments. However, not every piece of information can be transformed into knowledge; when an individual is unable to understand the contextual meaning of the information, the information cannot be transformed into knowledge and remains only in its current form.
Gharakhani and Mousakhani (2012)	Knowledge is a combination of experiences, values, contextual information, and expert insights that provide a basis for evaluating and integrating new experiences and information generated and applied in an individual's mind.
J. Li et al. (2018)	Knowledge is the result of logical processing of data and information as a prerequisite for decision-making and behavior.
Sang (2021)	Knowledge is an expression of information and data after bringing together logical reasoning, which can directly guide human actions and decisions.

This study considers knowledge as any skill or information that can be used in decision making and problem solving.

2.1.1.2 The importance of knowledge

Knowledge is considered an important organizational asset (Banks, 1993), and is closely related to firm capabilities (Winter, 1987). Miller and Shamsie (1996) divide resources into four categories of which knowledge is an important one. Stewart (1991), Bontis (1996), Edvinsson and Sullivan (1996) consider knowledge as a kind of capital, including human capital, structural capital, and relational capital. Knowledge is the most important resource to gain competitive advantage and the key to enhance innovation (Al-Husseini & Elbeltagi, 2015).

The KBV extends the resource-based theory by emphasizing knowledge as the most important strategic resource, characterized by its complexity (Grant, 1996). KBV views knowledge as a systematized and structured set of experiences and facts derived from data and information (Davenport & Prusak, 1998). Knowledge encompasses both information and know-how, enabling organizations to thrive by effectively creating, sharing, utilizing, and protecting information and know-how to survive, develop, and have competitive advantage (Kogut & Zander, 1992). KBV is a unique and scarce asset that is key to value and sustainable competitive advantage and this perspective posits that an organization's primary role is to leverage and generate new knowledge (Seleim & Khalil, 2007). Grant (1996) states that it is through the five attributes of transferability, ability to integrate, exclusivity, specialized knowledge acquisition, and the knowledge requirements for production that an organization shapes its knowledge into a resource that is unique to the organization and not easily imitated by competitors, to creating value for the organization.

Knowledge is an important resource within the organization, which plays a decisive role in organizational performance and core competitiveness, and how to better understand and manage knowledge has received a great deal of attention from researchers and business managers (Gemino et al., 2015).

2.1.1.3 Classifications of knowledge

Polanyi (1966) was the first to classify human knowledge into two categories. "Explicit" or "codified" knowledge refers to knowledge that can be communicated in formal, systematic language, whereas "tacit" knowledge possesses a personal quality that makes it challenging to formalize and communicate. Tacit knowledge is deeply rooted in context-specific actions, commitment and participation, and is "embedded in a holistic view of the human mind and body". Subsequent research perspectives have led to various taxonomies of knowledge and knowledge management (Alavi & Leidner, 2001). Nonaka (1994), Pathirage et al. (2007), as well as Gao et al. (2008) argue that knowledge encompasses both explicit and implicit

knowledge. Nonaka (1994) further posits that knowledge can be categorized into individual knowledge, group knowledge, organizational knowledge, and cross organizational knowledge. Quintas et al. (1997) distinguish knowledge into entity knowledge and process knowledge. Holsapple and Joshi (2000a) classify knowledge into purpose knowledge, strategic knowledge, cultural knowledge, and foundational knowledge. De Long and Fahey (2000) divide knowledge into personal knowledge, structural knowledge, and social knowledge. Lam (2005) asserts that knowledge can be divided into mental knowledge, concrete knowledge, embedded knowledge, and encoded knowledge. Srdoc et al. (2005) argue that knowledge includes general knowledge, specific knowledge, and expert empirical knowledge. Chua and Banerjee (2013) differentiate between private knowledge and public (organizational) knowledge.

Due to the diverse, complex, and dynamic nature of knowledge, proper knowledge classification is the basis for effective knowledge management. Nonaka's (1994) theory of organizational knowledge creation is considered a foundational concept in current KM practices. He defines the types of knowledge as tacit and explicit knowledge. Tacit knowledge is personal and internal to individuals, encompassing cognitive learning, mental models and expertise. Explicit knowledge can be encoded into various media, including paper documents, electronic databases and files, and operational procedures of an organization. Explicit knowledge is knowledge that can be communicated through formal, structured language (Nonaka et al., 2006). Explicit knowledge can be captured and shared via IT (Maertensson, 2000). Examples of explicit knowledge include text, computer code, pictures, program manuals, diagrams, and other observable forms (Dyck et al., 2005). Noe (2002) defines tacit knowledge as "personal knowledge based on individual experience and shaped by perceptions and values". Researchers have identified tacit knowledge as comprising lessons learned, rules of thumb, specialized knowledge, intuition, judgment, skills, beliefs, personal experiences, values, and creative processes (Bollinger & Smith, 2001). Tacit knowledge which resides in people's minds and is difficult to explain and communicate, is an important source for organizations, as 42% of corporate knowledge exists within employees, and the success of an organization heavily relies on leveraging this tacit knowledge (Singh, 2008). This study will adopt the knowledge categorization criteria of explicit and tacit knowledge.

2.1.1.4 Knowledge conversion

Nonaka (1994, 1998) proposes four modes of knowledge conversion: socialization, combination, externalization, and internalization. They convert tacit knowledge to tacit knowledge, knowledge to explicit knowledge, tacit knowledge to explicit knowledge, explicit

knowledge to tacit knowledge respectfully.

The first mode of the knowledge conversion model, socialization, facilitates the transformation of tacit knowledge through interpersonal interactions. Notably, individuals can acquire tacit knowledge without the use of words. For instance, apprentices learn their craft by working with mentors, relying on observation, imitation and practice rather than verbal instruction. Similarly, on-the-job training in the work of business employs these same principles. The key to acquiring tacit knowledge lies in experience. Without some form of shared experience, it is difficult for individuals to understand one another's thought processes. Mere information transfer lacks significance if it is dissociated from the emotions and subtle contexts embedded in shared experiences. This process of creating tacit knowledge through shared experiences is termed "socialization". Socialization is the process of transferring tacit knowledge to another individual who encodes the new knowledge in a tacit form. It can occur informally, such as informal conversations around a coffee machine or lunch table, or more formally, as in mentoring programs. However, because socialization involves transferring tacit knowledge between individuals, traditional hierarchical management models often inhibit this type of knowledge sharing.

The second model of knowledge transformation leverages social processes to integrate different forms of explicit knowledge held by individuals. This interaction occurs through communication mechanisms such as meetings and telephone exchanges. New knowledge can be generated through reconfiguring existing information by sorting, adding, reclassifying, and re-textualizing explicit knowledge. Modern computer systems provide a vivid example. This process of creating explicit knowledge from explicit knowledge is referred to as "combination". Combination entails converting explicit knowledge into a new variant, which may involve adding new content or simply altering the coding format of the existing explicit knowledge.

The third and fourth modes of knowledge transformation involve converting both tacit and explicit knowledge. These transformation models reflect the concept that tacit and explicit knowledge are complementary and can be developed over time through interactive processes. This interaction involves two distinct operations. The first is the transformation of tacit knowledge into explicit knowledge, referred to as "externalization". The second is the transformation of explicit knowledge into tacit knowledge, which closely resembles the traditional notion of "learning" and is referred to as "internalization". As will be discussed later, "metaphor" plays an important role in the process of externalization, while "action" is closely related to internalization. The expression of implicit perspectives is key to the creation of new knowledge. The following figure illustrates the four models of knowledge transformation,

known as the SECI model (Figure 2.1).

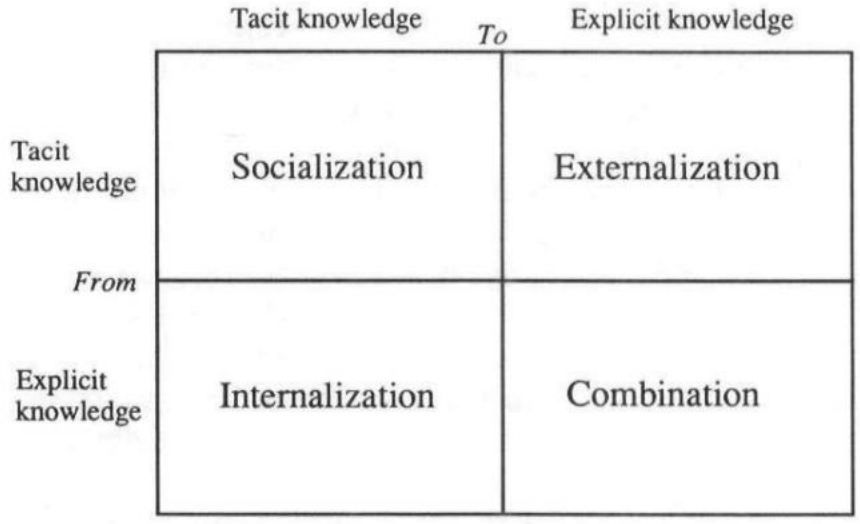

Figure 2.1 Patterns of knowledge creation

Source: Nonaka (1994, 1998)

Nonaka argues that the core of knowledge creation is the construction of tacit and explicit knowledge and, more importantly, the exchange between these two aspects of knowledge through internalization and externalization. Failure to establish a dialog between tacit and explicit knowledge may lead to significant issues. For instance, both pure combination and socialization have limitations. A lack of commitment and disregard for the personal significance of knowledge may result in pure combination being a superficial interpretation of existing knowledge, disconnected from present realities. Additionally, it may fail to materialize knowledge in a sufficiently concrete form to facilitate further knowledge creation in a broader social context. The "shareability" of purely socially created knowledge may also be limited, making it difficult to apply outside the specific context in which it was created. Unlike individual knowledge creation, organizational knowledge creation occurs across all four modes of knowledge creation, where the organization sustains a continuous cycle. This cycle is shaped by a series of transitions between different modes of knowledge transformation. While tacit knowledge held by individuals is central to the knowledge creation process, the actual benefits of realizing this knowledge are largely externalized and amplified through the dynamic interactions between all four modes of knowledge transformation. Thus, through the dynamic mobilization of tacit knowledge, a "spiral" model of knowledge creation is formed, as shown in Figure 2.2. As more participants in and around the organization become involved, the interaction between tacit and explicit knowledge becomes larger and faster. Thus, the creation of organizational knowledge can be seen as an upward spiral, progressing from the individual

level to the collective level, then to the organizational level, and sometimes to the inter-organizational level.

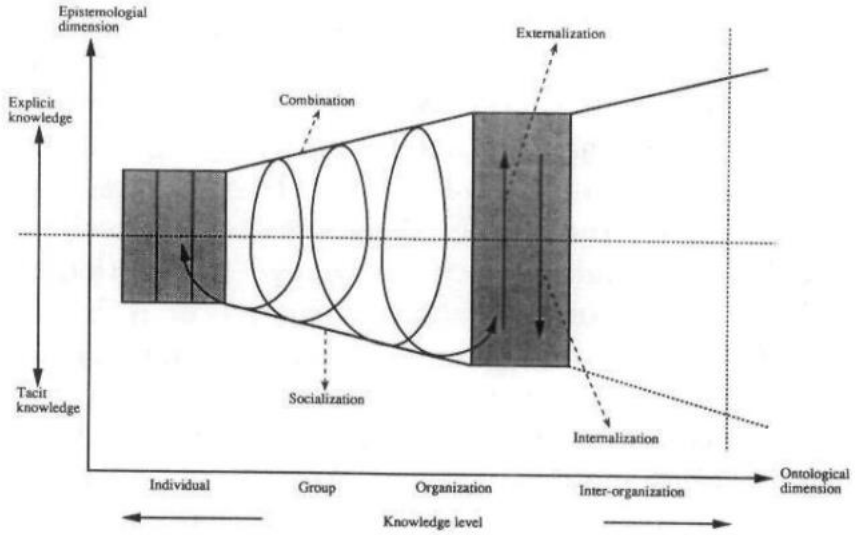

Figure 2.2 The "spiral" model of knowledge creation

Source: Nonaka (1994, 1998)

Fundamentally, knowledge is created by individuals; organizations cannot generate knowledge independently of their members. Organizations support creative individuals or provide an environment for these individuals to create knowledge. Therefore, organizational knowledge creation must be understood as a process that amplifies individual creativity "organizationally" and materializes it as part of the organizational knowledge network. The individual serves as the primary driving force in this process. Individuals accumulate tacit knowledge through direct "hands-on" experience. The initiation of organizational knowledge creation begins with the expansion of individual knowledge in the organization. The interplay between empirical knowledge and rationality enables individuals to develop their own perspectives of the world, which are articulated and amplified through social interaction. Organizations play a key role in mobilizing the tacit knowledge held by individuals and provide the conditions for the creation of "knowledge spirals" through socialization, combination, externalization, and internalization. All these modes of transformation dynamically and continuously interact, driving the knowledge creation process. While these models operate within an organizational context, they also acknowledge the significant role of individuals in fostering a creative environment.

Nonaka and Konno (1998) introduced the concept of *Ba* to describe the enabling environment for knowledge creation, which was first proposed by the Japanese philosopher Kitaro Nishida (1970, 1990) and further developed by Shimizu (1995). The concept of *Ba* can

be roughly translated into English as "place", and *Ba* provides a platform for individual or collective knowledge enhancement, a shared space that serves as a basis for knowledge creation, which can be physical (e.g., office), virtual (e.g., teleconference), or mental (e.g., shared experience) or a combination of any of the above.

Corresponding to the four stages of the SECI model (Nonaka & Konno, 1998), *Ba* can be classified into four types, originating *Ba*, interacting *Ba*, cyber Ba and exercising *Ba*, which aligns with one of the stages of knowledge creation: socialization, externalization, internalization and combination (Figure 2.3).

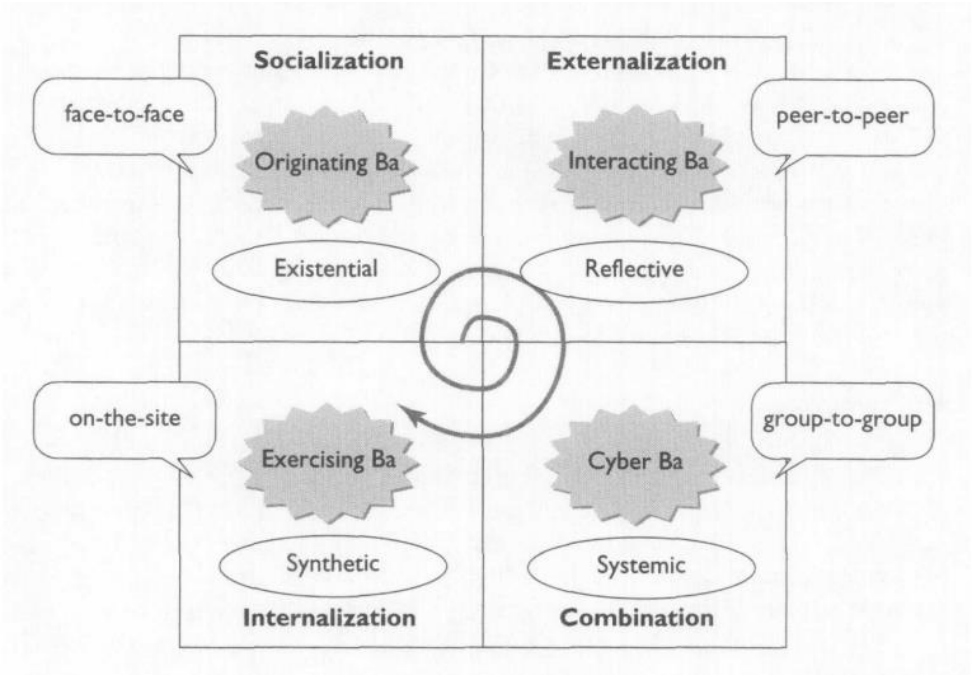

Figure 2.3 Four different types of Ba

Source: Nonaka (1998)

2.1.2 Knowledge management

2.1.2.1 Definition of knowledge management

The challenges of globalization, intense competition, and advances in communication and IT have led to a shift from a resource economy that controls physical resources to a knowledge economy that creates value through the use of knowledge (Mikkawi et al., 2017; Yeh et al., 2006). Many economists and management scientists have embraced the concepts of "knowledge economy" and "knowledge management" (Fadime Çınar, 2015). The emergence of the knowledge economy has compelled organizations to deviate from the traditional way of dealing with human resources and to adopt a knowledge management approach (Al-Busaidi & Olfman, 2017; B. Obeidat et al., 2017; Trivellas et al., 2015). Scholars from a variety of

disciplines, including management, economics, and sociology, agree that knowledge has diverted attention away from traditional resources, and they believe that managers should pay close attention to KM (Masa Deh, Obeidat, & Al-Dmour et al., 2015; Masa Deh, Obeidat, & Zyod et al., 2015; Masa Deh, Tarhini, & Al-Dmour et al., 2015; Maertensson, 2000; Shannak et al., 2012).

The focus of research has evolved over time, alongside the growing significance of KM. In the late 1970s, attention began to focus on the important role of knowledge in organizations (Argyris & Schon, 1978; Rosemberg, 1976), especially in the evolutionary theory of the firm (Nelson & Winter, 1982). Subsequently, the role of knowledge accumulation in organizational learning and learning organizations became the focus of research (Garvin, 1993; D. H. Kim, 1993; Senge, 1990). However, the term KM was not clearly defined until the 1990s, a period of high growth in information and communication technology (ICT). ICT played a crucial role in broadening knowledge source by facilitating interactions between people, while cross-generational technologies, such as multimedia, text analysis, and data mining, make it possible to acquire, store, access, and transform knowledge. This shift in KM research reflected a new research perspective, where knowledge was seen as an entity rather than a process, leading to the rise of technology-based KM. After the mid-1990s, scholars increasingly realized that KM is not solely technology-driven, prompting a re-examination of the role of people in KM. Current KM research widely acknowledges that both people and technology are essential. In recent years, some scholars (Moore, 2000; Quinn et al., 1996; Ruggles, 1998) have proposed frameworks for managing knowledge, developing knowledge-oriented organizations, and establishing related organizational models and practices, along with the necessary technical support to offer a more systematic description.

Michael Earl (2001) provides a more detailed classification of the research schools of KM, categorizing them into technical, economic and behavioral schools. The technical schools are further divided into systematic, graphic and mechanical, with each focusing on different aspects: the technology process, knowledge maps and KM system implementation, respectively. The behavioral schools are subdivided into organizational, spatial and strategic schools, concentrating on organization, space and ideological tendencies. The economic school, often referred to as the business school, mainly focuses on organizational gains.

From both domestic and international research perspectives, KM involves the main processes and tasks that constitute KM, including numerous links. In different links, according to different purposes and tasks, different management needs will be formed, and then form a complex content system, as summarized in Table 2.2.

Table 2.2 Definition and content of KM

Scholars	Definition and Content of KM
Verna Alle (1997)	knowledge management is the process of transforming information from various sources available to an organization into knowledge and linking that knowledge to people. knowledge management is the formal management of knowledge to facilitate its generation, acquisition and reuse.
Quintas et al. (1997)	knowledge management is the process of continuously organizing knowledge to realize existing and emerging needs, verifying existing knowledge resources, exploiting their value and exploring new opportunities. knowledge management is divided into five areas: information management, communication management, human resource management, intellectual capital management and brand management.
Wiig (1997)	knowledge management is the process of acquiring, organizing, reconstructing, storing, distributing and transferring knowledge, which involves knowledge sourcing, editing, transforming, disseminating, applying, creating, and emphasizes the need for joint efforts and cooperation among enterprises, departments, teams and individuals to carry out the work of all aspects of knowledge management.
Bassi (1997)	knowledge management is the process of creating, acquiring and using knowledge to enhance organizational capabilities.
Davenport et al. (1998)	knowledge management is a system that can provide decision makers or users in an organization with the necessary knowledge to make decisions and perform work.
Crossan et al. (1999)	knowledge management is a knowledge learning process that includes three levels: individual, team and organization.
Alavi and Leidner (1999)	knowledge management is the management of the process of acquiring, storing, transferring, sharing, applying and innovating knowledge to promote organizational innovation and competitiveness through the transformation of individual experience into organizational knowledge.
Horwitch and Armacost (2002)	According to some researchers, knowledge management is considered as a means of creating, implementing, transforming and storing accurate knowledge that helps to design improved policies, align actions and deliver results.
Bounfour (2003)	knowledge management is a set of processes, infrastructures, technologies, and management methods for creating, sharing, and influencing knowledge in and around an organization.
Liebowitz and Megbolugbe (2003)	knowledge management includes the creation, acquisition, storage, identification, encoding, transformation, sharing, dissemination, and utilization of knowledge.
Steven Walczak (2005)	knowledge management is any process (including formal policies or informal personal approaches) that contributes to the acquisition, sharing, creation, and utilization of knowledge to make decisions. Decisions may be made at the tactical level of the day-to-day operations of employees, or at a more strategic level, where top management sets the organizational strategy and each level of decision-making in between.
Wong and Aspinwall (2006)	knowledge management focuses on a proactive approach to managing and optimizing knowledge resources in an organization.
W. Hu (2009)	knowledge management is to use information technology as the support and means to transform organizational information into knowledge, to achieve the acquisition, dissemination, transformation and reuse of knowledge.
Duan (2014)	knowledge management aims to help organizations develop the technology, structure and system of internal knowledge exchange and application through the management of all kinds of organizational knowledge, so that all kinds of information, energy and material in the organization can be acquired, recorded,

	stored, updated, and innovated in the form of knowledge to complete the accumulation of knowledge and improve the innovation ability of the organization.
Girard and Girard (2015)	knowledge management refers to the process of creating, sharing, using and managing knowledge and information in an organization.
AL-Syaidh et al. (2016)	knowledge management can be distinguished as a formal, targeted process of judging what information is beneficial to the organization and deciding how to provide it to those who need it.
Darawsheh et al. (2016)	
Khasseh and Mokhtarpour (2016); Gold (2001); Shujahat et al. (2017;2018)	knowledge management refers to the processes and practices that leverage the knowledge assets of knowledge-based firms supported by knowledge management. Knowledge infrastructure to increase innovation and thus improve organizational performance. knowledge management consists of 3 components: practices, processes, and infrastructure.
Pauleen (2017)	knowledge management consists of two major processes of transferring knowledge and absorbing knowledge.
Pruzinsky and Milhalcova (2017)	knowledge management includes the processes of knowledge creation, knowledge codification, knowledge acquisition, knowledge sharing and knowledge retention.
Hislop et al. (2018)	Based on epistemology divides knowledge management into two: in objective and entity perspective, knowledge management manages knowledge through the creation of knowledge, databases, and in practical and relational perspective, knowledge management is the process of communication within members to achieve knowledge management.
Gaviria- et al. (2021)	knowledge management includes Knowledge Acquisition (KA), Knowledge Transfer (KT), Knowledge Use (KU).
Mila Kavali et al.. (2023)	knowledge management is a management function that serves to locate, create and manage knowledge flows within an organization.

This study adopts Alavi and Leidner's (1999) definition of KM, which refers to the management of the process of acquiring, storing, transferring, sharing, applying, and innovating knowledge. These processes enhance organizational innovativeness and competitiveness by enabling the transformation of individual experience into organizational knowledge. The reason for choosing the KM process as the focus of the study is that (Shujahat et al., 2018) the KM process exists naturally even in the absence of formal support and KM initiatives (Andreeva & Kianto, 2011).

The KM process has different components and the collection of these KM process definitions implies that the entire KM process includes knowledge creation, knowledge acquisition, knowledge sharing, knowledge transfer, knowledge utilization, knowledge retention, knowledge codification, and knowledge security (Ahmad et al., 2017; Kianto et al., 2016; Rasula et al., 2012). However, KM processes may vary depending on the level of aggregation (Andreeva & Kianto, 2011). Therefore, it has been suggested by some researchers that the KM process can be defined very comprehensively and reduced to the process of knowledge creation, knowledge sharing, and knowledge utilization (Ahmad et al., 2017; Rasula

et al., 2012), an operational definition that is consistent with the results of two empirical studies (Ahmad et al., 2017; Shujahat et al., 2017), where the first knowledge process, knowledge creation/knowledge generation, refers to an organization's ability to generate new knowledge in terms of developing and implementing new products and processes (Andreeva & Kianto, 2011), knowledge can be created through four processes: socialization, externalization, combination, and internalization (Nonaka & Takeuchi, 1995), which together are referred to as the SECI model or the theory of organizational knowledge creation; the second knowledge process, knowledge sharing, refers to the transfer of knowledge between individuals (Al-Husseini & Elbeltagi, 2015; Khasseh & Mokhtarpour, 2016).Finally, knowledge utilization, refers to the application of knowledge assets by different actors in the organization (Andreeva & Kianto, 2011; Khasseh & Mokhtarpour, 2016; Rasula et al., 2012).

KM process is a systematic activity of organizational capabilities and is considered vital (Alaarj et al., 2016; Y. Y. Chang & Chuang, 2011). ICT tools, especially the Internet, can facilitate the creation, storage, and sharing of tacit and explicit knowledge (Alavi & Leidner, 2001; Sousa & Rocha, 2019). Knowledge creation is the ability of an organization to develop new and useful ideas and solutions in all aspects of organizational activities, from product and technology processes to management practices (Abubakar et al., 2019; Balde et al., 2018; Mehralian et al., 2018; Nonaka, 1994). Knowledge creation is very necessary because today's knowledge will probably not solve tomorrow's problems (Awad & Ghaziri, 2007). Knowledge codification includes activities required to codify tacit knowledge into explicit form, store documented knowledge and provide up-to-date documented knowledge to others in the organization (Filius et al., 2000). Knowledge acquisition represents organizational practices aimed at gathering information from sources outside the organization (Darroch, 2005; Zahra & George, 2002). Knowledge sharing is the systematic dissemination of knowledge across the organization (J. Yang et al., 2005). Knowledge sharing activities include informal communication, brainstorming, coaching, and mentoring (Akram et al., 2020; Borges et al., 2019; Filius et al., 2000; Goel et al., 2010; M. Kumar, 2005). Knowledge sharing provides opportunities for interpersonal collaboration and is becoming increasingly important in organizations (M. Lin & Zhang, 2019). In most cases, knowledge sharing is necessary for employees in an organization (Cabrera & Cabrera, 2002) to achieve sustainable competitive advantage. KM focuses on knowledge sharing within the organization (Gil & Carrillo, 2016). Knowledge retention refers to the activities associated with the turnover of managers and the associated loss of expert knowledge and is a key strategic resource (Gil & Carrillo, 2016; Levallet & Chan, 2019; Motshegwa, 2017). Knowledge retention is a suitable platform for

regular updating of knowledge (Gil & Carrillo, 2016).. Knowledge retention is not only a strategy but also a cycle that shows the percentage of knowledge that can be extracted from each experienced employee (Levallet & Chan, 2019). Knowledge utilization is the application of knowledge to organizational operations and processes to produce valuable outputs in terms of products and services (Iqbal et al., 2019). Knowledge utilization makes the ongoing work smoother (Singh & Sharma, 2011).

Findings suggest (Andreeva & Kianto, 2011) that while all knowledge processes have a beneficial effect on innovation, knowledge creation has the greatest impact on innovation. It was found (Al-Husseini & Elbeltagi, 2015) that knowledge sharing plays a key role in promoting product innovation. Effective use of knowledge and acquisition of new knowledge is the only way for organizations to maintain competitive advantage in today's competitive environment (Dmaithan & Musa, 2019). It is important to think about what is the knowledge that needs to be managed when managing knowledge (Singh, 2008).

2.1.2.2 The importance of KM

In today's globalized, information-driven economy, effective management of intellectual capital is a critical issue for organizations (Walczak, 2005). Proactively managing, protecting and nurturing knowledge resources is necessary for organizational performance (Caputo, 2017; Santo, 2005). KM helps organizations to compete by identifying and exploiting collective knowledge in the organization (Von Krogh, 1998). Kavalic et al. (2021) argued that effective KM is necessary for the competitive sustainability of organizations. In the environment of knowledge economy, the ability to manage knowledge is becoming increasingly important (Mila Kavali et al., 2023). KM can be viewed as an organization's ability to create, acquire, distribute and transform knowledge into market competitiveness (Walters, 2002).

According to Carl Frappuolo (Frappuolo, 1998), KM has four basic functions of externalization, internalization, mediation, and cognition, which denote the acquisition of knowledge from the outside and its classification and organization, internal knowledge transfer, the provision of a source of knowledge for knowledge seekers, and the application of the knowledge gained by the above three functions. The recipient's ability to assimilate knowledge affects their level of drive and understanding (Cohen & Levinthal, 1990). How individuals are encouraged to share valuable knowledge is important (Bukowitz & Williams, 1999; Roberts, 2000; Rolland & Chauvel, 2000).

KM has been applied to a wide range of activities aimed at managing, exchanging, creating, or enhancing knowledge assets within an organization (Haggie & Kingston, 2003).

Organizations must not only leverage existing knowledge but must also continuously explore new knowledge for future organizational growth and to maintain a sustained competitive advantage (Sambamurthy et al., 2003).To continuously enhance knowledge creation, storage, and competitiveness, organizations implement effective KM and encourage employees to accumulate and share knowledge and work experience. Effective KM ensures that every employee has access to appropriate and highest quality information available when decisions need to be made (Walczak, 2005).

The purpose of KM is to manage and share knowledge within the organization. The essence of KM is the degree of "sharing"; the more knowledge is shared, the easier it is for KM to provide subordinates with access to the knowledge they need, and the higher the value of the knowledge, which is the basis for sustained organizational effectiveness (Lahaie, 2005). Large organizations are becoming increasingly aware of the importance of knowledge for efficiency and competitiveness (Halawi et al., 2005).

Lichtenthaler and Lichtenthaler concluded (2009) that KMCs involve the ability to reconfigure and adapt knowledge, and that firms successfully manage knowledge to achieve dynamic growth of managerial knowledge, and as such, KMCs help firms to formulate countermeasure strategies, and to achieve increased innovation capabilities. Research by Nielsen et al. (2011) shows that the organizational performance of the project increases as the KMC, knowledge acquisition and dissemination capability, and social communication and interaction capability continue to increase, so KMC can significantly improve the level of project performance.

G. Santoro et al. (2018) developed a model of KM systems and argued that as KMCs increase, it facilitates the establishment of an open, collaborative ecosystem that enhances knowledge utilization and ultimately increases the capacity for creativity. Dabić et al. (2019) argued that that the growing innovative performance of technology-oriented firms fosters an increase in the level of KM and, ultimately, a rise in the firm's capital absorption capacity. Pazmino-Santacruz and Afcha-Chavez (2019), using the KM capacity as a mediating variable, the analyze the contribution of human capital expansion to KMC, which, as it rises, facilitates the realization of innovation in management processes. The study (Pazmino-Santacruz & Afcha-Chavez, 2019) suggests that KM is a key strategic resource for the European Model of Excellence in Quality Management (EFQM) and proposes KM elements and their processes to achieve quality excellence management.

Nonaka and Takeuchi (1995) posited that in modern society somehow everyone has become a knowledge worker. Therefore, KM also contributes to employee benefits (Tiwari & Lenka,

2017). KM can promote innovative behavior among employees (S. Tsai, 2018) and can contribute to the enhancement of employee motivation (Da Silveira, 2019). Bloodgood et al. (2021) argued that the power of knowledge affects the degree of strategic positioning of the organization and thus affects the performance of employees. The determinants of knowledge have an impact on the non-financial performance of companies such as learning, growth and all internal processes of the employees (Abdollahbeigi & Salehi, 2021).

As a management function, KM ensures that knowledge is effectively applied in achieving long-term business goals (Darroch & McNaughton, 2002). KM is emerging as an innovative model for which organizations can sustain their success. In an environment of complexity, risk, uncertainty, and intense competition, organizations need to leverage all of their capabilities, both tangible and intangible resources, to invest in human capital that enables their employees to continuously learn and knowledge to improve performance and create value (María Díez et al., 2010). Knowledge enhances competitiveness and therefore KM is preferred as a problem-solving enabler (Gupta et al., 2000). Numerous studies have shown that KM process has a constructive impact on the performance or efficiency of organizations (Gold, 2001; Iqbal et al., 2019). KM enables organizations to achieve high levels of organizational performance (Al-Hakim & Hassan, 2016; Iqbal et al., 2019).

The creation, acquisition, storage, sharing, and utilization of knowledge over time ensures the longevity of any institution (Ballantyne, 2000). Studies have shown that a high level of KM has an impact on the quality of work, business performance, and thus the competitiveness of the organization (Kavalic et al., 2021).

Modern organizations must create and disseminate knowledge to remain competitive (Davenport & Prusak, 2000). G. Santoro et al. (2018) argued that KM systems facilitate the creation of open and collaborative ecosystems through the development of in-house KMCs, as well as the internal and utilization of external knowledge flows, which in turn improves innovation capabilities. They also found that KM has a positive and significant impact on entrepreneurship and performance (G. Santoro et al., 2019). KM practices contribute to organizational performance (Abubakar et al., 2019; Meher & Mishra, 2019; Shujahat et al., 2017), foster organizational innovation practices (Bloodgood, 2019; Matricano et al., 2019; Nonaka, 1994) and strategic decision-making (Cabrilo & Dahms, 2018; Peruffo et al., 2018). KM practices activities ultimately enhance the competitive advantage of the organization (Barley et al., 2018; Iqbal et al., 2019; Kongpichayanond, 2009; Sahibzada et al., 2020; Teixeira et al., 2018).

Effective management of knowledge resources leads to higher innovation performance

(Khasseh & Mokhtarpour, 2016; V. H. Lee et al., 2013; Rasula et al., 2012). There is a significant correlation between knowledge creation and innovation performance (Andreeva & Kianto, 2011; S. H. Chen et al., 2012); knowledge sharing and innovation (Al-Husseini & Elbeltagi, 2015; V.H. Lee et al., 2013); knowledge utilization and innovation performance (V. H. Lee et al., 2013; Song & Deng, 2005; Soto-Acosta et al., 2016) are significantly correlated with each other.

Facilitating KM depends on KMCs that help create knowledge by integrating/combining different resources and activities that have a positive impact on competitive advantage, KM effectiveness, and organizational effectiveness (Aujirapongpan et al., 2010; Masa Deh et al., 2017). KM competencies promote organizational performance (Chiu & Chen, 2016).

KM is viewed as a prerequisite for improving organizational productivity and flexibility (Abualoush et al., 2018; Ammari et al., 2017; B. Obeidat et al., 2017; O. Obeidat et al., 2017; Maertensson, 2000; Shannak & Obeidat, 2012). Some researchers suggest that KM should be the basis of organizational capability enhancement that can lead to superior organizational performance (Alenezi et al., 2017; AlHrassi et al., 2016; Alkandari et al., 2017; Almajali & Al-Dmour, 2016; Khwaldeh et al., 2017; Masa Deh et al., 2018; Mikkawi et al., 2017; Tarhini et al., 2015; Yassien & Mufleh, 2017). Additionally, KM can create value for the organization's stakeholders (AlHarrasi & AL-Lozi, 2016; Khalayleh et al., 2017; Schiuma et al., 2007).

According to Gharakhani and Mousakhani (2012), KM creates new capabilities for organizations, achieves performance excellence, encourages innovation, and increases customer value. Demchig (2015) states that KM stimulates innovation, improves services provided to customers, and helps organizations achieve business excellence by accumulating, mentioning the usability and accessibility of knowledge, and effectively utilizing knowledge to help organizations achieve business excellence. Masa'deh (2016) agrees with the importance of KM for organizations that has been reported by many researchers. Cho (2011) argues that KM enables organizations to become flexible so that they can respond quickly to changing conditions, promote innovation, and enhance decision-making capabilities and productivity.

2.1.2.3 Impacting elements of KM

Knowledge management-related researchers have extensively studied KM influences, ranging from organizational strategy, external environment, resources, leadership style, organizational structure, organizational culture, and IT. Michael H. Zack (Drew, 1999; Earl, 2001; Johannessen et al., 1999; Liebowitz & Beckman, 1998; Zack, 1999b) emphasized the establishment of a knowledge strategy aligned with organizational strategy, which guides the organization's KM

practices. According to an empirical study conducted by Alavi and Leidner (1999), the success or failure of adopting KM can be viewed in terms of the knowledge and information content managed and the technology. Holsapple and Joshi (2000b) adopted a holistic perspective of KM, compiling past research on KM and identified three main categories of KM influences through the Delphi method: management, resources, and environment. Wixom and Watson (2001) hypothesized that organizational factors (managerial support, resources, user participation.), project-related factors (resources, user participation, team skills.), and technological factors (high-quality source system, better development technology). Rubenstein-Montano et al. (2001) point out that the integration of KM with the organization's strategic goals, the people involved in KM activities, and the cultural environment in which KM is developed, are often overlooked.

Focusing on corporate knowledge activities, Kang and Kim (2007) identified top management support and organizational culture as important factors influencing corporate knowledge activities. Teerajetgul et al. (2009) started their study from the field construction of engineering projects and this study focused on KM practices and found that accountable leadership, rewards or incentives, collaboration, trust, IT, and personal competencies or skills were the main influences on KM.

Lindner and Wald (2011), in their study of KM factors in temporary organizations, found that in addition to IT support and formal elements of the organization, cultural factors also had a significant impact on KM success. M. C. Kim and D. W. Kim (2011) conducted an empirical study of the factors influencing the use of KM systems in business enterprises and found that knowledge creation capability, knowledge infrastructure, and managers' willingness to support are factors that determine the level of use of KM, and that superior knowledge creation capability facilitates the realization of high-quality KM.

Pazmino-Santacru and Afcha-Chavez (2019), as well as Gürlek and Çemberci (2020) verified that knowledge-based leadership significantly enhances KMCs, and that a sound leadership level is critical to project performance, and as KMCs continue to grow, organizational innovation performance rises, ultimately improving the overall performance of the firm.

By sorting out the existing studies, this study summarizes the influencing factors for organizations to carry out KM into three dimensions: environmental factors, organizational factors and IT. Environmental factors affect the resources and conditions available in the process of KM, which are important for the improvement of organizational structure and information level, and different environments have a profound impact on the use and

development of KM (Sang, 2021). Environmental factors affecting KM include laws and regulations (S. S. Kim & Y. J. Kim, 2017), social environment (Von Krogh, 2012) and the level of competition. Changes outside the organization are transmitted to the organization as external environmental factors, and organizational pressures and opportunities due to rapid changes outside the organization will provide opportunities and challenges for the organization to assimilate and digest knowledge from outside the organization and to achieve knowledge re-innovation. Organizational factors mainly include organizational culture and organizational structure.

2.1.2.3.1 Organizational culture

Culture encompasses the values, beliefs, principles and behaviors that exist within an organization (Cho, 2011). Every organization has a unique culture, and culture may act as a barrier or enabler to KM (Iftikhar, 2003).

Having an appropriate organizational culture may be a prerequisite for KM effectiveness (Islam et al., 2015). If an organization's culture is not receptive to change, then the KM program is doomed to fail (Aujirapongpan et al., 2010). Therefore, an appropriate organizational culture is one that consists of employees sharing, coordinating, collaborating, and acquiring knowledge (C. Yang & Chen, 2007). Neglecting communication, training and development, interrelationships, motivation, rewards, and job support between employees and the organization can create barriers to KM (G. N. Lee et al., 2010).

Organizational culture is widely recognized as a key factor influencing the success of KM (Davenport & Prusak, 1998; Singh & Kant, 2008). Organizational culture is defined as the shared behaviors, values, and beliefs that members of an organization learn (Lawson & Ventriss, 1992). Organizational culture can reinforce beliefs, shape attitudes, establish performance expectations, and guide behavior. The best organizations have strong cultures that encourage adaptability and continuous improvement operations in all areas (Adams, 2009). Organizational culture change is difficult to achieve (Roth, 2004).

Empirical studies on the relationship between organizational culture and KM show that organizational culture influences KM (Asl et al., 2012; Shafei et al., 2011).Delong and Fahey (2000) studied that organizational culture affects KM in four ways, which are: organizational culture affects the organization's assumptions about what knowledge is; organizational culture moderates the relationship between individual and organizational knowledge; organizational culture can create a social interaction that can be used to determine the occasions when knowledge is applied; and organizational culture affects the creation and application of new

knowledge. KM is not about managing knowledge, but about managing and creating a corporate culture that facilitates and encourages the sharing, appropriate use and creation of knowledge to achieve strategic competitive advantage for the organization. The culture should be knowledge-oriented, i.e., create a knowledge-friendly culture (Allame et al., 2011). Otherwise, the lack of an organizational culture that supports, encourages, and rewards knowledge creation, sharing, and use will be one of the major barriers to effective KM (Singh & Kant, 2008).

The existence of a "knowledge culture" is critical to the success of KM in an organization (Davenport et al., 1998), as it demonstrates management's commitment to KM initiatives and facilitates the sharing of tacit knowledge to achieve higher quality decisions. Organizational culture is shaped and reinforced through interrelated elements such as strategy, structure, people, and processes (Sanchez, 2004). A key aspect of any motivational strategy related to knowledge culture is to reward knowledge sharing within knowledge teams and across organizational team populations, rather than individual performance, which can lead to knowledge hoarding Walczak, 2005).Chuan Lee and Wen-Jung Chen (2005), among others, highlight the role of culture in the KM activities.

Masa'deh (2016) stated that "Organizational culture not only defines the value and advantages of knowledge to the organization, it also affects the ability of employees to share knowledge. Organizational culture is essential for knowledge sharing and teamwork (Cho, 2011).

Organizational culture is crucial in encouraging interaction and collaboration among individuals which is necessary for knowledge flow, providing individuals with the ability to self-organize their personal knowledge to facilitate problem solving and knowledge sharing (Almajali & Al-Lozi., 2019). Researchers have reported that one of the most important knowledge sharing elements in culture is trust, and that a high level of trust reduces individuals' reluctance to share knowledge and reduces the risk associated with losing competitiveness (Kushwaha & Rao, 2015).

Creating a culture that allows easy access to knowledge should be at the top of management's agenda during the implementation phase of KM (Yeh et al., 2006). Integrating organizational culture with KM objectives is considered a complex process, especially in organizations characterized by hierarchical structures and bureaucratic control (Pandey & Dutta, 2013). Shannak and Obeidat (2012) in their article argued that culture significantly influences how organizations implement strategic decisions. For example, they discuss that culture plays a vital role in the implementation process within Jordanian banks.

2.1.2.3.2 Organizational structure

Organizational structure is designated as the formal distribution of employment functions and administrative mechanisms to maintain consistency and integrate work activities (Ghani et al., 2000). To realize the full potential of knowledge, an appropriate structure should be established (Claver-Cortés et al., 2007).

Knowledge organization management structures facilitate the development of intellectual capital or knowledge creation in several ways (Walczak, 2005). People work within the organizational structure and go through organizational processes to achieve the overall business strategy. Organizational structure and corporate culture are interrelated, and both have been identified as necessary factors for the success of KM initiatives (M. Santoro & Gopalakrishnan, 2000). A knowledge structure that supports an organizational knowledge culture enables flexible management of corporate knowledge assets, which will facilitate knowledge creation by promoting explicit and tacit knowledge sharing and utilization (Walczak, 2005). Smaller and newer entrepreneurial organizations, particularly those with 200 or fewer employees, may have an advantage over larger, older organizations with long-standing corporate cultures and more rigid management structures when implementing cultural shifts (Becerra-Fernandez et al., 2004).

Increased competition and accelerated technological change require better knowledge transfer across organizational boundaries (Gopalakrishnan & Santoro, 2004), and organizational structure has been identified as one of the factors affecting the performance of knowledge transfer. Gold (2001) states that organizational structure is an important factor in the use of technology, and more specifically, that organizational structure must be flexible to encourage knowledge sharing and collaboration across traditional organizational boundaries to facilitate knowledge creation.

Organizations that attempt to introduce KM initiatives without a management support structure soon discover that investments in KM do not yield any expected benefits (Goh, 2003; Nahm et al., 2004; Swan et al., 2000). Research initiatives have suggested that the first step before a fully distributed knowledge transfer system that includes both horizontal and vertical knowledge transfer is formed within an organization is to establish knowledge groups, cross-functional teams, and cross-departmental teams consisting of knowledge groups, cross-functional teams, and cross-departmental teams that span the functional areas of the organization, and from which the members feedback the knowledge sharing to their original functional areas or departments (Walczak, 2005).

Researchers have argued that structural factors such as incentive systems, job design, managerial support policies for managers, and rules, regulations, and practices may act as barriers to KM, and the reason behind this is related to the fact that organizational structure plays an important role in leveraging technology and communication networks and facilitating collaboration and knowledge sharing in an organization (Aujirapongpan et al., 2010; Pandey & Dutta, 2013).

The relationship linking organizational structure to knowledge sharing comes from the social characteristics of the organization that consists of hierarchy, density, and connectivity that connects employees collectively, thus enabling smooth knowledge exchange (Almajali & Al-Lozi., 2019). Researchers have proposed two features of organizational structure that have an impact on knowledge processes: centralization and formalization (Islam et al., 2015). Centralization relates to the extent to which rights to decision-making and evaluation activities are aligned at the highest point in the organizational hierarchy (D. Lee & Choi, 2003). Formalization refers to the "formal rules and regulations that govern organizational activities and manage work relationships" (Kushwaha & Rao, 2015). Organizational structure is crucial for facilitating knowledge flow through organizational processes, reward systems, and policies, which help define how knowledge is recognized and subsequently distributed throughout the organization (Sandhawalia & Dalcher, 2011).

2.1.2.3.3 Information technology (IT)

Initially, KM was defined as a concept that could be managed through IT (IT). Consequently, KM practices were commonly associated with tools such as instant messaging, knowledge maps, intranets, knowledge repositories, print publications, and training programs. However, as KM evolves beyond its initial focus on IT, technology has become an important factor in effectively supporting KM processes. The widespread adoption of IT can enhance KM efficiency and expand knowledge performance. Research on the influential role of IT mainly centers on its theoretical significance and the mechanism; numerous of studies have established the importance of IT in KM, while interest in understanding the pathways through which IT impacts KM continues to grow.

KM system serves as a tool for creating, selecting, storing and disseminating knowledge, which can largely enhance the creation, storage and sharing of knowledge, and even improve the effectiveness of quality re-creation of knowledge. Knowledge accumulation is challenging to quantify and store, and when employees with specialized knowledge and work experience leave the company, this experience and knowledge will also disappear, leading to tangible and

intangible losses for the company (Shih et al., 2017). Furthermore, the rapid development of information and communication technologies is fundamentally changing the way (Dietz et al., 2022).

Alavi and Leidner (2001) argue that the major difference between KM and KM system lies in their focus: KM emphasizes the knowledge itself, whereas KM system focuses on the tools and measures to create, select, store, and diffuse knowledge. KM is more concerned with the body of knowledge and its benefits to users, while KM systems is aimed at helping users explore knowledge and utilize it in a faster, more diverse and deeper way (Shih et al., 2017). Studies have also shown that usefulness and ease of use influence the use of information products or technologies by individuals or organizations (Davis et al., 1989). They argue that users will find an innovative product or technology useful to them or their organization if they believe that such innovative products or technologies are highly compatible and easy to learn, that is to say, assumption that perceived ease of use affects perceived usefulness.

Technological capability refers to "an organization's basic IT structure, including hardware and software, as well as internal and external system networks and databases" (Pandey & Dutta, 2013). Technology is regarded as an indispensable tool for KM and affects the effectiveness of KM in two ways. Firstly, it ensures that the appropriate technology is in place to facilitate the effectiveness of KM. Secondly, technology flattens the organizational structure, thereby increasing the effectiveness of KM (Aujirapongpan et al., 2010). Although the hardware, bandwidth and network infrastructure of technology are important, they are not sufficient to perform the KM activities of sharing, storing, disseminating and maintaining knowledge. Therefore, other tools are also crucial such as social media, dynamic websites and content repositories (Islam et al., 2015).

IT research can facilitate the processes of externalization, internalization and combination, such as large organizational databases that can be accessed and understood by each member, distributed wireless computing of information increases the content of knowledge as an explicit source and facilitates internalization. The externalization of knowledge, which converts tacit knowledge into explicit forms, is facilitated by tools such as e-mail, corporate letters, and voice recognition technology (Nonaka & Konno, 1998). Liebowitz (2001), Marwick (2001) emphasize the integrated use of knowledge to support KM. Alavi and Leidner (2001) advocate the application of a range of information systems to manage the organizational knowledge used for support in order to enhance the organizational processes of creation, storage, retrieval, transformation and application.

Jennex and Adelakun (2003) point out that IT is an important factor in the successful

implementation of KM in an organization. Song and Deng (2005) argue that IT is an integral component of KM. Kuo and Ye (2010) use IT as the background for their study, and concluded that increased investment in IT contributes to improving the KMCs of project members, thereby enhancing project performance. Ahn (2012) argued that the construction of an organization's IT infrastructure and the effective utilization of IT significantly impact the acquisition, transfer, and use of knowledge. Research has deepened in this area, quantifying IT's effect on KM and expanding its application value, with big data platforms providing technical support for enhancing the quality and efficiency of KM.

In addition, technologies used in KM can be classified into three categories based on their purpose: (1) knowledge generation tools, which acquire, synthesize, and create knowledge; (2) knowledge codification tools, which codify both tacit and explicit knowledge in a way that facilitates access and transfer; and (3) knowledge transfer tools, which eliminate the temporal, physical, and social distances associated with knowledge sharing and distribution (Cho, 2011).

Under the conditions of creating and using new knowledge, technological infrastructure plays a crucial role in an organization's KM system to share existing knowledge through the integration of various technological platforms. Although technology improves the ability of the organization to implement KM actions, it is not sufficient in itself and requires other such as strategy, culture and structure (Almajali & Al-Lozi., 2019). Out of this need, technology needs to sustain other KM enablers such as organizational business strategy, culture and structure; and ensure that accurate knowledge is managed in the right way (Cho, 2011).

2.1.3 Knowledge Management Capability

For KM to be efficient and effective, certain competencies are needed (Almajali & Al-Lozi., 2019). The concept of Knowledge Management Capability (KMC) has been widely described by scholars. Nielsen (2006) stated that organizations operating in dynamic environments must possess strong KM competencies to develop and support work practices and to enable the organization to cope with changing conditions and maintain a competitive advantage (Nielsen, 2006). Over time, the field of KMC research has evolved significantly, transitioning from its origins in computer science to its current complexity. Regardless of the KM perspective, knowledge is viewed as an important strategic resource and KMC is the ability of an organization to manage these resources (Mao, 2015). Currently, organizations accumulate knowledge at all levels, and the great challenge of KM is how to collect it and ultimately use it to compete (Popa et al., 2018).

As shown in the definition of KMCs in Table 2.3 below, KMCs are a construct that

encompasses a multidimensional construct. However, there is still a lack of consensus among scholars and researchers regarding the structural composition of KMCs, and uncertainty remains about which specific organizational capabilities should be included in KMCs.

Table 2.3 Definition of KMC

Representative Scholars	Definitions
Teece et al. (1997)	knowledge management capabilities are primarily concerned with an organization's ability to create, acquire, integrate, and allocate resources.
Gold (2001)	knowledge management capabilities consist of knowledge infrastructure capability and knowledge process capability; knowledge infrastructure capability include technology, structure and culture; knowledge process capability include knowledge acquisition, knowledge transformation, knowledge application and knowledge protection capabilities.
Alavi M and Leidner D E (2001)	knowledge management capability is the ability of an organization to identify, and use collected information to help compete.
Bose (2003)	knowledge management capability is the ability of an organization to continuously learn to use existing knowledge to create new knowledge.
Kearns G S and Lederer A L (2003)	knowledge management capability is the ability of an organization to leverage and deploy knowledge resources to capture business value and competitive advantage.
Chuang S H (2004)	The ability of an organization to leverage technical, structural, social and cultural knowledge management resources to gain competitive advantage.
H. Tanriverdi (2005)	knowledge management capability is the ability to create, transfer, and integrate knowledge in an organization and to utilize knowledge resources.
Bogner W C and Bansal P (2007)	knowledge management capability is often viewed as a dynamic organizational capability that helps to create value by better transforming existing knowledge into new knowledge.
Lichtenthaler and Lichtenthaler (2009)	knowledge management capabilities include knowledge acquisition, retention and application and can represent the organization's ability to explore and leverage knowledge in open innovation.
H. Lin (2013)	knowledge management capabilities are organizational mechanisms that continuously create knowledge and encourage the organization to acquire, store, protect and share knowledge.
Tseng S (2014)	knowledge management capability is the ability of an organization to create new knowledge by using existing knowledge through continuous learning.
S. Liu and Deng (2015)	knowledge management capability is mainly the ability to create, transfer, utilize and preserve knowledge.
Chiu and Chen (2016)	knowledge management capabilities include knowledge infrastructure capabilities and knowledge process capabilities.
Y. Zhang et al. (2018)	knowledge management capability is divided into three dimensions: technical, structural, and cultural. Among them, the technological dimension is the ability to effectively utilize technological architectures so that firms can share knowledge through internal collaboration; the structural dimension is the structural elements that enable firms to transform human relationships and capital into new knowledge; and the cultural dimension is the ability of firms to effectively manage knowledge.
Naqshbandi and Jasimuddin (2018)	knowledge management capability consists of two dimensions: knowledge processing capability and knowledge infrastructure capability. Knowledge processing capability refers to the level of acquiring, transforming, applying and protecting knowledge; Knowledge infrastructure capability is manifested through technical, structural and cultural infrastructure.

KM processes are often defined as actions related to knowledge acquisition, sharing, and

utilization to improve organizational competitiveness (Barley et al., 2018; Iqbal et al., 2019; Teixeira et al., 2018). Researchers have defined the KMCs of organizations in the context of the KM process (Gold, 2001; Iqbal et al., 2019). This study adopts Gold's (2001) view of KMC from two perspectives, knowledge infrastructure and knowledge processes, as shown in Figure 2.4.

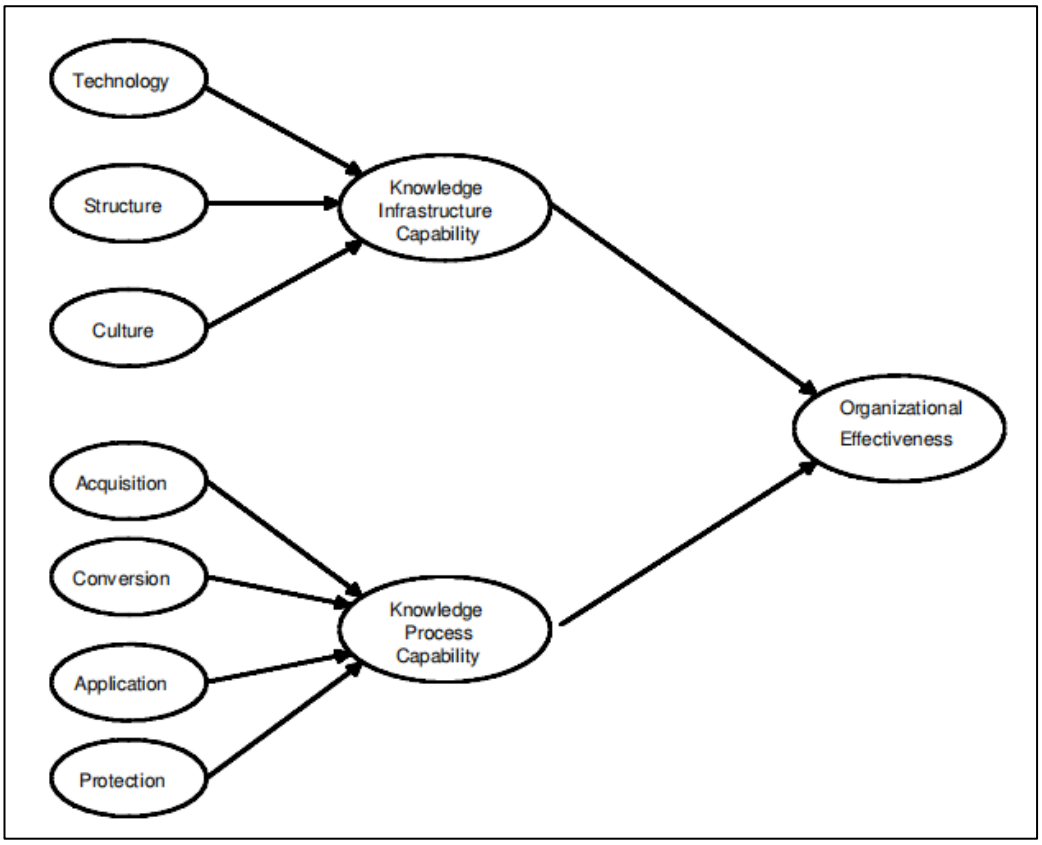

Figure 2.4 Dimensions of KM

Source: Gold (2001)

Gold (2001) argues that the first dimension of measuring KMC is the knowledge infrastructure, which includes three levels: technical, structural and cultural. As mentioned earlier, technology, structure and culture are the critical components for successful implementation of KM. KM infrastructure is considered to be the foundation of KM, which reflects organizational culture, organizational structure, organizational IT infrastructure, public knowledge and physical environment (Pannu, 2017). Knowledge infrastructure applies knowledge in an effective and correct way will help the organization to improve its competitive advantage (Masa'Deh et al., 2019). Establishing the appropriate infrastructure fosters knowledge sharing and dissemination within the organization by promoting a conducive culture and structure that enhance interactions and build strong relationships among employees, thereby encouraging them to share and disseminate knowledge (Chow & Chan, 2008). Unfortunately, many organizations are struggled to extract and share knowledge due to

ineffective KM and inadequate infrastructure (Masa Deh et al., 2019).

Gold (2001) further argued that the second dimension of measuring KMC is the knowledge process which covers from knowledge acquisition, knowledge transformation, knowledge utilization and knowledge preservation. Knowledge acquisition is an important part of knowledge transfer and is also considered to be an integral part of the KM process. The organization first searches for and captures knowledge, subsequently internalizing it before applying the internally acquired knowledge.

2.1.4 Characteristics of KM in healthcare institutions: an overview of current research trends and implications

Hospitals are complex environments, rich with sociological variables. making them difficult to understand and even more challenging to change (Rowley, 2006). They are viewed as intricate systems combining technological, industrial, and scientific processes among individuals with diverse educational, cultural, and social backgrounds (Kannampallil et al., 2011). KM in healthcare can be seen as a formal set of methods and techniques designed to facilitate the creation, identification, acquisition, development, preservation, dissemination, and utilization of knowledge assets in healthcare institutions (Abidi, 2001). Many researchers have proposed various KM frameworks or applications in healthcare settings (Delesie & Croes, 2000; M. R. Lee et al., 1999; Liebowitz, 2010; Torralba Rodriguez et al., 2003).

Healthcare knowledge is created and consumed by a wide range of multidisciplinary stakeholders, including healthcare practitioners (such as specialists, physicians, nurses, and therapists), administrators, policy makers, patients, and care providers. In the field of healthcare KM, healthcare knowledge sharing aims to create a knowledge-centered healthcare system (Abidi, 2007). The concept of "healthcare knowledge management" began to be characterized by the creation, modeling, sharing, manipulation, and systematic translation of healthcare knowledge to improve the quality of patient care (Riano, 2007). According to Zipperer (2016), there is a great potential for improvement of multidisciplinary interactions within healthcare system institutions through a KM approach ranging from broad collaboration to physician roles. Healthcare institutions also benefit from the tacit KM that supports teamwork (Zipperer, 2016).

Healthcare professionals are an important component of the healthcare system and are the direct providers of healthcare services. Compared to other industry populations, healthcare professionals have occupational specificities that distinguish them from other industries, requiring them to continually accumulate specialized knowledge buildup and develop practical skills, while, at the same time, enduring burdens and risks in their work (Q. Zhang et al., 2019).

Healthcare professionals are critical to the functioning of the healthcare system, and human resources are a key factor in ensuring the success of the organization relative to other related factors (Abdullahi et al., 2023).

The literature on KM in healthcare frequently highlights the fragmented state of healthcare knowledge and emphasizes the necessity for collaboration across organizational and expertise boundaries (Meijboom et al., 2004). While the fragmented or "distributed" nature of organizational knowledge is not exclusive to healthcare institutions or the healthcare sector, (Tsoukas, 1996), it holds particularly significance in this context. Tagliaventi and Mattarelli (2006) noted that healthcare institutions are specialized institutions where diverse groups of individuals with distinct rules, performance standards, behaviors and values converge. Paul (Paul, 2006) similarly asserts that healthcare delivery is a collaborative process with explicit and tacit knowledge aspects in which healthcare providers work together to achieve outcomes in terms of access, quality, and cost that they find themselves struggling to meet, if not unrealistically.

Aldred (2002) further illustrates that managing knowledge in a healthcare setting is like trying to knit with thousands of knotted strands of wool: data is kept in multiple locations, managed by different people and institutions, and stored in every conceivable format. Additionally, the fragmentation of medical knowledge is underscored by pronounced professional boundaries. Ferlie et al. (2005) have argued that social boundaries and cognitive or epistemic boundaries between and within professions impede the diffusion of innovations. Currie and Suhomlinova (2006) findings suggest that knowledge sharing is difficult to achieve in practice due to professional boundaries.

A substantial body of literature documents that the difficulty of putting new knowledge into practice may stem from an overabundance of medical knowledge. Much of this literature addresses the increasing saturation of the healthcare sector, especially individual practitioners, and provides new information. Davenport and Glaser (2002) vividly describe this situation with the real-life example of Dr. Bob Goldszer, who according to the authors must keep abreast of approximately 10,000 different diseases and syndromes, 3,000 drugs, 1,100 laboratory tests, and many of the 400,000 articles added to the biomedical literature each year.

As a result, as Heathfifield and Louw (1999) put it, medicine has reached a crisis point. Physicians are no longer able to memorize or effectively apply the vast amount of clinically relevant scientific knowledge practiced. Modern healthcare professionals are overwhelmed with information and are often unable to access the specific information they need when and where it is required.

The challenge of "information overload" is so prevalent in the day-to-day work of healthcare practitioners (Brien & Cambouropoulos, 2000) that some of the literature has shifted from merely describing the problem to lengthy descriptions of origins and solutions (Hall & Walton, 2004). Indeed, the rise of medical informatics is a direct repose to this information overload crisis. As described below, one of the most popular tools for KM in healthcare is data mining, an advanced IT used to search and analyze large amounts of data.

The literature addresses the diverse sources and types of knowledge that underpin healthcare decision-making, emphasizing that healthcare professionals value and seek local and tacit knowledge. Efforts to manage healthcare knowledge by focusing solely on explicit and codified knowledge are unlikely to succeed. Clarke and Wilcockson (2002) conclude that while evidence-based practice holds great promise, it is not a panacea. Evidence and distal knowledge may be a tool. But it is proximal, recent knowledge that informs health and social care practitioners whether a given tool is appropriate for the task and meets the needs of service users. Clinical decision-making, therefore, is situated or 'situated' in the context of proximal knowledge, which fluctuates depending on in time, place and person.

Gabbay et al. (2003), through over two years of ethnographic research in the United Kingdom, found that clinicians rarely directly access or use explicit evidence from research or other formal sources. Instead, they rely on what the authors refer to as "threads of thought," which include collective reinforcement, internalization, and tacit norms. Although these threads are somewhat influenced by scientific research, they are primarily shaped by clinicians' own experiences, their colleagues' experiences, and their interactions with opinion leaders, patients, and pharmaceutical representatives, as well as other sources of tacit knowledge. Dawesh and Sampson (2003) corroborated these findings by examining the relationship between clinicians' information needs and their information-seeking behaviors. Their study revealed that after desktop text sources, the second most common source of information was simply asking colleagues. Notably, they found only one instance in which an electronic database was the primary source.

Tagliaventi and Mattarelli (2006) also emphasized the critical importance of social and physical proximity in knowledge exchange. Using both qualitative and longitudinal methods, they investigated the process of knowledge sharing between individuals in different professional groups and found that 'operational proximity' (the extent to which professionals are in the same location) is a major determinant of knowledge flow knowledge, and that those working side by side show a strong tendency to share knowledge. They conclude that knowledge flow in healthcare networks occurs primarily in tightly knit networks of practice,

where operational proximity combined with value sharing serves to leverage tools that allow for the circulation of tacit and concretized ways of knowing.

Several authors, including Lathlean and Le May (2002), Gabbay and Le May (2004), Tagliaventi and Mattarelli (2006), have highlighted the important role of informal networks and social groups in transferring knowledge information to clinicians, nurses, technicians, and other healthcare professionals. For all these authors, the circulation of knowledge within healthcare settings heavily relies on professional networks and socialization practices, which can enhance how healthcare institutions utilize their knowledge base.

Booth (2001) identifies ten components of successful KM, arguing that addressing content and technology issues alone is insufficient; an empowering culture is also necessary. This includes support at the administrative level and the creation of an environment that encourages the sharing of good practices. Most importantly, KM should be integrated with the organization's business objectives and managed in a similar way to the management of other commodities within the organization.

Sensky (2002) argues that KM will not happen in healthcare institutions unless leadership, culture, human resource management practices, and IT infrastructure and skills are in place. Ferlie et al. (2005) examined a number of innovations and found that the tendency for professionals to operate within monodisciplinary communities of practice creates social and cognitive boundaries, which in turn hindered their diffusion. This study is especially noteworthy because it highlights the distinction between formal approaches and informal practices in knowledge flows. In a healthcare context, where professional relationships are often highly institutionalized, physician resistance to KM initiatives can be understood as a struggle for control of the knowledge process and a clash of alternative ways of managing knowledge. Currie and Suhomlinova (2006) document this phenomenon by examining the impact of organizational and professional boundaries on knowledge sharing.

Koumpouros et al. (2006) examined the critical success factors for building a multidisciplinary health community KM system using Internet-based ICT. Among the key success factors identified were a critical mass of knowledge, political commitment and endorsement, a well-structured ontology, multilingualism of content and eternal processes, and a patient- and problem-oriented KM system.

Tagliaventi and Mattarelli (2006), based on their study of practice sharing in the aforementioned practice networks, found that knowledge exchange was greater when professional groups shared common values, such as patient centrality. In addition, as previously discussed, they found that knowledge-related interactions were greater among professionals

who operated in closer proximity.

Addicott et al. (2006), through their investigation of the values of the aforementioned NHSC Networks in the UK, found that over-regulation and political interference were significant barriers to knowledge processes within clinical networks. Clinical networks initially set up for the purpose of knowledge sharing eventually became instruments for achieving government objectives. As a result, knowledge sharing was marginalized in favor of meeting performance targets and complying with government protocols. Clinical and managerial networks were also considered by Guven Uslu (2006), who argued that, although the government encourages clinicians and managers to work together in networks to improve performance, such networks are difficult to achieve in practice. The main barrier identified in the study was the conflict between clinical and managerial priorities: while managers emphasized cost efficiency, clinicians prioritized patient care.

The study concluded (Nicolini et al., 2008) that the major contributing factors to successful KM in healthcare institutions include shared values and culture, minimizing concerns about power and status differentials, interdisciplinary (broad-based membership), proximity (operational), salience of themes, political commitment and support, and loose structure. In contrast, barriers to successful KM in healthcare structures include over-management and interference from the political arena, clinical management conflicts, career barriers, lack of trust, poor quality relationships, inadequate technical skills, and lack of strategic breadth and leadership.

Bower et al. (2000) found that professionals in the healthcare sector often resist ICT innovations, which they perceive as having the potential to disrupt critical processes, especially when these processes involve a large tacit knowledge component. The planning, collection and integration of KM systems within healthcare systems are becoming increasingly important to help manage and transfer knowledge effectively to improve performance and ensure quality of care (M. Wang & Fan, 2003).

Sensky (2002) identified the lack of a clear KM strategy and leadership (e.g., no Chief Knowledge Officer), the lack of an appropriate culture, and poor IT infrastructure as potential barriers to KM in healthcare. Lorence and Churchill (2005) examined the importance of the use of computerized medical record systems as a clinical KM tool. Overall, they found that the diffusion of computerized health IT was uneven, due in part to cultural factors, distrust of computerized data, and lack of technical training and knowledge.

The issue of mistrust in computerized data has also been raised by Guah and Currie (2004) ,Bower, Reid, Barry, and Ibbotson (2000), who examined the use of ICTs as a way of

establishing interprofessional and interdisciplinary boundaries. They found that the uptake and use of ICTs are significantly influenced by various social and operational factors, such as concerns about the formalization and traceability of previously informal conversations, shifts in power dynamics (both between ICT-using professionals and between doctors and patients), pressures for social, cultural, and procedural consistency, and individual attitudes to technology, which often result in a general aversion to ICTs.

2.2 Job satisfaction

2.2.1 Definition of job satisfaction

Since 1924, the National Academy of Sciences of the United States, under the National Science Council, conducted an experiment at the Hawthorne plant of the Western Electric Company. The initial purpose of this experiment was to determine the impact of lighting quality on productivity, aiming to verify the assumption that "improving illumination reduces fatigue and thus increases productivity." However, the experimental results showed that changes in illumination did not significantly affect productivity. In 1927, Harvard professor Mayo and his colleagues took over the Hawthorne experiment and extended the research. Mayo's team carried out three phases of study, including welfare experiments, interview experiments and group experiments. Their final research led to conclusions that were radically different from classical management theories: that employees' emotions affect their work behavior, and that their psychosocial factors are the main determinants of job satisfaction and productivity. The Hawthorne experiment is considered by many researchers to be the forerunner of job satisfaction research (Hassard, 2012).

Inspired by the Hawthorne experiment, American psychologist R. Hoppock (1935) posited that employees develop psychological and physiological evaluations, resulting in feelings of satisfaction or dissatisfaction with their work environment. In his book *Job Satisfaction*, R. Hoppock was the first to introduced the clear concept of job satisfaction, describing it as employees' subjective responses to their work environment. Subsequently, various industries began to introduce the concept of job satisfaction, and numerous scholars have carried out studies on job satisfaction for different industries and put forward the concept of job satisfaction, shown in Table 2.4.

Table 2.4 Definition of job satisfaction

Representative Scholars	Definitions
R. Hoppock (1935)	Job satisfaction is the feeling and evaluation that employees will make from their own psychological and physiological satisfaction or not with the work itself and the work environment they are doing, that is, a subjective emotional response of employees to the work situation.
Locke (1969)	Job satisfaction is a positive or pleasurable emotional condition resulting from an individual's evaluation of his or her job or work experience, an emotional response, a response that stems from the individual's job satisfaction or conformity to his or her important work values, this definition tends to be a comprehensive definition in which the job satisfaction is the employee's overall feeling of fulfillment or degree of contentment with the job itself and the work situation in this perspective.
Smith et al. (1969)	Job satisfaction is how employees feel about their jobs.
Locke (1976) Odom et al. (1990)	Job satisfaction is the extent to which employees feel positively or negatively about their jobs.
Cranny et al. (1992)	Job satisfaction is an employee's effective response to his or her job, which is the result of the incumbent's comparison of actual results with desired results.
Spector (1997)	Job satisfaction is the extent to which people like (satisfied) or dislike (dissatisfied) their jobs.
Scheirmerhorn et al. (2005)	Job satisfaction relates to how people think, feel and perceive their jobs, i.e., how satisfied they are with different aspects of the job itself, the level of pay, opportunities for advancement, and attitudes toward coworkers.
Griffin and Moorhead (2007)	Job satisfaction reflects the satisfaction and fulfillment that a person derives from his or her job.
J. M. George and Jones (2008)	Job satisfaction is a collection of beliefs and feelings that people have about their jobs.
Bahnase (2011)	Job satisfaction is the degree to which an individual accepts his or her work and relationships with others in the work environment.
Abu Raddaha et al (2012)	Job satisfaction is the extent to which employees like their jobs.
Shaikh et al. (2012)	Job satisfaction is the degree to which employees derive pleasure from their work or the positive emotional state of employees after evaluating their work and performance.
Faragher EB, et al. (2013); Spector (1997)	Job satisfaction is a concept that corresponds to user satisfaction, which is the degree of difference in the feeling state of the practitioner working in a specific industry organization through the actual effect of the psycho-emotional perception of the industry and the work performed in that specific organization in comparison with its expectations, and it is the subjective evaluation of the staff of the degree to which their needs have been met.
X. Lu (2013)	Job satisfaction is the result of a subjective emotional response obtained after understanding and interpreting an individual's attitude toward the work itself and toward the various factors that characterize the work.
Masa Deh (2016)	Job satisfaction is an individual's attitude towards work.
Qiu (2018)	Job satisfaction is a subjective value judgment and a psycho-perceptual activity, which is the result of comparing the expectations of the staff member before practicing in a specific organizational unit with the actual perception obtained after taking office in a specific organizational unit.
She (2019)	Job satisfaction is the psychological perception of the work itself and related aspects (including work environment, work status, work style, work pressure, interpersonal relationships.) during the process of working in a specific organization.
Alotaibi et al.	Describe the feelings of employees about their work.

According to Chinese scholars W. Yu and Wang (2010), the definitions of job satisfaction can be categorized into several types:

Generalized definition: The unidimensional concept of employee satisfaction that workers perceive their jobs and their work environments through a singular feeling of satisfaction. This interpretation emphasizes the overall emotional response of employees to their job, neglecting the processes and deeper factors that contribute to the formation of their satisfaction.

Expectation gap definition: This definition is grounded in equity theory, focusing on employees' sense of fairness. It asserts that employees are always working with the psychology of making comparisons, in the work of the real value of the work of the employee's return is higher than the value of the employee's expectations of the return, and the gap between the real return and the expected return is reflected in the satisfaction of the employee, the higher the real value of the work of the return is the higher the perceived level of satisfaction. The greater the actual value of returns, the higher the perceived level of satisfaction.

Multi-layer architecture type definition: This perspective considers the multifaceted evaluation of work from the viewpoint of employee care. It proposed that employee satisfaction is not only reflecting the subjective feelings of workers on the perceivable dimensions of their work, but also a comprehensive evaluation of various aspects of the work they are engaged in, such as job content, work environment, and compensation and benefits. This approach offers a more thorough and nuanced understanding of the essence of employee satisfaction.

Job satisfaction has been the focus of attention in the field of organizational management, organizational behavior, is one of the most studied concepts in the field of organizational behavior. Modern management science regards employee job satisfaction as an index of organizational well-being and a "barometer" of organizational management (Anderson D R et al., 2010). Organizations should continuously strive for improvement to avoid the disastrous effects of employee dissatisfaction (Bakotić, 2012; B. Obeidat et al., 2016).

Research has demonstrated that job satisfaction significantly influences employee motivation, organizational commitment, and ultimately both the quantity and quality of performance (Bolon, 1997; Petty et al., 1984; Siguaw et al., 1994). Maister (2001) argues that job satisfaction can help to improve the performance of an enterprise and optimize the business structure of the enterprise, which has a great impact on the overall improvement of enterprise performance. Behavioral and social science research has shown that there is a correlation between job satisfaction and job performance (Judge et al., 2017). If an employee does not feel satisfied about his or her job, he or she may intentionally or unintentionally sabotage all plans

(Heidari et al., 2022). Satisfied employees markedly improve company performance compared to dissatisfied employees, and a satisfied employee increases the value of the company's human capital, which has a substantial impact on the overall value of the company (Gottwald & Lejsková, 2023). W. Zheng (2001) argues that employee satisfaction reflects the level of satisfaction of an individual employee, which is highly individualized, and linking these levels to performance outcomes; thus, increasing an individual's satisfaction can elevate their job performance. S. Zhou and Wei (2011) found that higher levels of job satisfaction correlate with improved performance. Additionally, the satisfaction of knowledge workers varies at different stages of their careers, affecting work performance differently. Unlike traditional employees, knowledge workers are motivated more by challenging opportunities than by assessments of their knowledge and problem-solving skills (Shujahat et al., 2018). Furthermore, Job satisfaction makes employees more productive at work (Alrawahi et al., 2024). Empirical evidence suggest that job satisfaction moderates the relationship between creative self-efficacy and innovation, with satisfied employees having higher creative self-efficacy and demonstrating greater innovation (B. Hu & Y. Zhao, 2016).

Job satisfaction is a major attitudinal antecedent of turnover propensity and exit behavior (Ladelsky & Lee, 2023). It is also one of the most important factors affecting burnout (Tavacıoğlu et al., 2019). As job satisfaction increases, burnout decreases (Tavacıoğlu et al., 2019). The concept of job satisfaction contributes to the psychological well-being of employees at work (Robbins et al., 2003). Stressed, depressed, and dissatisfied employees exhibit lower levels of job quality and productivity compared to their less stressed and more satisfied counterparts (E. George & Zakkariya, 2015). Job satisfaction also affects employee behaviors such as absenteeism (Venkataramani et al., 2010). Employees are the main determinants of organizational productivity as they contribute to the competitive advantage of the organization (Masa'Deh et al., 2019). While the main purpose of an organization is to distribute products or services in order to satisfy customers. However, in order to ensure external customer satisfaction and internal customer satisfaction, employee satisfaction should be firstly provided (Shan et al., 2014).

Chinese researchers assert that improving employee satisfaction enhances employees' sense of belonging to the enterprise, which is conducive to the growth of the enterprise and the progress of employees (Jing, 2015). In the era of the knowledge economy, the focus of enterprise competition is talent, and enterprises must improve employee satisfaction in order to attract and retain talent (Y. Jiang & J. Fan, 2016).

2.2.2 Major research theories of job satisfaction

The major research theories of job satisfaction include the following:

2.2.2.1 Human relations management theory

The doctrine of human relations, which originated in the Hawthorne experiments, advocates that management should focus on the central role of people and that the focus of management research should shift from the work itself and environmental factors to the human factor. The theory of human relations believes that people not only have the need and pursuit of material and monetary needs, but also social and psychological needs, the role of people is very important for the survival of the efficiency of the impact of the staff's attitudes, namely, "morale" is a key factor, and in addition to the influence of "organization" on people's work status, efficiency and enthusiasm, non-organizational factors (such as employee job satisfaction) also affect the staff's feelings and motivation towards their work (Langdale, 1974).

2.2.2.2 Hygiene-motivational factors theory

American behavioral scientist and psychologist Frederick Herzberg (1964) proposed the two-factor theory of motivation (Herzberg, 1964), also known as the "Two Factor Theory" or the "Motivation-Health Theory". Two Factor Motivation Theory describes the mechanism of employee motivation from the discussion of "satisfaction and dissatisfaction", "hygiene factors and incentives" and the relationship between the two-factor motivation theory, and derives a series of factors affecting job satisfaction from the two dimensions of satisfaction and dissatisfaction. The factors affecting job satisfaction are categorized as motivational and health factors (Goetz et al., 2012). According to Herzberg (2003), the opposite of job satisfaction is not dissatisfaction but simply lack of satisfaction. That is, there is no continuity of degree between satisfaction and dissatisfaction, nor are they opposites, but two separate objects, thus "the opposite of employee satisfaction is not dissatisfaction but the absence of satisfaction, the opposite of dissatisfaction is not satisfaction but the absence of dissatisfaction" (Fred, 2011).

Health factors are preventive factors, related to the environment. health factors establish a theoretical baseline or "zero level" for motivation, serving as the foundation upon which motivation begins. These factors include job safety and security, working conditions, management systems, job status, and interpersonal relationships. On the other hand, motivational factors are related to the nature of job itself and include aspects such as feelings of accomplishment, job development, the job itself, responsibility, and recognition. When these motivational factors are fulfilled, they generate motivation, whereas their absence do not

necessarily lead to dissatisfaction, as is the case with health factors (Fred, 2011).

Based on the two-factor theory, although the satisfaction of health factors does not directly create motivation, it can prevent dissatisfaction and maintain the status quo, and that motivation requires a focus on motivational factors in addition to the satisfaction of health factors in order to achieve a better motivational effect and to fully motivate employees (Fred, 2011). Managers should combine the two organically, and adopt appropriate incentive mechanisms to meet the needs of motivational factors while satisfying hygiene factors in a timely manner to enhance job satisfaction (R. Zhang, 2020).

Researchers have applied Herzberg's two-factor theory to study job satisfaction among healthcare professionals (M. Liu et al., 2023).

2.2.2.3 Equity theory

In the early 1970s, American psychologist John Stacey Adams proposed equity theory, also known as Social Comparison Theory, a motivational theory that examines the relationship between motivation and perception arguing that the degree of perceived fairness or unfairness in the work environment is the most important determinant of job satisfaction (Pritchard, 1969). Research demonstrated that rationality and fairness in the distribution of wage and compensation can have a significant impact on staff's enthusiasm, work attitude and motivation to work, and further affect work efficiency and work output (Huseman & Miles, 1987).

The theoretical model is defined as follows (Y. Li & Y. Li, 2007). OP refers to one's feelings about the compensation received, IP pertains to one's feelings regarding the inputs contributed by the individual, OC relates to one's feelings about the compensation received by others, and IC refers to one's feelings about the inputs made by others. Inputs include variables such as gender, age, education, social status, position in the organization, and the level of effort the individual puts into the job. Outcomes primarily consist of rewards, including wages, status, promotions, and intrinsic interest in the job. The model suggests that employees' job satisfaction is more dependent on relative rewards, which derived from subjective comparative perceptions of their own rewards and inputs and those of a reference.

$$\frac{OP}{IP} = \frac{OC}{IC} \tag{2.1}$$

Equity Theory Model (Y. X. Lee & Y. M. Lee, 2007)

Equity theory suggests that comparisons occur in two ways (K. Chen, 2005). First, horizontal comparisons involve an employee assessing the ratio of their "rewards" to "inputs" in relation to others within the organization, with perceived fairness arising only when these ratios are equal. Conversely, if an individual perceives their outcome-to-input ratio to be lower

than that of colleagues, they may experience feelings of unease. This perceived disparity can result in internal tension, potentially leading to decreased motivation, prompting the individual to seek to restore a sense of fairness. The second important aspect is vertical comparison, where employees evaluate their current effort-to-reward ratio against their past effort-to-reward ratios, determining fairness based on equality between these ratios. Equity theory suggests that a rational allocation system can stimulate employees work motivation and potential and enhance their job satisfaction (Fang, 2016; S. Zhou et al., 2014) .

2.2.2.4 Expectancy theory

In 1964, Victor H. Vroom, a famous North American psychologist and behavioral scientist, firstly proposed (1964) the Expectancy Theory in his book Work and Motivation, which is also known as Valence-Motivation -Expectancy Theory, the formula is expressed as follows: motivational force = $\sum$ expectation value $\times$ valence, where motivational force is the force that pushes the motivated to take action, expectation value is the probability that the motivated person estimates that he or she will achieve the goal through efforts, and valence is the probability that the motivated person expects the result to meet the goal. It is the degree to which the motivated person expects the outcome to be met. Expectancy theory suggests that the strength of a person's motivation depends on the product of expectancy and potency, that is to say, the greater the individual's certainty about the work goal and the higher the self-estimated probability of reaching the goal, the stronger the motivation he or she can inspire to do the job, and the higher the motivation to do the job, with a focus on analyzing the conditions that make the motivating factors play a greater role (K. Chen, 2005).

The theory asserts that employees will take their work seriously when they believe that their work can provide them with what they really want and need or pursue, so by linking employees' needs with their job performance, employees will choose to achieve performance improvement by working more seriously and diligently, that is to say, staff members achieve excellent personal performance through their personal efforts, and the organization grants them personal rewards or rewards, thus satisfying the staff's needs and forming an effective cyclic process (P. Wang, 2015).

2.2.2.5 Maslow's hierarchy of needs theory

In 1943, Abraham Harold Maslow, a famous American psychologist, put forward the Hierarchy of Needs Theory, also known as Maslow's Five Hierarchy of Human Needs, in his representative work '*A Theory of Human Motivation Psychological Review*'. The theory divides

people's needs into Physiological needs, Safety needs, Love and belonging, Esteem and Self-actualization, which are arranged in a hierarchy from low to high. According to the theory, individuals only pursue higher-level needs once their lower-level needs are sufficiently met, which in turn creates the motivation that drives human behavior. This theory requires managers to pay attention to the current level of needs of employees and take targeted management measures to satisfy certain needs for the purpose of motivation (B. Cai et al., 2020) .

2.2.2.6 Existence-Relatedness-Growth(ERG) theory

Building on Maslow's hierarchy of needs theory, Clayton Alderfer of Yale University in the United States proposed the humanistic theory of needs, which reclassified human needs into three categories: the need for survival (Existence), the need for interrelationships (Relatedness) and the need for growth and development (Growth). This is also known as the "ERG" theory of needs (Alderfer, 1969).

The ERG theory not only reorganizes the core human needs, but also challenges the theory of Maslow's hierarchy of needs theory that "the hierarchy of needs is a rigid structure that is arranged in a hierarchical order from low to high", which argues that the various types of needs are a reversible unity, and that when people's higher needs are not fulfilled, or suppressed or weakened, it is possible to increase. When people's higher needs are not met or are suppressed or weakened, they may increase or place more value on lower needs, and this return to lower needs is the reversibility of people's needs, emphasizing that people's needs coexist at the same time (Fang, 2016; S. Zhou et al., 2014).

2.2.2.7 Job identity theory

Job Characteristics Theory, also known as the Job Characteristics Model, was proposed by Harvard University professor Richard Hackman. The theory identifies five core dimensions: task identity, task significance, autonomy and feedback. These dimensions directly influence the psychological state of employees, thereby affecting their work outcomes. Richard Hackman emphasized the interaction between human psychology and work, arguing that these five dimensions' shape employee motivation and performance. He further suggested that a good work model would foster motivation, while a poorly designed one would lead to job burnout (S. Zhao et al., 2023).

2.2.3 Measurement of job satisfaction

Measurement of job satisfaction has always been a problem for researchers and managers.

Generating an unbiased measurement technique is a major problem in organizational behavior research. Indeed, job satisfaction is a fundamental to an organization and closely related to work behaviors such as efficiency and productivity. Satisfied employees are motivated to improve their work behaviors, while dissatisfied employees tend to perform less effectively (Papadopoulos, 2015). Job satisfaction leads to high quality performance by increasing people's consistency and confidence (Almajali & Al-Lozi., 2019).

The main methods of measuring job satisfaction include interviews, questionnaires, and critical incident methods, with questionnaire method being the most commonly used (F. Liu, 2021). Job satisfaction measurement scales process certain characteristics (She, 2019): they should be applicable to various job types, sensitive to changes in employee satisfaction, non-threatening to encourage participation, and be both valid and reliable while also easy to score.

Questionnaire measurements of job satisfaction are categorized into single global rating and summation score (L. Li, 2019). Single assessment method is not categorized the content or characteristics of job satisfaction, but it is regarded to measure the existence of employees' satisfaction or dissatisfaction attitude towards their work. Multidimensional is to assess job satisfaction from various side perspectives, see it as components of the job to be measured individually, and finally assess the overall job satisfaction by calculating the overall job satisfaction, the more multidimensional scale used is the Minnesota Satisfaction Questionnaire (MSQ), which contains the job itself, interpersonal relationships, compensation, and development. Moorman (1993) argued that the MSQ, a multidimensional scale designed based on the two-factor theory, which includes an assessment of both health care and motivational factors, was found to be a more comprehensive and accurate measure of employee job satisfaction by comparing it with a unidimensional scale, which explains a higher percentage of variance (Moorman, 1993). Chinese researchers also suggest (She, 2019) that job satisfaction is a complex multi-structural concept that should be evaluated from all perspectives of work aspects.

The content structure and measurement results of job satisfaction scales vary depending on the research theories and objectives. Some of the commonly used job satisfaction scales include the following:

2.2.3.1 Minnesota satisfaction questionnaire (MSQ)

The Minnesota Satisfaction Questionnaire (Weiss et al., 1967) was developed by Weiss et al. and utilizes a five-level assessment methodology to evaluate 20 dimensions of job satisfaction such as vigor, independence, diversity, social status, leadership, values, security, authority,

talent utilization, corporate policies and involvement, compensation, room for advancement, creativity, work environment, coworker relationships, praise, and accomplishment.

The MSQ is suitable for use in a variety of studies, and its greatest advantage is that it can be used to obtain satisfaction scores for each dimension as well as to assess general job satisfaction (Rentsch & Steel, 1992).The MSQ is able to provide a more complete overall measure of the various constructs of job satisfaction, but due to the large number of questions in the full version of the scale, which requires a high degree of patience on the part of the participant in actual measurement, it is often prone to measurement error. It is often prone to measurement errors and is less used by researchers (L. Li, 2019).

To address the scale's complexity, a short-form MSQ was developed, consisting of 20 selected questions. This version measures job satisfaction, with 12 questions assessing intrinsic satisfaction (questions 1~4, 7~11, 15~16 and 20) and 6 questions assessing extrinsic satisfaction (questions 5~6, 12~14 and 19). All 20 questions contribute equally to the general job satisfaction score, with each question carrying the same weight (Fieds, 2004). The short-form MSQ scale has been widely adopted by researchers across various industries around the world (Danacı & Yazır, 2022; Rogowska & Meres, 2022; Tavacıoğlu et al., 2019). The 12 entries of the short-form MSQ scale assessing intrinsic satisfaction mainly evaluate employees' satisfaction with the job content itself, while the 8 entries assessing extrinsic satisfaction focus on factors like income, promotion opportunities, and management that are not related to the job content. The study proved that the short-form scale has high reliability and validity in measuring intrinsic satisfaction, extrinsic satisfaction and general satisfaction (She, 2019)

A study conducted in China used the translated Chinese version of the Minnesota Satisfaction Short-form Scale to measure physician job satisfaction and concluded that the scale is a valid tool for assessing physician job satisfaction (L. Zhou & Wang, 2018). This version employs a 5-point Likert scale, where 1 = very dissatisfied, 2 = dissatisfied, 3 = unsure, 4 = satisfied, and 5 = very satisfied. The total score ranges from 0 to 100, with higher scores indicating greater job satisfaction. A score below 40 signifies dissatisfaction, scores between 40 to 59 indicate uncertainty, scores between 60 to 79 reflect basic satisfaction, and scores above 80 indicate high job satisfaction.

The MSQ has been widely used in studies of job satisfaction of healthcare providers such as doctors, nurses, radiographers, therapists, and medical teams in countries around the world (Akyurt, 2021; Dinibutun, 2023; Dziedzic et al., 2023; Erten et al., 2022; Hemmati-Maslakpak et al., 2021; Heydari et al., 2022; Kavurmaci et al., 2022; Kiliç Barmanpek et al., 2022; Koroma et al., 2021; Lakatamitou et al., 2020; Manookian et al., 2023; H. R. Rostami et al., 2021;

Sharmin et al., 2023; Uzdıl et al., 2023; Zikusooka et al., 2021), and has also been widely used in studies of job satisfaction among medical workers such as pediatricians, psychiatrists, nurses, and primary health care providers in China (Ai et al., 2010; J. Chen et al., 2022; Hao et al., 2022; F. Jiang et al., 2019; D. Liu et al., 2021; Q. Wang et al., 2023; Q. Wang et al., 2022; X. Yu et al., 2020; Zhu et al., 2020).

2.2.3.2 Other satisfaction scales

(1) Overall Job Satisfaction

The Overall Job Satisfaction (OJS) scale was developed by Cammann et al in 1983 and is part of the Michigan Organizational Assessment Questionnaire (OAQ), a generalized tool for measuring job satisfaction (Fieds, 2004).The scale is consists of 3 questions on a 7-point Likert scale: i) Overall, I am satisfied with my job; ii) By and large, I dislike my job; and iii) By and large, I like working here.

Some studies (Lacey et al., 2011; Varytis & Giannouli, 2023; Vidal-Alves et al., 2021) have utilized the OJS to assess job satisfaction among nurses.

(2) Job Descriptive Index

The Job Descriptive Index (JDI) (Fieds, 2004) was developed by Smith et al. in 1996, originally described job satisfaction through 72 measures across five dimensions: the job itself, supervisors, compensation, opportunities for advancement, and coworkers. Over time, the JDI has been modified by different researchers and has seen widespread application.

It has been utilized in several countries to measure job satisfaction among medical professionals such as pharmacists, orthopedic surgeons, and psychiatrists (Abdullahi et al., 2023; Ebrahimpour et al., 2023; Kader et al., 2021; Puhanić et al., 2022; F. Rostami et al., 2021; Samadi et al., 2023). Additionally, studies have been conducted in China to investigate the job satisfaction of orthopedic and neurosurgeons using the JDI (J. Yu et al., 2020).

(3) Job Satisfaction Survey

The Job Satisfaction Survey (JSS), developed by Spector (Spector, 1997), measures employee satisfaction regarding the work environment and other aspects of the workplace in nine dimensions. Some studies have used JSS to measure job satisfaction among healthcare providers (Deshmukh et al., 2023).

(4) Porter Need Satisfaction Question

The Porter Need Satisfaction Questionnaire (NSQ) was designed by Porter based on the gap definition of job satisfaction and developed from the differential theory of satisfaction (Fieds, 2004). Each item in the scale comprises three questions: (i) How much is it "currently"? (ii)

How much "should" I have? How important is it to me? A Likert 7-point scale is used to measure these questions. The response to the first question was subtracted from the response to the second question, indicating the level of satisfaction. A greater difference suggests a larger the gap between expectation and reality, reflecting low satisfaction. Conversely, a smaller difference indicates higher satisfaction. In addition, comparing the satisfaction level derived from the third question provides insight into the respondent's true level of satisfaction regarding the item.

(5) Job Diagnostic Scale

In Job Diagnostic Scale (JDS) (Fieds, 2004), overall job satisfaction is measured through three dimensions: internal job motivation, overall satisfaction, and growth satisfaction. Internal job motivation is measured through six questions, overall satisfaction is measured through five questions, and growth satisfaction is measured through four questions.

(6) Job in General Scale

The scale describes overall job satisfaction through 18 questions and can be used alone or in conjunction with the JDI (Fieds, 2004).

2.2.4 Influences on job satisfaction

Numerous studies have investigated the antecedents of job satisfaction (Masa Deh et al., 2019). Scholars have classified the antecedents of job satisfaction into organizational and individual categories, with the latter receiving the most attention (Bellou, 2010; Masa Deh & Gharaibeh et al., 2013; Masa Deh et al., 2016; Masa Deh & Shannak et al., 2013; Shannak & Obeidat, 2012). Additionally, some scholars categorize job satisfaction factors into intrinsic and extrinsic factors. Intrinsic factors are related to the actual work that individuals do in the organization. These factors include diversity, skill utilization, and autonomy. Conversely, factors are related to aspects of the work environment such as pay, working conditions and coworkers (AL-Ma'Seb & AL-Gaoud, 2015).The summary of research on factors affecting job satisfaction is shown in Table 2.5.

Table 2.5 Studies of on factors influencing job satisfaction

Researcher	Influencing factors
Hoppock (1937)	Fatigue, job monotony, working conditions, leadership style
Schaffer and Robert (1953)	Recognition, financial security, control, emotions.
Herzberg (1964;1959)	Based on two-factor theory, motivational factors: the job itself, promotion, being appreciated, responsibility, fulfillment, growth and development. Health factors: wages, work environment, job security, company policies, technical supervision, interpersonal relationships.
Porter and	Security, social, independence, self-esteem, self-actualization

Lyman (1961)	
Friedlander (1963)	Social and technical environment factors, recognized factors, self-actualization factors
Vroom (1964)	Business management, compensation packages, job content, organization, promotion, work environment, coworker relations
Locke (1969)	The job itself, working conditions, job compensation, job recognition, promotion opportunities, benefits, managers, coworkers, organizational members
Smith et al (1969)	Job itself, job compensation, fairness, advancement opportunities, coworkers
Alderfer (1969)	Existential needs (E) based on ERG theory: paychecks, benefits, security. The need for relationships (R): coworker relationships, leadership relationships, customer relationships. Growth needs (G): personal growth
Seashore and Taber (1975)	Employee relationships with supervisors, coworkers, and with subordinates
Locke (Locke, 1976)	Stress, job autonomy, expectations, self-esteem, values, individual characteristics
Arold and Feldman (1982)	Job itself, job rewards, work environment, promotion opportunities, supervisors, work group
Glisson and Durick (1988)	Job design, skill diversity, and role ambiguity
Spector (1997)	Gap between expected and actual compensation
Connolly and Viswesvaran (2000)	Some researchers have studied the relationship between job satisfaction and individual affective differences in terms of positive affect, negative affect, and affective tendencies, respectively, and concluded that there is a correlation between the two.
Price (2001)	Job integration, communication, income level, corporate centralization
Klassen and Robert (2010)	Self-confidence
Umit and Pinar (2019)	Core self-evaluation; balanced view of time
Rostami et al. (2021)	Mental workload
Rogowska and Meres (2022)	Emotional intelligence
Garmendia et al. (2023)	Social support
Gottwald and Lejsková (2023)	Perceived workload
J. Lu et al. (2001)	Corporate image (management system, customer service, quality management, participation management), leadership (managers, job recognition), job rewards (compensation, benefits, training and development, work environment), job collaboration (coworkers, communication, respect), and the job itself (sense of job competence, fulfillment, and security)
B. Hu and J. Chen (2003)	Wages and salaries, work environment, leadership level, management policies, incentives
Shu and Liao (2003)	Organizational structure and tendencies, working conditions and requirements, career development, roles in the organization, interpersonal relationships, social support, managing things
Nan et al. (2004)	Basic perception, value perception, employee expectations, employee needs, degree of conformity to needs
Z. Wang and Jiang (2004)	Age, gender, length of service, job type, education level, marital status, individual income, work experience, nature of work
F. Liu and J. Zhang, (2004)	Wages and benefits, company in general, customer service, department, direct supervisor, work objectives, work performance, personal development, top management

W. Zhao (2004)	Compensation, environment, system, management, culture, growth, achievement, fairness, autonomy
G. Zhang and Hao (2005)	Work itself, work reward, work conditions, work group, corporate culture
Jiang et al. (2006)	Organizational climate, career commitment, work initiative, burnout
C. Huang (2007)	Job reward, job itself, institutional factors, leadership factors, self-efficacy, interpersonal relationships, workload
S. Zhang and Liao (2007)	Job itself, upper management, coworkers, promotion, compensation
G. Li (2007)	For personal factors (individual characteristics such as gender, age, and education), job factors (the job itself, environmental conditions, salary and compensation, and room for advancement.), and other factors (factors such as leadership styles, development prospects.)
S. Li et al. (2008)	Work environment, welfare benefits, work stress, interpersonal relationship, self-actualization
Gu et al. (2012)	Salary and compensation, work itself, work environment, personal development space, supervisors, and interpersonal management system
Jing (2015)	Work environment (working time, working equipment), work itself (interest level, self-actualization, challenge level), work reward (salary distribution, promotion, welfare benefits), interpersonal relationship (opinion communication, organizational support level), and enterprise (management level, management effectiveness, leadership satisfaction)
Jiang and Fan (2016)	Employees themselves (emotional identity, emotional exhaustion, depersonalization, continuous support, internal drive), interpersonal relationships (coworker relationships, supervisor relationships), work-related (working conditions, work itself, job suitability, reciprocity of power and responsibility, career effectiveness), external rewards (job recognition, career development), and the organization (company climate, institutional norms, employee engagement)
X. Yin (2018)	Work itself, public service motivation, interpersonal relationships, promotion rewards, institutional management
Q. Wang and Tan (2019)	Occupational burnout
D. Liu (2021)	Rewards, interpersonal interactions, leadership style, work itself, personality traits

2.2.5 The research of physicians' job satisfaction

Job satisfaction among physicians in the healthcare sector is a significant concern (Eker et al., 2004). Notably, there exists a direct correlation between physician job satisfaction and patient satisfaction (Martins & Teresa, 2012). The job satisfaction of healthcare providers is critical in healthcare management, as employees' levels of job satisfaction directly impact healthcare users (Deshmukh et al., 2023). Employees' job satisfaction is an important factor in the effective functioning of healthcare institutions (Verulava, 2024). High job satisfaction among healthcare workers can yield numerous benefits, including improved staff retention and increased patient satisfaction (Yami et al., 2011).

Physicians who are highly satisfied are better positioned to deliver quality healthcare, which in turn enhances patient satisfaction and productivity (Luthans et al., 2004) while reducing costs (W. Yin et al., 2006). Research conducted on medical staff in Chinese public

hospitals (She, 2019) indicated that employees with high job satisfaction are more inclined to produce high output and quality work. On the other hand, a decrease in job satisfaction among physicians may lead to an increase in turnover rates, affect the continuity of healthcare services, and may lead to tensions between doctors and patients and higher costs of health services (Murray et al., 2001). The decline in the healthcare labor force is a global trend that is worrisome in low- and middle-income countries (LMIC) (Abdullahi et al., 2023). Studies have shown (Q. Wang & Tan, 2019) that healthcare workers' job satisfaction is significantly associated with the quality of services they provide, their intention to leave, and their productivity. Job satisfaction not only has a direct negative effect on burnout and turnover intention, but also has an indirect effect on turnover intention through burnout as a mediator (H. Wang et al., 2020). Furthermore, physician job satisfaction affects physicians' own health and career development (Stobbe et al., 2021). A positive correlation was observed between healthcare providers' job satisfaction and patient satisfaction (Deshmukh et al., 2023). Job satisfaction among health practitioners has also been recognized as an important factor affecting their efficiency, well-being, and mental health (Alotaibi et al., 2023). Increased job satisfaction is expected to reduce job fatigue (Danacı & Yazır, 2022). Moreover, healthcare worker satisfaction is the basis of patient satisfaction, and the improvement of healthcare worker satisfaction will promote the improvement of patient satisfaction and contribute to the virtuous circle of hospital management (Z. Wang et al., 2019). A nationwide study of 136 tertiary public hospitals in China (Z. Wang et al., 2019) showed that healthcare workers' job satisfaction was significantly and positively related to inpatient satisfaction. Job satisfaction was negatively correlated with propensity to leave (Q. Wang & Tan, 2019).

It has been found that nurses' job satisfaction has a profound effect on the quality of care (Heidari et al., 2022). For instance, job satisfaction among oncology nurses enhances psychiatric care (Manookian et al., 2023). Furthermore, there exists a statistically significant negative correlation between job satisfaction and emotional exhaustion (Heidari et al., 2022). Caregivers with high job satisfaction are better able to balance the work and family life (Uzdıl et al., 2023). A study in Turkey proved (Kiliç Barmanpek et al., 2022) that as nurses' job satisfaction increases, their quality of life and quality of care rises.

Conversely, job dissatisfaction is one of the most important factors influencing healthcare workers to seek a career change, reduce productivity and possibly move to more promising opportunities, thus posing a threat to public health in the region (Abdullahi et al., 2023). Job satisfaction is a key concern for healthcare professionals and directly affects patient safety and quality of healthcare delivery (Kader et al., 2021). Additionally, low job satisfaction increases

burnout among healthcare workers (Samadi et al., 2023).

The study by Abdullahi et al. (2023) found that overall job satisfaction among healthcare providers is low, with some areas reporting a satisfaction rate of only 65%. In certain regions, the satisfaction rate among healthcare providers' employees is as low as 20% (Deshmukh et al., 2023). A Turkish study on primary health care workers showed (Erten et al., 2022) that their overall satisfaction was moderate, with a mean score of 3.21 ± 0.67 out of 5. Studies have shown (Sharmin et al., 2023) that physicians' satisfaction with the psychological environment during the COVID-19 epidemic is higher than their satisfaction with the physical working conditions. The unknown nature and high contagiousness of COVID-19 during the epidemic can lead to high levels of stress and tension among healthcare workers, which ultimately leading to exhaustion and affecting their job satisfaction (Heidari et al., 2022). Studies have also shown (Deshmukh et al., 2023) that among doctors, nurses, and support staff within healthcare institutions, the highest percentage of dissatisfaction is observed among doctors (20%), followed by nurses (6.66%), and support staff (6.67%.). Support staff reported significantly higher satisfaction levels compared to physicians and nurses. Younger staff (38.14%), regular staff (33.33%) and new staff (37.5%) were more satisfied. A survey of 314 healthcare workers in Malaysia (Azmi et al., 2022) showed that the incidence of job dissatisfaction was 35.7%. A study of 1732 Swiss physicians (including general practitioners, internists, and pediatricians) showed (Bovier et al., 2009) that higher levels of job satisfaction can alleviate emotional exhaustion and mental health problems among physicians. It has also been found that nursing staff have higher job satisfaction than specialists and general practitioners (Zikusooka et al., 2021).

Since the 1980s and 1990s, there has been a gradual increase in research on job satisfaction of medical personnel in China. W. Yang (1988) found that the job satisfaction of nurses in hospitals was at a medium level and lower than that of other occupational groups by means of a satisfaction survey of nurses. Q. Zhang et al. (1991) studied the job satisfaction of health epidemic prevention personnel at all levels in the Jiamusi area by means of a questionnaire survey, and concluded that employers should set up a feedback system for employee satisfaction, which can be used to solve their hardships in a timely manner and to mobilize the employees' work motivation. The results of (Tong & Luo, 2003) also showed that the overall job satisfaction of medical personnel was not high: the comparisons across different roles reveal that administrative staff exhibit higher job satisfaction than that of doctors and nurses, and the job satisfaction of doctors with different titles differed in different dimensions. X. Li and Wang (2004) conducted a questionnaire survey on the satisfaction of community medical staff with

their work in the community, and the results showed that the overall job satisfaction of community medical staff was not high, especially in terms of work pressure, sense of security, and work remuneration. H. Zhang (2005) focused on the correlation between psychological and behavioral factors and job satisfaction of community medical staff with urban community hospitals in-service personnel as the research object. P. Zhang and Cui (2005) provided a comprehensive summary of job satisfaction research, examining its definition and theoretical foundations. They highlighted those theories such as job characteristics, Maslow's hierarchy of needs, equity theory, Herzberg's two-factor theory, and expectancy theory form the theoretical basis for the majority of job satisfaction studies.

In recent years, most of the studies in China have shown that the level of job satisfaction among domestic healthcare workers is not satisfactory (W. Yin et al., 2006). The results of a study of family physicians in Chengdu, China, showed (J. Chen et al., 2022) that family physicians had a low level of job satisfaction. It has been shown (Y. Zhang & Feng, 2011) that across China, more and more physicians are leaving or intend to leave their jobs due to job dissatisfaction. Job satisfaction was a significant direct predictor of physicians' intention to resign in China (Y. Zhang & Feng, 2011).48.51% of medical staff were dissatisfied with the professional environment in which they worked (Yan & Su, 2015) . Scholars such as D. Hu et al. (2016) reported that the overall satisfaction level of Chinese healthcare workers was low. The 2018 "Third-party Evaluation of the National Action Plan for Further Improving Medical Services" surveyed 136 public tertiary hospitals in China, and the results showed that the job satisfaction level of clinicians was only 34.6% (S. Wu et al., 2019). Studies in China have shown higher occupational stress and poor subjective well-being among medical staff (Q. Zhang et al., 2019). K. Zhao et al. (2019) concluded that the current overall job satisfaction of physicians is still low after a study of physician job satisfaction in county-level public hospitals in Sichuan Province. A study of job satisfaction of family physicians in Guangzhou, China (S. Liu & Y. Zhang, 2020) showed that overall job satisfaction of family physicians was low. Moreover, a survey of 30 randomly selected hospitals in Beijing showed that medical staff satisfaction has yet to be improved (J. Liu, 2020). A study of pediatricians' job satisfaction in Nanjing, China (Zhu et al., 2020) showed that pediatricians' job satisfaction was at a generally low level. In Chongqing, China (B. Liu et al., 2020) concluded that pediatricians' overall job satisfaction was not high. A study of physicians in Hangzhou, China, also found (Ma et al., 2021) that overall physician satisfaction was low. A sample survey covering eastern, central, and western China showed that physician satisfaction was at a low level (X. Li et al., 2022).

The study of factors influencing job satisfaction has emerged as a significant area of

research concerning medical personnel both domestically and internationally. Joyce (1998) investigated the perceptions of job satisfaction of caregivers working in nursing homes in the western U.S.A. The results concluded that job satisfaction was related to the stability of the job, the potential for growth and development in the job, and external pressures given to the job by the society. Annick, Marc, and Ives (2007) found that organizational structure has an impact on nurses' job satisfaction, in addition, salary is the most important dimension in job satisfaction. Jane Ferguson (2011) concluded that hospital pharmacists' satisfaction with upper management is an important factor in job satisfaction, and that poor frontline management, lack of recognition and insufficient support from the management reduces pharmacists' job satisfaction. A survey of university specialized hospitals (Yami et al., 2011) revealed that the main causes of low job satisfaction among medical staff are lack of motivation, inadequate salary, inadequate training opportunities and inadequate human resources. Factors that can bring about high job satisfaction among medical personnel are satisfaction from helping others and career fulfillment.

Chinese researchers have also paid much attention to the factors influencing job satisfaction of medical personnel. W. Yang (1988) found that the main determinants of nurses' job satisfaction were managers' help, meaning of work involvement, job autonomy, and job pay. X. Zhao and Rong (1996) found that gender, age, education, and title all have an effect on job satisfaction by analyzing the factors influencing the work mindset of 123 maternal and child health care workers, and the overall trend was that the older the age, the higher the title, and the longer the years of work, the higher their job satisfaction. Ai ,He, and Yang (2010) used the Minnesota Questionnaire to survey 100 emergency physicians in a comprehensive tertiary hospital and found that the overall satisfaction of emergency physicians was on the low side, reflecting the reality that this group of people has a high level of work intensity and long working hours, while at the same time, their work compensation could not form a corresponding match.

The evaluation of job satisfaction among healthcare workers, both domestically and internationally, is primarily assessed from the perspectives of hospital management and the needs of healthcare professionals. This evaluation focuses on the impact of the basic conditions within the organization itself, such as the working environment, remuneration and benefits, and the standard of hospital organization and management on the degree of satisfaction (X. Chen et al., 2020; Qian et al., 2017; S. Sun et al., 2019). Systematic evaluation studies have shown (M. Liu et al., 2023) that factors affecting healthcare professionals' job satisfaction can be categorized into intrinsic and extrinsic factors. Intrinsic factors include 4 themes: responsibility, opportunities for advancement, recognition, and a sense of personal accomplishment and

growth. Extrinsic factors, on the other hand, include 5 themes: salary and benefits, organizational policies and management, interpersonal relationships, working conditions, and work status. Physicians' satisfaction with their work environment incorporates both psychological and physical elements, and one of the significant challenges they face is adapting to evolving work environments, such as those that emerged during the COVID-19 pandemic (Sharmin et al., 2023).The research on the influencing factors of job satisfaction among medical staff is summarized in Table 2.6.

Table 2.6 Recent studies on the factors influencing job satisfaction among healthcare workers

Researcher	Findings of the study
Akinyemi and Atilola (2013)	Lower age, opportunities for career development, autonomy of practice, alignment of work with core personal and professional values and work environment are factors that influence job satisfaction among Nigerian physicians.
Khamlub et al. (2013)	Conflict resolution at work, relationship with other colleagues, and organizational structure as major factors influencing overall job satisfaction among healthcare workers in Laos
R. Kumar et al. (2013)	A survey of public health professionals in Islamabad, Pakistan, found that the main triggers of job dissatisfaction were low wages, insufficient financial incentives, lack of training opportunities, and inadequate supervision.
Yolanda Raquel Lapeña-Moñux (2015)	Positive and positive communication enhances job satisfaction among caregivers.
Y. Lu et al. (2016)	Educational level, occupation, annual income, years of working experience, night shift frequency, doctor-patient relationship, and work stress significantly affect job satisfaction of healthcare workers in Guangdong Province, China.
F. Yang and Li (2016)	Working hours, age, income, working hours, type of hospital, and job attributes are significant influences on job satisfaction of medical staff.
S. Liu et al. (2016)	Income and social respect for the profession affect job satisfaction of Chinese medical staff.
Jin et al. (2018)	Job stress significantly affects job satisfaction of Chinese medical personnel.
X. Yu et al. (2018)	The most significant causes of dissatisfaction among Chinese healthcare workers are overwork and lack of support.
Qiu (2018)	Factors such as work environment, organizational management and policies, working conditions, interpersonal relationships, remuneration, and career development affect the job satisfaction of employees in Chinese public hospitals.
F. Yu et al. (2019)	Region, gender, literacy, education, title, income level, whether to work overtime, career development opportunities, work pressure, emotional exhaustion, depersonalization, and impaired personal accomplishment are the main factors affecting job satisfaction of Chinese general practitioners.
Jiang et al. (2019)	Low salary, doctor-patient relationship, and high workload are the most important reasons for low job satisfaction among Chinese psychiatrists.
Hsieh et al. (2019)	Building better relationships with supervisors and developing education and training can lead to higher job satisfaction among teaching hospital staff.
T. C. Chang and Chang (2019)	Significant differences in overall job satisfaction between female shift nurses and the interactions between day/night and evening/night shifts in Taiwan, China.
Song et al. (2019)	Perceived usefulness, perceived ease of use, attitude toward system use, and job control of hospital information systems all affect job satisfaction of Chinese physicians.
Zou et al. (2019)	Factors affecting job satisfaction of general practitioners in Chongqing, China, are gender, department of service, weekly workload, type of work unit, highest education, title, family support for practicing general medicine, and career love.

Q. Zhang et al. (2019)	Information system use habits significantly and positively influence physician job satisfaction through positive effects on three dimensions of physician job characteristics (perceived diagnosis and treatment process complexity, perceived diagnosis and treatment process rigidity, and role overload), as well as two dimensions of job status (physicians' knowledge absorption capacity, and intention to adopt innovative products).
S. Wu et al. (2019)	Factors such as income situation, workload, doctor-patient relationship, distribution system of hospitals, and promotion system have an impact on job satisfaction of Chinese healthcare workers.
J. Liu (2020)	Development prospect, hospital category, salary package, job category, workload and title have an impact on job satisfaction of medical staff in tertiary hospitals in Beijing, China.
H. Wang et al. (2020)	Job rewards, work environment and organizational management are the main reasons for low job satisfaction among primary healthcare workers in China.
S. Liu and Zhang (2020)	Position influences job satisfaction of family physicians in Guangzhou, China.
Guo et al. (2020)	Work environment, income level, whether to work overtime, and vacation system affect job satisfaction of primary care physicians in China.
Yu et al. (2020)	High occupational risk, heavy workload, and few promotion opportunities are the main reasons for low job satisfaction of medical staff in public hospitals in Jiangsu Province, China.
Zhu et al. (2020)	Overall job satisfaction of pediatricians in Nanjing, China is negatively correlated with age, title, and years of experience.
L. Yang et al. (2020)	Age, promotion system, income level, doctor-patient relationship, and performance appraisal have an impact on the job satisfaction of primary care physicians.
Yao et al. (2020)	Working years, gender, weekly rest days, and income are factors affecting job satisfaction of Chinese pediatricians.
B. Liu et al. (2020)	Factors affecting job satisfaction of pediatricians in Chongqing, China were title, average daily working hours, working years, and average monthly income. The study in Chongqing, China found that income was an important factor influencing job satisfaction, average daily working hours were negatively related to job satisfaction, and young pediatricians with some work experience had the lowest job satisfaction.
Samira and Stina (2020)	Work bad environment, salary, self-worth realization of work and external recognition all has an impact on job satisfaction of medical researchers.
N. Chen and X. Chen (2020)	Work environment, management system, emotional attitude, workload, organizational leadership, willingness to leave, income return, and family status are the eight main factors affecting job satisfaction of hospital workers.
Ma et al. (2021)	The degree of influence of economic factors on doctors' job satisfaction in Hangzhou, China has decreased, and non-economic incentives have become a more influential factor on doctors' job satisfaction. In addition to salary factors, convenience of going to work, working conditions, daily working hours, hospital management system, relationship with colleagues, relationship with leaders, respect and recognition from the public, sense of belonging to the job, and training opportunities all have an impact on doctors' job satisfaction.
Akyurt (2021)	Continuing education, in-service training, and regular updating of knowledge are important in increasing radiologists' job satisfaction because knowledge is associated with self-confidence and stress reduction.
D. Liu et al. (2021)	Age, education, monthly income, working hours, specialty and title were significantly associated with job satisfaction among Chinese physicians, and no significant gender differences in job satisfaction were observed after controlling for confounders.
Akyurt (Akyurt,	Longer working years, discomfort with working in a radiation environment and

2021)	using public transportation to get to work were significant predictors of poorer job satisfaction among radiographers, while time off significantly predicted higher job satisfaction.
Zikusooka et al. (2021)	Professional status, income, teamwork and team management of healthcare workers were significantly associated with job satisfaction.
Koroma et al. (2021)	Low allowance and delayed payment were significantly associated with dissatisfaction among healthcare workers.
J. Chen et al. (2022)	Age, education level, job level, type of organization, years of experience and monthly income were factors affecting job satisfaction of family physicians in Chengdu, China, and job stress and over commitment were negatively associated with overall job satisfaction.
Puhanić et al. (2022)	The main determinants of job satisfaction among Croatian healthcare professionals were younger age, being female, less work experience, and being married or in a partnership.
Azmi et al. (2022)	Job satisfaction is low among healthcare workers in Malaysia who are younger and dissatisfied with annual performance
Erten et al. (2022)	The most important predictor of job satisfaction among primary health care workers in Turkey is "liking the workplace".
Hao et al. (2022)	A survey on job satisfaction of general practitioners in Guangdong Province, China, found that general practitioners who frequently self-learned relevant knowledge had higher overall satisfaction than those who did not.
Abdullahi et al. (2023)	Factors affecting job satisfaction of health care providers in Nigeria include facility conditions, coworker relations and remuneration.
H. Lee and Choi (2023)	Doctor-patient relationship and communication skills affect job satisfaction of health care providers.
Tran et al. (2023)	Working conditions, leadership style, and benefits are factors that significantly affect job satisfaction of pharmacists in regional hospitals in Vietnam. Pharmacists who had worked in the field for a long time, had no other duties than their primary duties and worked in private healthcare institutions were more satisfied with their jobs.
Soriano-Vázquez et al. (2023)	Emotional intelligence as a factor influencing job satisfaction among healthcare providers.
Deshmukh et al. (2023)	Satisfaction among healthcare providers was positively related to factors such as type and nature of work, relationship with coworkers and supervisors, while factors such as interpersonal communication, salary and promotion opportunities were more related to dissatisfaction. Factors such as job security, youth and work experience were strongly associated with job satisfaction. Employees were more satisfied with the type and nature of work and relationship with coworkers, while they were more dissatisfied with salary, promotion opportunities and interpersonal communication.
Alotaibi et al. (2023)	Among Saudi Arabian health practitioners, males were more satisfied with their jobs than females, there was a significant association between age group and job satisfaction, older practitioners were more satisfied than younger practitioners, and those with more than five years of experience were the most satisfied.
Mulligan et al. (2023)	Health practitioners' job satisfaction was negatively associated with educational debt, weekly hours of work, and some practice settings, and job satisfaction was positively associated with expected age of retirement.
Q. Wang et al. (2023)	Changes in income, years of work, years of work, and age were the four most important factors affecting job satisfaction among primary health care providers in China during the COVID-19 epidemic.
Ofei et al. (2023)	Adverse leadership behaviors affect nurses' job satisfaction.
Dziedzic et al. (2023)	During the COVID-19 epidemic, job satisfaction was higher among those working in non-infectious hospitals and those with higher monthly incomes. The highest

	rated area of job satisfaction was the opportunity to do good for others, and the lowest rated areas included: job evaluation methods and pay systems, opportunities for promotion and access to senior positions, and the number of tasks to be performed during the workday.
Dinibutun (2023)	Married doctors in public hospitals in Turkey have significantly higher job satisfaction than single doctors, and doctors in public hospitals also have significantly lower job satisfaction compared to doctors in private hospitals.
Xu & Zhou et al. (2023)	Perceived management support was significantly and positively related to job satisfaction of physicians through motivation as a mediator.
Verulava (2024)	The most important influences on job satisfaction of Georgian physicians are: relationship with managers, relationship with colleagues, communication with patients, possibility of continuing medical education and quality of services. Younger physicians are more likely to be dissatisfied than older physicians. Women were less satisfied with their workload compared to men. Many respondents were dissatisfied with their current income and remuneration methods. Physician specialists were particularly dissatisfied due to work/life balance violations.
Pursio et al. (2024)	Factors affecting job satisfaction among Finnish nurses, in addition to staffing, resource adequacy, and leadership style, being able to participate in knowledge sharing and professional autonomy were also associated with job satisfaction.

In the analysis of job satisfaction, many studies have used Herzberg's two-factor theory as a theoretical framework. Samira and Stina (2020) applied this theory to explore motivational factors related to job satisfaction among medical laboratory professionals (MLPs) in Oman. Similarly, several researchers in China have also utilized the two-factor theory to examine job satisfaction among physicians in tertiary public hospital, family physicians, and other medical groups (Y. Cai et al., 2022; W. Han et al., 2023; Ma et al., 2021). It was found (Ma et al., 2021) that in addition to salary, factors such as convenience of work, working conditions, daily working hours, hospital management system, relationship with colleagues, relationship with leaders, respect and recognition from the public, sense of belonging to the job, and training opportunities all impact on doctors' job satisfaction. According to the two-factor theory, salary is a hygiene factor, and when a doctor's income meets their basic needs, it prevents job dissatisfaction, but does not necessarily increase job satisfaction. The factors that lead to greater job satisfaction are often non-financial incentives, such as opportunities for personal fulfillment. According to the two-factor theory, job satisfaction and dissatisfaction are not simple opposites. Eliminating the factors that cause dissatisfaction in medical staff does not lead to positive attitudes and satisfactory results, but only to the neutralization of "dissatisfaction". This category of factors, called health factors, is mostly related to the environment, such as interpersonal support, work intensity, and compensation and benefits. The absence of these factors does not directly lead to dissatisfaction, but rather to a state of "no satisfaction". Similarly, motivational factors are factors that bring about positive emotions and feelings of satisfaction, including recognition, opportunities for advancement and development.

In the 21st century, research on job satisfaction in the healthcare services industry has been further advanced, gradually exploring job satisfaction scales for different populations working in the healthcare services industry (Gleeson et al., 2001; Mohammadreza Amiresmaili, 2013; Williams & Skinner, 2003). Studies related to the evaluation of healthcare workers' satisfaction have been commonly conducted at home and abroad, mostly using the MSQ, JDI and OJS were used to measure healthcare workers' job satisfaction. The most commonly used instrument for measuring healthcare providers' job satisfaction is the MSQ, which is widely used not only abroad (Dziedzic et al., 2023; Erten et al., 2022; Heydari et al., 2022; Kavurmaci et al., 2022; Kiliç Barmanpek et al., 2022; Koroma et al., 2021; Manookian et al., 2023; Uzdıl et al., 2023; Q. Wang et al., 2023), and has also extensively in China (Ai et al., 2010; D. Liu et al., 2021; Fu et al., 2023; Hao et al., 2022; Jiang et al., 2019; Q. Wang et al., 2022; Q. Wang et al., 2023; X. Yu et al., 2020; Zhu et al., 2020).

There is also the use of JDI (Abdullahi et al., 2023; Ebrahimpour et al., 2023; Kader et al., 2021; F. Rostami et al., 2021; Samadi et al., 2023; J. Yu et al., 2020), the OJS (Lacey et al., 2011; Varytis & Giannouli, 2023; Vidal-Alves et al., 2021), and the Job Satisfaction Questionnaire (JS Scale) (Deshmukh et al., 2023) instruments to measure medical staff satisfaction.

2.3 KM and job satisfaction

In the 21st century, knowledge work and knowledge worker have become increasingly important (Palvalin et al., 2017; Turriago-Hoyos et al., 2016). Knowledge worker is the use of knowledge resources as inputs and new ideas, processes and products as outputs (P. F. Drucker, 1999; Shujahat et al., 2018). In the context of knowledge workers, knowledge worker satisfaction is defined as the overall satisfaction or good feelings of knowledge workers towards all aspects of the workplace and organization, including the work itself, co-workers, supervisors, and procedural and distributive justice (Singh & Sharma, 2011; Spector, 1997). Although job satisfaction is one of the most researched topics by academics and practitioners (Toker, 2011), it is seldom explored from a KM perspective (Masa Deh et al., 2016; Masa'Deh et al., 2019). After the 21st century, a small number of studies began to link KM to job satisfaction (S. Almahamid & A. McAdams et al., 2010; Koseoglu et al., 2010; Y. Lee & Chang, 2007). Studies have shown (Kianto et al., 2016; Koroshnia & Forozan, 2018; T. N. Kumar, 2018; Malik & Kanwal, 2017) that there is a direct correlation between KM dimensions and employee job satisfaction. KM provides the best knowledge to knowledge workers and can significantly

increase their satisfaction (Biasutti & Heba, 2012; Kianto et al., 2016). With the application of KM, knowledge worker satisfaction can be increased within an organization (Kianto et al., 2016; Sahibzada et al., 2020).

A limited number of studies have started to explore the connection between KM and employee job satisfaction (S. Almahamid & A. C. McAdams et al., 2010; Khanal & Raj Poudel, 2017; Kianto et al., 2016; Koseoglu et al., 2010; Y. Lee & Chang, 2007; Singh & Sharma, 2011). These studies have been conducted in different sectors such as the telecommunication sector, the hospitality sector, the financial sector and the public government sector.

Knowledge workers are those whose work is based on knowledge acquired through formal education or work experience. These employees contribute to the growth and development of the organization due to their ability and capacity to solve challenging problems and develop new solutions (Masa Deh et al., 2019). Organizations should focus on the job satisfaction of knowledge workers because only satisfied employees are motivated and productive (Masa Deh et al., 2019). Recent findings suggest that KM has a complex impact on job satisfaction (Mila Kavali et al., 2023).

Investigations have shown that KM produces high levels of knowledge worker satisfaction in organizations (Shujahat et al., 2018). The study clearly emphasized the need for further research on the relationship between KM and knowledge worker satisfaction in knowledge-intensive organizations (Shujahat et al., 2018). Y. Lee and Chang (2007) examined the relationship between employee job satisfaction and KM in a wire and cable group relationship in Taiwan. Their findings showed the correlation between job satisfaction and KM. It has also been found that KM can indirectly affect employee job satisfaction by improving the economic performance of the organization (Bastida et al., 2018; Guerci et al., 2019). Other studies have analyzed the overall impact of employees' knowledge and skills on job satisfaction (Alonso et al., 2019; Davila et al., 2019; Hendri, 2019). Koroshnia and Forozan (2018) also demonstrated that KM dimensions are significantly correlated with job satisfaction.

Current research on the impact of KM on job satisfaction can be summarized into two primary areas.

The first aspect is based on Gold's (2001) definition of knowledge infrastructure capabilities in KMCs to measure the impact of KM on job satisfaction from the perspective of knowledge infrastructure capabilities. The study showed (Masa Deh et al., 2019) that technical and cultural infrastructures have a significant positive effect on job satisfaction, while structural infrastructures do not have a significant effect on job satisfaction. This study was conducted on knowledge workers in universities and the results showed (Masa Deh et al., 2019) that there is

a significant gender difference in the perception of the effect of knowledge infrastructure on job satisfaction. The model for this study is shown in Figure 2.5. However, no significant differences were found across age, experience, or academic rank groups using an ANOVA test. Furthermore, Attar and Sweis (2010) identified other benefits of IT investments such as faster access to information, faster execution of work and better communication. They (Attar & Sweis, 2010) found a positive relationship between ICT adoption and job satisfaction. The findings showed that the more investment in IT, the more satisfied their employees will be with their working conditions, their relationships with coworkers, and their personal job characteristics (Attar & Sweis, 2010; Hajir et al., 2015; B. Obeidat & Al-dalahmeh, 2015).

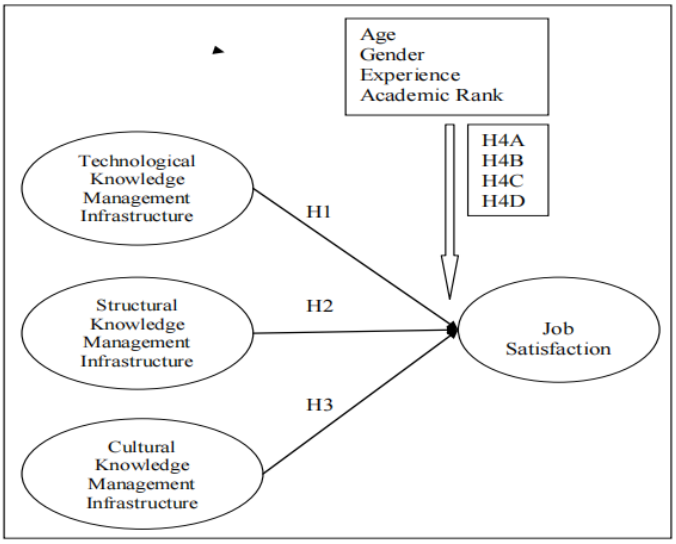

Figure 2.5 The impact of knowledge infrastructure on job satisfaction

Source: Masa'Deh et al. (2019)

The second aspect focus on measuring the impact of KM on job satisfaction in terms of KM processes based on Gold's (2001) definition of knowledge process capabilities in KMCs. The study identifies four key KM processes: knowledge acquisition, knowledge transformation, knowledge sharing, and knowledge utilization (Fugate et al., 2009; Gholami et al., 2013; Gold, 2001; Gowen III et al., 2006; Rasula et al., 2012; Ștefan et al., 2016). The results of studies about the KM process on the satisfaction of knowledge workers show (Umar et al., 2020) that the KM process significantly increased the satisfaction of knowledge workers. The proposed research model is illustrated in Figure 2.6.

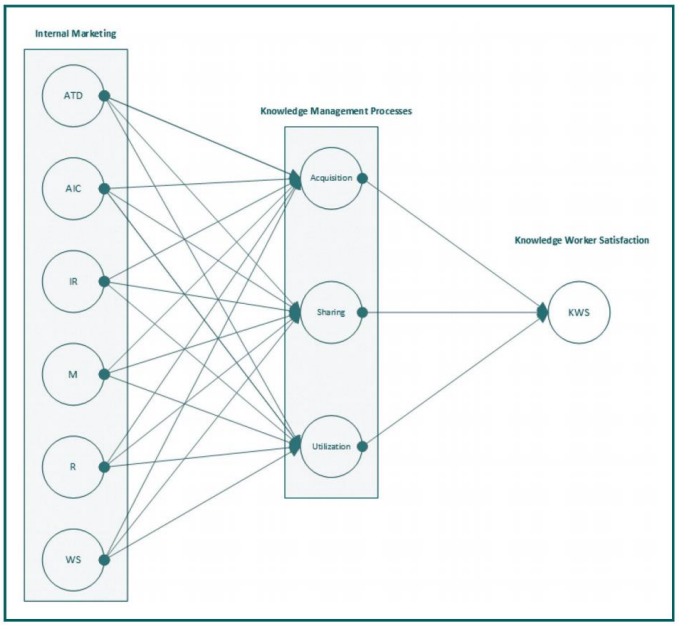

Figure 2.6 The impact of KM process on job satisfaction

Source: Umar et al. (2020)

A study conducted in Chinese higher education institutions found (Umar et al., 2020) that knowledge workers' job satisfaction has a significant mediating role between KM processes and organizational performance. Additionally, research within the Chinese software industry found (Anum Shahzadi et al., 2021) that KM processes directly and indirectly affect project success through knowledge worker satisfaction as a mediating variable. The proposed research model is illustrated in Figure 2.7.

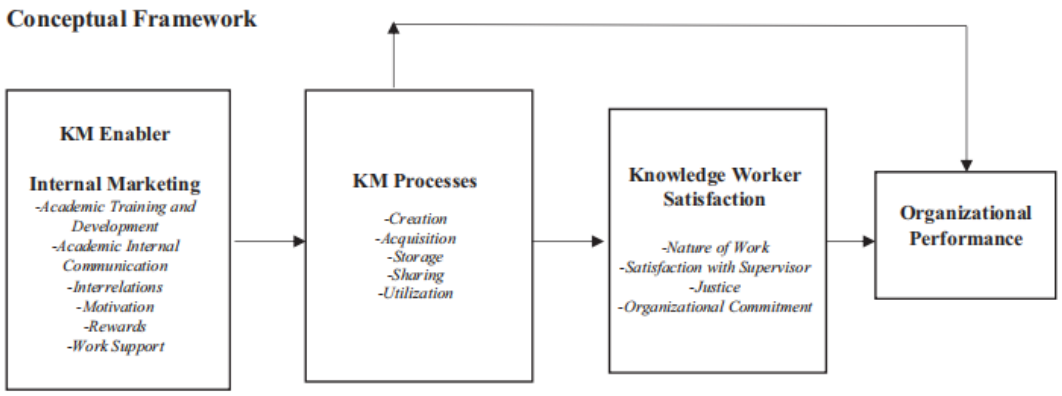

Figure 2.7 The impact of knowledge process on job satisfaction and organizational performance

Source: Umar et al. (2020)

A study involving 306 knowledge workers in Pakistani software companies revealed that job satisfaction of knowledge workers significantly mediates between two knowledge processes (knowledge creation and knowledge sharing) and innovation, and plays a significant role in mediating between knowledge utilization and innovation. The proposed research model is illustrated in Figure 2.8.

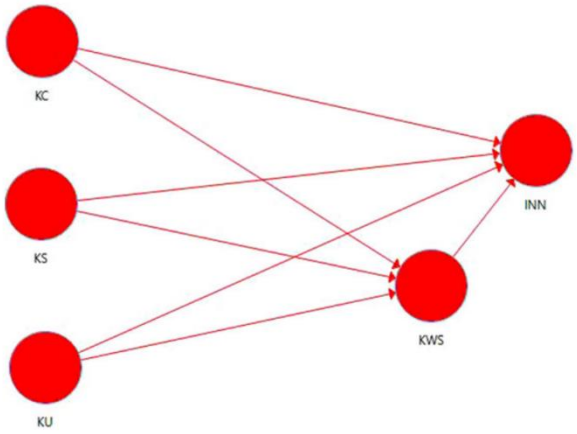

FIGURE 1 Research model (KC = Knowledge Creation; KS = Knowledge Sharing; KU = Knowledge Utilization; KWS = Knowledge-worker Satisfaction; INN = Innovation)

Figure 2.8 The impact of KM process on job satisfaction and innovation

Source: Shujahat et al. (2018)

A study on manufacturing enterprises in Serbia (Kavalic et al., 2023) suggests that KM has a complex impact on job satisfaction. Based on the complex relationship between KM and satisfaction, it is suggested to try to improve KM to achieve higher satisfaction. The proposed research model is illustrated in Figure 2.9.

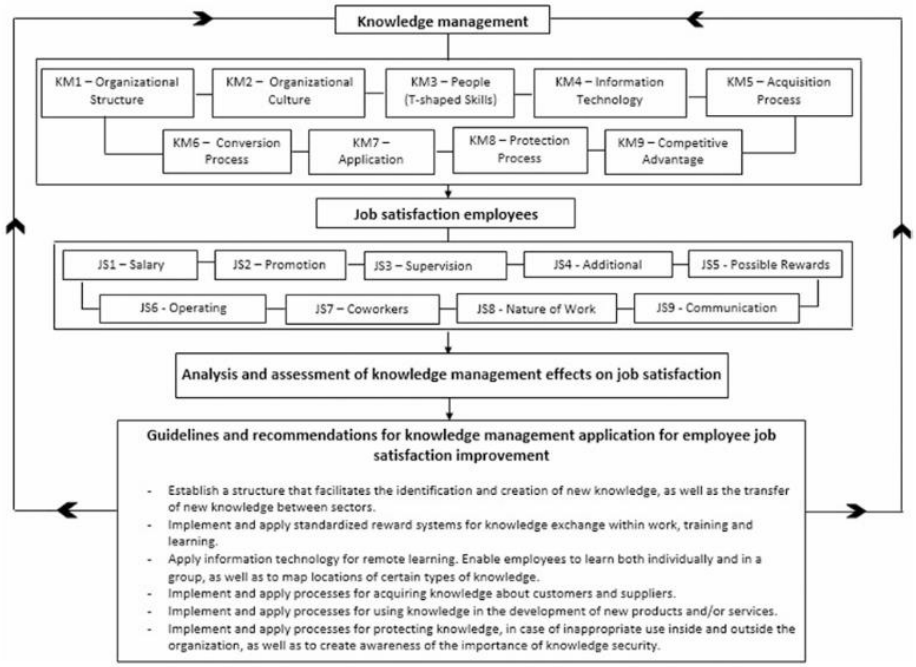

Figure 2.9 Model for improving KM in order to increase job satisfaction levels

Source: Kavalic (2023)

Numerous empirical studies have explored the relationship between KM process, particularly knowledge sharing and job satisfaction (Butt et al., 2018; Kianto et al., 2016; Shujahat et al., 2018). additional research has assessed the relationship between KM and satisfaction (Chatzoudes et al., 2015). It has been found that employee satisfaction increases

when KM processes are effectively integrated within the organization (Kianto et al., 2018; Kianto et al., 2016; Shujahat et al., 2018).

KM processes in organizations enhance employees' ability to build shared understanding and derive value from knowledge in knowledge-intensive environments (Mohrman et al., 2002). In the knowledge age, KM processes represent a contextual feature of the work environment that enriches work and improves job satisfaction (Morgeson & Humphrey, 2006). T. N. Kumar (2018) concluded that KM practices (knowledge creation, knowledge acquisition, knowledge acceptance, knowledge storage, knowledge sharing, and knowledge application) have a significant impact on job satisfaction.

Almahamid, McAdams, and Kalaldeh (2010) conducted a study focusing on the impact of knowledge sharing on job satisfaction among160 employees in Jordan. Their study showed that knowledge sharing practices significantly affected employees' job satisfaction. Kianto et al. (2016), Malik and Kanwal (2017) argued that job satisfaction was influenced by knowledge sharing.

Imran, Bilal, Aslam, and Rahman (2017)discussed the impact of knowledge application process on job satisfaction. Knowledge acquisition process affects employees' job satisfaction (Gangi et al., 2019; Kianto et al., 2016; G. Wang et al., 2019). In addition, knowledge transformation has also been found to affect employees' job satisfaction (S. H. Han, 2018; Ibidunni et al., 2018; Karolidis & Vouzas, 2019; Serenko, 2019). Knowledge protection, as a process of KM, has also been successively found to have an impact on job satisfaction (Byrd & Turner, 2001; Y. Huang et al., 2019).

The two-factor theoretical model has been widely used in current research on KM on job satisfaction (Umar et al., 2020). Health factors and motivational factors are two important corollaries of Herzberg's two-factor theory (Herzberg, 1964, 1966). KM especially KM process reduces dissatisfaction while achieving satisfaction through motivational factors (Shujahat et al., 2018). KM ensures rewards, leadership support, and fair treatment, which ensures the availability of hygiene factors stops employees from developing dissatisfaction (Donate & Guadamillas, 2015; P. F. Drucker, 1998, 1999; P. Drucker, 1998; Kulkarni et al., 2006). The KM process eliminates dissatisfaction through motivational factors while increasing satisfaction (Sahibzada et al., 2020; Shujahat et al., 2018).

KM also influences motivational factors by providing employees with the following five basic motivational elements (P. F. Drucker, 1999; C. H. Liu et al., 2017; Palvalin, 2017; Palvalin et al., 2017; Shujahat et al., 2018; Turriago-Hoyos et al., 2016), including: providing employees with the necessary autonomy in their work; advocating for learning and knowledge-enriched

flavoring, which can have a significant impact on the KM process of knowledge workers; and permitting knowledge workers to interact in different knowledge activities, which in turn stimulates their intrinsic motivation to maintain and create knowledge (Nonaka & Takeuchi, 1995); empowering employees to take responsibility for acquiring, sharing and utilizing knowledge; and providing supportive work facilities.

The researcher argues that KM can serve as an antecedent to worker satisfaction, supported by various studies (Chatzoudes et al., 2015; Kianto et al., 2016; Razmerita et al., 2016; Shujahat et al., 2018).

Employee satisfaction should be a primary concern for organizations, especially in the healthcare sector, where human resources are the most valuable asset (Popa et al., 2018) .Healthcare provider job satisfaction reflects how healthcare providers feel about their jobs, and dissatisfaction can lead to program sabotage, either intentionally or unintentionally (Heydari et al., 2022). Moreover, healthcare providers' job satisfaction is recognized as an important predictor of the quality of patient care (Soriano-Vázquez et al., 2023).In the field of health care research, attention has also begun to focus on the impact of KM on job satisfaction. For example, a study conducted on workers in the Romanian healthcare system found (Popa et al., 2018)that knowledge acquisition and knowledge utilization had a significant positive impact on employee satisfaction, whereas knowledge sharing was associated with a decrease in satisfaction, with the relationship further influenced by the type of hygiene factor provided. Similarly, a study on pharmacists in a Jordanian pharmacy chain showed (Rateb et al., 2022) that there is a correlation between pharmacists' satisfaction and ICT use. The results of a recent study on healthcare institutions (Fadaie et al., 2023) showed that there is a significant positive correlation between KM processes (creation, retention, and application) and employee satisfaction, and there is no significant relationship between knowledge transfer and employee satisfaction, and that KM processes have a positive impact on employee performance and job satisfaction.

Interviews with doctors in tertiary public hospitals in China on job satisfaction (Ma et al., 2021) revealed that most doctors emphasize the importance of opportunities for professional development and recognition, such as platforms for scientific research and innovation, overseas training opportunities, and peer-to-peer learning and exchange. As knowledge-based employees, doctors prioritize personal growth and career development. A survey of general practitioners (GPs') in Guangdong (Hao et al., 2022) found that those who frequently engaged in self-learning reported higher job satisfaction compared to those without this habit. However, there are currently no studies that directly examine the relationship between KM and job satisfaction

among medical staff.

2.4 Research hypothesis

H1: Knowledge infrastructure capacity affects physicians' intrinsic satisfaction in Chinese MCH institutions.
H2: Knowledge process capability influences physicians' intrinsic satisfaction in Chinese MCH institutions.
H3: Knowledge infrastructure capabilities affect physicians' extrinsic satisfaction in Chinese MCH institutions.
H4: Knowledge process capability influences physicians' extrinsic satisfaction in Chinese MCH institutions.
H5: Knowledge infrastructure capabilities influence physicians' general satisfaction in Chinese MCH institutions.
H6: Knowledge process capability influences physicians' general satisfaction in Chinese MCH institutions.

2.5 Conceptual model

This study's conceptual model is based on the two-factor theory, Gold's (2001) KMC model, and recent research on KM and job satisfaction (Masa'Deh et al., 2019; Shujahat et al., 2018; Umar et al., 2020). The conceptual model is illustrated in Figure 2.10.

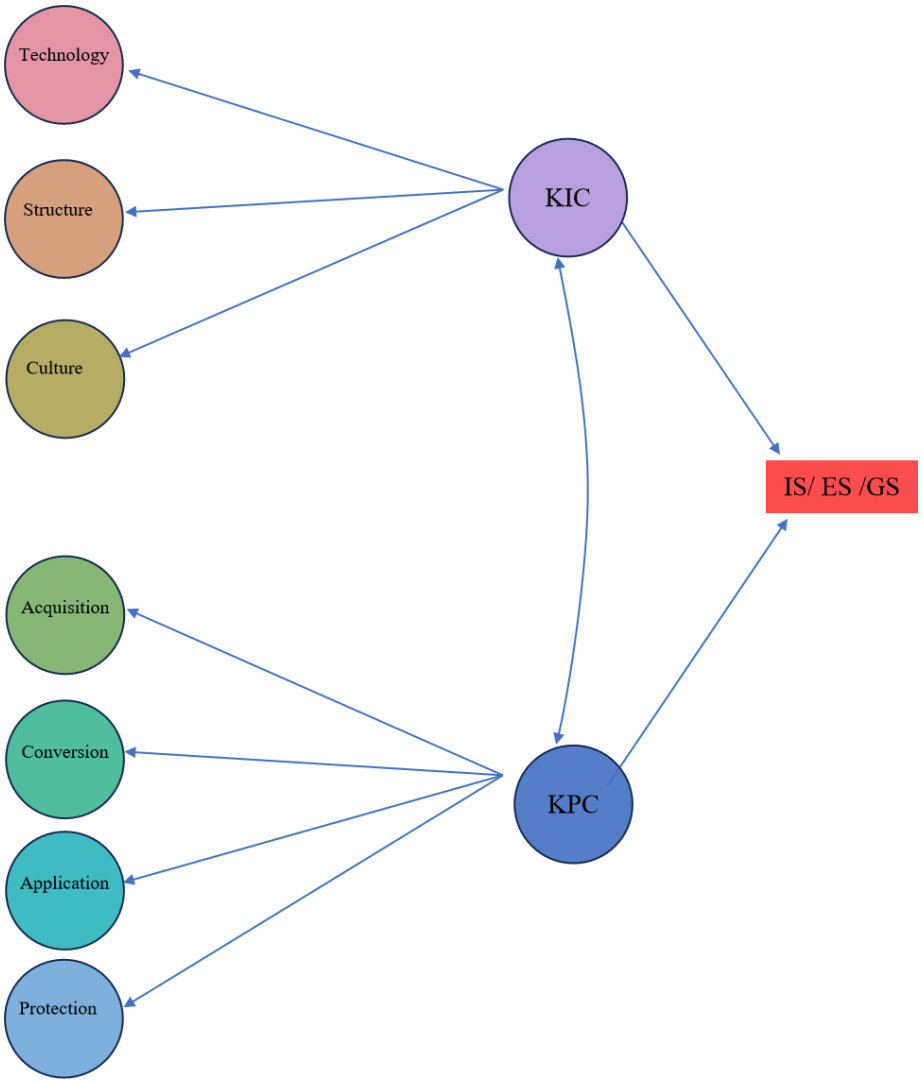

Figure 2.10 The impact of KMC in maternal and child health care institutions on physician satisfaction in China

(KIC: Knowledge Infrastructure Capability. KPC: Knowledge Process Capability. IS: Intrinsic Satisfaction. ES: Extrinsic Satisfaction. GS: General Satisfaction)

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Chapter 3: Research Methods

3.1 Research design

To address the research questions, this study is grounded in the theoretical advancements in KMCs and job satisfaction both domestically and internationally. It formulates a research design and proposes a conceptual model for this study. The research design consists of two distinct phases:

Phase One involves the development of a KMC scale tailored for hospitals in China. Utilizing literature review, Delphi expert consultations, preliminary investigations, and extensive surveys, this phase aims to construct and validate a set of evaluation instruments for KMCs suited to Chinese hospitals.

Phase Two uses MCHIs in the Shenzhen region as a case study to examine how KMCs influence physicians' job satisfaction within Chinese MCHIs.

3.2 Phase 1: Development of a KMC Scale for Chinese hospitals

This phase encompasses several key research activities: the development of a comprehensive entry pool for the Chinese Hospital KMC Scale, conducting Delphi expert consultations, selecting and refining scale entries, determining the content of the scale. Conducting a small-scale pre-survey to gather feedback from respondents, facilitating expert focus group discussions, refining the linguistic expression of scale entries, and finalizing the initial scale. Subsequently, a large-scale survey was conducted to assess the reliability and validity of the initial scale and to establish the KMC Scale for Chinese hospitals.

3.2.1 Development of entry pool

Based on literature review, existing business organization KMC measurement scale entries, and expert consultations, a pool of entries was developed and categorized into 2 subscales of the conceptual model KMC. The first subscale is KIC, includes 3 dimensions: technical foundation, structural foundation, and cultural foundation. The second subscale, KPC, encompasses 4 dimensions: acquisition process, transformation process, application process, and protection

process. this framework serves as the foundation for establishing the initial KMC Scale for Chinese hospitals.

3.2.2 Formation of the initial scale

3.2.2.1 Delphi expert consultation

In the selection of experts for the Delphi consultation, three criteria were taken into consideration: (1) geographical distribution (experts were mandated to represent more than three different regions across China), (2) professional diversity (covering various positions related to hospitals and KM), and (3) expertise familiarity (experts must demonstrate substantial familiarity with the research domain). Additionally, the expert authority coefficient was comprehensively assessed, with a minimum threshold of $\geqslant 0.70$ to ensure credibility.

Eighteen experts from Beijing, Shanghai, Shenzhen and other regions were selected to participate in Delphi Expert Consultation, based on the preliminary KM capacity scale for Chinese hospitals.

The experts panel consisted of hospital directors, hospital management department heads, professors from research institutes, and other professionals with expertise in areas such as hospital strategic management, hospital operational management, hospital information management, medical research and teaching management, medical case management, medical quality management, clinical medicine, nursing, health policy, health management, and medical science research.

Before the Delphi expert consultation, each expert completed a self-assessment form to evaluate their familiarity with KM research in Chinese hospitals using a 5-point Likert scale. Additionally, they were asked to assess the influence of four aspects—theoretical analysis, practical experience, peer understanding, and intuition—on their judgment.

The expert authority coefficient (Cr) was calculated using the formula $Cr = (Ca + Cs)/2$, where Ca represents the judgment coefficient and Cs denotes the familiarity coefficient (X. Sun, 2020). Familiarity was categorized into five levels: very familiar (1.0), familiar (0.8), average (0.5), less familiar (0.2), and very unfamiliar (0). The judgment coefficient Ca was based on expert's assessment of the influence of theoretical analysis, theoretical analysis, practical experience, peer understanding, and intuition, each rated on a scale of large, medium and small. A quantitative table was used to assign specific values, as shown in Annex A. The expert authority coefficient was calculated for each expert, with a value of $\geqslant$ 0.70 considered acceptable.

The first round of Delphi expert consultation was conducted using a Likert 5 scale to evaluate the scale's dimensions and entry pool. Experts provided importance and appropriateness scores and were also encouraged to offer open-ended feedback and suggestions for modifying the scale dimensions and entries. Expert responses were collected, and the expert positivity coefficient was calculated, which reflects the response rate to the consultation and the response rate for each question.

The degree of harmonization of expert opinions was calculated based on the first round of experts' ratings of importance and appropriateness ratings for each entry.

The mean, standard deviation, and coefficient of variation of the importance score, appropriateness score, and total score were used to analyze the results of the experts' evaluation of the dimensions and entries. The total score was calculated as the mean of the importance score and appropriateness score, i.e., total score = (importance score + appropriateness score)/2. The criteria for screening dimensions and entries were based on Lian et al. (2021): If the mean of the total score was <4.00 and the coefficient of variation was <20.00%, the dimensions and entries could be considered for deletion. If the mean total score was <4.00 and the coefficient of variation was ⩾20.00% or if the total mean score ⩾ 4.00 with a coefficient of variation ⩾ 20.00%, a decision would be made on retaining or removing the dimensions and entries based on expert modification suggestions. If the total mean score was ⩾ 4.00 and coefficient of variation < 20.00%, the dimensions and entries were retained. If the expert's ratings for all entries are ⩽2.00, the expert's response would be considered infeasible and the advice form is invalid.

Based on the open-ended solicited expert's modifications to the entries, the entry presentation was modified and optimized to create a revised version of the scale after the first round of Delphi expert consultation.

In the second round, experts were again asked to evaluate the importance and appropriateness of the scale entries using a Likert 5-point scale. The second round of expert opinions was collected, and the degree of harmonization among experts were calculated based on the importance and appropriateness of each entry.

3.2.2.2 Pre-survey and focus group discussion

Using the Delphi expert-consulted scale, a small-scale pre-survey was conducted to gather feedback from respondents. Additionally, expert focus group discussions were held to refine the scale entries, leading to the development of the Chinese Hospital KMC Scale.

3.2.3 Conducting surveys to assess the reliability and validity of the scales

After fine-tuning the scale items through Delphi expert consultations and focus group discussions, the study proceeds to conduct a large-scale survey to validate the reliability and validity of the scale, providing a basis for optimizing and finalizing the KMC scale for Chinese hospitals.

The survey targeted regions in China with varying levels of economic development, including the eastern coastal areas, central inland regions, and western remote areas, encompassing general hospitals and specialized hospitals across provincial, municipal, and county healthcare institutions. The respondents represented a diverse and representative group, including physicians, nurses, medical technicians, and administrative staff, which provides a comprehensive reflection of the status of KMCs across various healthcare institutions.

During the initial phase, the study primarily centered on the preliminary validation of the scale. Following Gold's (2001) guidance on sample size, this phase aimed to gather 1,000 valid questionnaires to fulfill the statistical power needs for reliability and validity evaluations. optimization. A sufficient sample size was guaranteed that the initial assessments of reliability and validity yield highly reliable results, thus facilitating future scale optimization.

The survey is conducted using an online questionnaire format. Online surveys allow for broader coverage of regions and institutions, thereby improving the efficiency of data collection. To ensure data quality, the research team implemented stringent quality control measures for the questionnaire data, including thorough verification of responses and the elimination of invalid questionnaires. All valid questionnaires were entered into a database, providing data support for the systematic evaluation of the scale's reliability and validity.

Reliability analysis is employed to assess the internal consistency of the scale, reflecting the degree of coordination among items measuring the same latent variable. Reliability analysis enables the examination of whether the scale items exhibit good consistency, thus ensuring their stability and reliability. Validity assessment is used to verify whether the scale accurately reflects the target concept and to examine the consistency between the scale structure and the research objectives. The assessments of reliability and validity provide data support for the selection of scale items, linguistic optimization, and improvements to the overall structure of the scale. The investigations and evaluations conducted in this phase lay the groundwork for further validation and promotion of the scale in subsequent stages.

3.3 Phase 2: A study of KMC and physicians' job satisfaction in Chinese MCHIS

The objective of this phase aims to implement the KMC scale for Chinese hospitals, developed in the first phase, within MCHIs in Shenzhen, examining how the KMCs of these institutions affect physicians' job satisfaction. In this study, a self-designed questionnaire was utilized to conduct a sampling survey at MCHIs in Shenzhen, systematically investigating the relationship between KMCs and physician satisfaction within these institutions.

3.3.1 Questionnaire

The survey questionnaire is structured into three sections. The first section gathers basic information about the respondents from MCHIs, including variables such as gender, age, title, position level, engaged position, education level, income level, weekly working hours, and night shift status, aimed at describing sample characteristics and controlling for confounding factors. The second section features the Chinese Hospital KMC Scale developed in the first phase, intended to measure the KMCs of MCHIs. The third section incorporates the Chinese version of the Minnesota Satisfaction Short-form Scale, which has been validated in prior research and is capable of effectively assessing physicians' job satisfaction (L. Zhou & Wang, 2018).

3.3.2 Sampling framework and sample size

The formula for calculating the sample size is as follows: $n = \frac{\mu_{\alpha/2}^2 * P * (1-P)}{\delta^2}$. n represents the required sample size derived from the calculations. This is the quantile of the standard normal distribution corresponding to the selected confidence level, reflecting the requirements for the confidence in the estimated results. p is the anticipated population proportion estimate. δ represents the acceptable margin of error, indicating the maximum permitted difference between the estimated value and the true value. The smaller δ is, the higher the precision required for the estimate, thereby necessitating a larger sample size.

This study adopted a 95% confidence level ($\alpha = 0.05$), with the corresponding $\mu_{\alpha/2}$=1.96. Integrating the data on job satisfaction among clinicians from prior studies (S. Wu et al., 2019), the estimated population proportion p was set to 34.6%. The allowable margin of error δ was controlled within 5%. Preliminary calculations indicate that the required sample size is 348 participants. To account for potential issues such as incomplete questionnaire responses or

invalid data, the initial sample size was increased by 5% to enhance reliability, resulting in a final target sample size of 366 participants.

This study employed a stratified random sampling method, using the size of the institutions as the stratification basis, selecting three MCHIs of varying sizes in Shenzhen as the research sample. The three institutions varied in their establishment dates, developmental phases, and volumes of medical services, and are designated as 1, 2, and 3, respectively. The sample size was allocated based on the number of physicians at each hospital, with random sampling conducted within the same type of departments to identify the survey subjects. In detail, the number of sampled physicians from the three hospitals was 231, 101, and 34, leading to a total of 366 participants.

3.3.3 Survey method

The study was conducted by trained investigators who have undergone standardized training, ensuring the rigor and consistency of the survey process. The survey was conducted in the form of electronic questionnaires, facilitating centralized management and implementation of quality control. The researcher supervised the entire survey process and check the completeness and validity of the questionnaire responses to ensure the collected data is of high quality and reliability.

In this phase of the research, the scale developed in the first phase is applied to the specific context of MCHIs in Shenzhen, systematically analyzing the impact of KMCs on physician satisfaction, thus providing empirical support for the practical application and further optimization of the scale.

3.4 Statistical analysis methods

To comprehensively examine the measurement structure of the questionnaire and its alignment with the theoretical model, as well as to explore the relationship between KMCs and satisfaction, this study employed various statistical methods including reliability and validity analysis, confirmatory factor analysis (CFA), correlation analysis, one-way analysis of variance, and structural equation modeling (SEM). The following is a detailed description of the specific methods employed in each part of the analysis:

Initially, reliability and validity analysis were performed to assess the scale's reliability and validity. Reliability was gauged using Cronbach's α coefficient to evaluate the scale's consistency and stability, while validity is assessed through CFA to ascertain the structural

soundness of the scale and the relationships among latent variables.

Subsequently, correlation analysis was utilized to investigate the relationships among the various dimensions of KMCs and physician job satisfaction. By calculating Pearson or Spearman correlation coefficients, the strength and direction of the associations between these variables were elucidated.

Third, the proportional distribution of demographic characteristics among respondents from the three MCHIs was compared using chi-square tests to assess potential differences. One-way analysis of variance (ANOVA) was employed to compare differences in physicians' job satisfaction and KMCs across the institutions. When the results of ANOVA indicated statistically significant inter-group differences, post hoc tests (such as the Least Significant Difference (LSD) method) were conducted to identify the specific sources of significance. Independent samples t-tests and ANOVA were applied to analyze the impact of respondents' demographic characteristics on physicians' job satisfaction.

Ultimately, upon validating the rationality of the measurement model, structural equation modeling (SEM) was employed to analyze the path relationships between latent variables from a comprehensive perspective. Through the assessment of model fit indices (such as GFI, CFI, RMSEA, etc.) and the significance testing of path coefficients, the direct and indirect impacts of KMCs on satisfaction were thoroughly elucidated.

3.4.1 Reliability analysis

The main purpose of reliability analysis was to evaluate the internal consistency of the questionnaire and assess the stability and consistency of the scale's outcomes across varying measurement conditions. This study employed Cronbach's α coefficient to examine the overall reliability of the scale, the reliability of subscales, and the reliability of each dimension. In the detailed analytical process, the Cronbach's α coefficient was initially computed for the entire scale to evaluate its overall reliability level; subsequently, the Cronbach's α coefficients for the KIC subscale and the KPC subscale were calculated separately to further examine the internal consistency of each subscale; Lastly, the Cronbach's α coefficients were computed for the items across seven dimensions (technical foundation, structural foundation, cultural foundation, acquisition process, transformation process, application process, and protection process) to ensure that the reliability of each dimension meets the necessary standards. This study utilized SPSS 27.0 to perform the reliability analysis and offers a comprehensive assessment of the scale's reliability level.

3.4.2 Confirmatory factor analysis

This study systematically examined the measurement model of latent variables and their observed variables using CFA. The analysis was divided into two parts, assessing the latent variable structures of the KIC subscale and the KPC separately. In the CFA of the KIC subscale, a model consisting of three latent variables was constructed: Technology, Structure, and Culture. Specifically, Technology was measured by items Q1 to Q5, Structure was measured by items Q6 to Q9, and Culture was measured by items Q10 to Q15. To ensure the model's identifiability, the variances of the latent variables were fixed at 1. Following the recommendations provided by the Modification Indices (MI), multiple error correlation paths were incorporated into the model to enhance its goodness of fit.

In the CFA of the KPC subscale, a model consisting of four latent variables was constructed: Acquisition, Conversion, Application, and Protection. Acquisition was measured by items Q16 to Q19, Conversion by items Q20 to Q22, Application by items Q23 to Q26, and Protection by items Q27 to Q28. Similarly, the variances of the latent variables were fixed at 1, and several error correlation paths were added based on the MI values.

After fitting the model, the model's adequacy was evaluated using various fit indices, including the Chi-square value (χ^2), Goodness-of-Fit Index (GFI), Comparative Fit Index (CFI), Non-Normed Fit Index (NNFI, also known as Tucker-Lewis Index, TLI), and Root Mean Square Error of Approximation (RMSEA).

3.4.3 Correlation analysis

Correlation analysis was employed to explore the linear relationships between various dimensions of KMC and the dimensions of physician job satisfaction, thereby revealing the strength and direction of the relationships between the variables. This study primarily utilized Pearson correlation analysis and Spearman rank correlation analysis, with the specific choice depending on the distribution type and nature of the data. The detailed steps for the analysis were outlined as follows:

(1) The correlation coefficients between each dimension of knowledge infrastructure and knowledge process capabilities (such as technical foundation, structural foundation, cultural foundation, acquisition process, conversion process, application process, and protection process) and the dimensions of intrinsic satisfaction (IS), extrinsic satisfaction (ES), and general satisfaction (GS) were computed;

(2) Statistical significance tests (such as p-values) were employed to assess whether the

correlations are significant, with significance levels set at $p < 0.05$ or $p < 0.01$;

(3) A correlation matrix was constructed to clarify the specific correlation strengths between the variables.

Through correlation analysis, the preliminary role of KMC in enhancing physician satisfaction was revealed, thereby providing a basis for subsequent analyses.

3.4.4 Hypotheses testing

A chi-square test was conducted to compare the proportional distributions of demographic characteristics among respondents from the three MCHIs.

Analysis served to assess the differences in physician's job satisfaction and KMC across the three institutions. When the results of ANOVA indicate statistically significant inter-group differences, post hoc tests (such as LSD method) will be conducted to identify the specific sources of these significant differences.

Independent samples t-tests and ANOVA were utilized to assess how the respondents' basic characteristics (such as job title, educational level, and income level) affect physician job satisfaction. Independent samples t-tests were applied to compare the means of two independent groups (such as gender).

The significance test was evaluated using the p-value; a p-value of less than 0.05 indicates that the differences between groups are statistically significant.

3.4.5 Structural equation models

Based on the verification of the questionnaire's structural validity, a structural equation model was further developed to explore the pathway relationship between KMC and satisfaction. First, the research variables were standardized to eliminate the influence of differing dimensions on the analysis results. The survey questions in the first section (Q1 to Q15) and the second section (Q16 to Q28) were standardized using Z-transformation, ensuring that the mean of each variable was 0 and the standard deviation was 1. Simultaneously, the GS, IS, and ES were also subjected to the same standardization process to ensure data consistency.

The construction of the structural equation model is based on a two-level factor theoretical framework. The KIC scale was divided into three dimensions: Technology, Structure, and Culture, which were measured by Q1 to Q5, Q6 to Q9, and Q10 to Q15, respectively. The KPC scale was divided into four dimensions: Acquisition, Conversion, Application, and Protection, measured by Q16 to Q19, Q20 to Q22, Q23 to Q26, and Q27 to Q28, respectively. To ensure

the model's identifiability, the variance of each first-order factor was fixed at 1.

On this basis, a second-order factor model was further defined. The three dimensions of KIC were reflected through a second-order factor KIC, while the four dimensions of KM processes were represented by another second-order factor KPC. Within the model, the variance of the second-order factors was constrained to 1, allowing for a correlation between KIC and KPC to illustrate the inherent relationship between KIC and KPC.

To improve the model's fit, several highly correlated error paths were incorporated according to MI value indications, thus more accurately reflecting the latent relationships among the variables, effectively improving the model's fit, aligning it more closely with theoretical expectations.

3.4.6 Statistical analysis software

Descriptive and differential analyses of the respondents' basic information, KMC evaluation results, and job satisfaction were conducted using SPSS 27.0. Correlation analysis and one-way analysis of variance (ANOVA) were undertaken to investigate the relationship between KMC and physician job satisfaction.

R 4.11 was utilized to carry out confirmatory factor analysis and structural equation modeling, mainly employing various statistical analysis packages including *haven, lavaan, semPlot*, and *dplyr*. By integrating these statistical software packages, a range of statistical analysis functionalities was accomplished, encompassing CFA, SEM, path coefficient calculation, and model fit assessment.

Chapter 4: Results

Based on the two phases of the study design, the results were divided into two parts. The first part focused on developing a KMC scale for Chinese hospitals, while the second part examined the relationship between KMC and physician satisfaction in Chinese MCHIS.

4.1 Chinese hospital knowledge management capability scale

4.1.1 Initial pool of scale entries

The initial hospital KMC scale was developed with 2 subscales, 7 dimensions, and 55 entries. The first subscale is KIC, which contains 3 dimensions: technical foundation (7 items), structural foundation (9 items), and cultural foundation (8 items). The second subscale, KPC, consists of 4 dimensions: acquisition process (9 items), transformation process (7 items), application process (8 items), and protection process (7 items).

4.1.2 Delphi expert consultation

4.1.2.1 Basic profile of experts

A total of 18 experts were consulted. Of these, 6 experts were aged 50 years or older, accounting for 33.33%; 8 experts were aged between 40 and 49 years (44.44%); and 4 experts were aged between 30 and 39 years (22.22%). In terms of work experience, 9 experts had over 20 years of experience (50%), 6 had 15-20 years of experience (33.33%), 2 had 11-15 years (11.11%), and 1 had 6-10 years (5.56%).

The experts held various positions: 2 were hospital leaders, 1 was the head of hospital operations, 2 led the hospital IT management department, 2 headed the research and teaching management department, 1 was in charge of case statistics, 1 led healthcare quality management, 3 were clinicians, 2 were clinical nursing staff, 1 was a health policy research expert, 2 specialized in health management research, and 1 was involved in medical research. For further details, refer to Annex C: Delphi Specialist Consultant Expert Profiles.

The authority coefficients of the experts ranged from 0.70 to 1.00, with an average of 0.86, as shown in Annex C. All 18 experts returned their evaluations, with a response rate of 100%, indicating a high level of engagement.

4.1.2.2 Scale refinement based on expert opinions

Based on the first round of Delphi consultation, the importance ratings, appropriateness ratings, overall ratings, and their means ($\bar{X}$), standard deviations (s), and coefficients of variation (CVs) were calculated for each dimension and item, as detailed in Annex D. The experts' ratings of the scale dimensions and items, along with the resulting adjustments, are also presented in Annex D. The scale was revised in response to the feedback from the first round of expert consultations.

Following the established screening criteria, all 7 dimensions of the 2 subscales were retained. Out of the 55 initial items, 26 were deleted, 2 were merged, and 5 were optimized for clarity and language. The ratings and changes made during the first round of consultation are detailed in Annex D, where the adjustments to the scale dimensions and items are also shown. A second round of Delphi consultation was conducted using the revised scale, and the ratings from this round are presented in Annex E.

The Kendall's coefficient of concordance for the first round of expert ratings on the importance of the 55 items was 0.11 ($p < 0.001$), and for appropriateness, it was 0.13 ($p < 0.05$). In the second round, the Kendall's coefficient for the 28-item importance ratings increased to 0.39 ($p < 0.001$), and for appropriateness, it was 0.42 ($p < 0.001$). This significant increase in coordination between the two rounds indicates a statistically meaningful improvement ($p < 0.05$). Detailed coordination coefficients for both rounds are provided in Annex F.

After two rounds of Delphi expert consultation, the Chinese Hospital KMC Scale was preliminarily established with 2 subscales, 7 dimensions, and 28 entries.

4.1.3 Pre-survey and focus group discussion

Through convenience sampling, 20 hospital staff members were selected to participate in a small-scale pre-survey, in which respondents were asked one by one whether they understood the scale entries and whether their understanding aligned with the intended design. Based on the pre-survey results, focus group discussions were organized.

Five experts participated in the focus group discussions, including two hospital administrators, one expert in health policy research, and two experts in health management research. The discussions primarily focused on optimizing the scale items in response to the pre-survey findings. As a result, the wording of eight items was refined to ensure they were easier for respondents to understand within the context of Chinese hospitals. Details of the optimized and revised Chinese Hospital KMC Scale are provided in Annex G.

The Chinese Hospital KMC Scale has two subscales, seven secondary dimensions, and 28 tertiary entries. Entries 1-5, 6-9, and 10-15 correspond to the technical foundation, structural foundation, and cultural foundation dimensions of the KIC subscale, respectively. Meanwhile, entries16-19, 20-22, 23-26, and 27-28 correspond to acquisition process, transformation process, application process, and protection process dimensions of the KPC subscale, respectively.

4.1.4 Scale reliability and validity analysis

The survey was conducted using the developed Chinese Hospital KM Scale, administered to 49 healthcare institutions with a total of 1,037 participants. These institutions were in cities across three regions of China with varying levels of economic development: the eastern coastal region, the central inland region, and the western remote region. In the eastern coastal region, the cities included Xiamen (Fujian Province), Shenzhen (Guangdong Province), and Ningbo (Zhejiang Province). The central inland region included Harbin (Heilongjiang Province), Bengbu (Anhui Province), Anyang (Henan Province), Xinxiang (Henan Province), Wuhan (Hubei Province), Hengyang (Hunan Province), Yueyang (Hunan Province), and Changsha (Hunan Province). The western remote areas included Chengdu (Sichuan Province), Luzhou (Sichuan Province), Kashi (Xinjiang Uygur Autonomous Region), Shihezi (Xinjiang Uygur Autonomous Region), and Lanzhou (Gansu Province).

The healthcare institutions surveyed comprised both general and specialized hospitals at provincial, municipal, and county levels.

The reliability of the scale was assessed using the survey data. The overall Cronbach's α was 0.979, indicating excellent reliability. For the KIC subscale, Cronbach's α was 0.965, and for the KPC subscale, Cronbach's α was 0.966, both demonstrating strong reliability. Detailed reliability results for each dimension of the scale are provided in Annex H.

4.1.4.1 Results of Confirmatory factor analysis (CFA) for KIC subscale

Figure 4.1 presents the results of the CFA for the KIC subscale. The chi-square value (χ^2) of the model is 335.878, with 82 degrees of freedom, and the P value is less than 0.001, indicating statistical significance of the model. Furthermore, the fit indices are as follows: GFI = 0.957, NFI = 0.982, RFI = 0.977, IFI = 0.986, TLI = 0.983, and CFI = 0.986 all of which exceed 0.95; with an RMSEA of 0.055, which is less than 0.08, indicating that the model exhibits a good fit. The factor loadings for all items are above 0.7, reflecting a high construct validity of the scale. The covariance between the technical foundation and the structural foundation is 0.80, the

covariance between the technical foundation and the cultural foundation is 0.78, while the covariance between the structural foundation and the cultural foundation is 0.97, all of which are statistically significant.

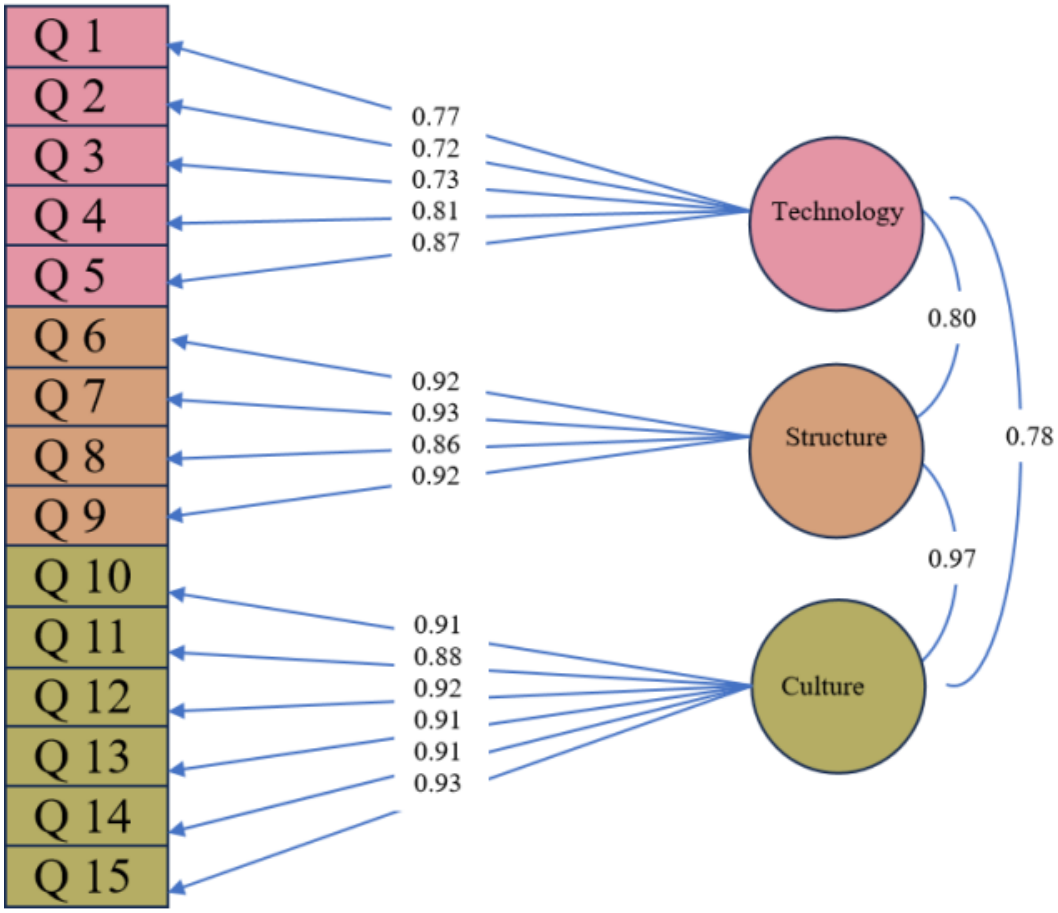

Figure 4.1 Results of CFA of KIC subscale

(Chi-square = 335.878, Degrees of freedom = 82, Probability level <0.001; GFI=0.957, NFI=0.982, RFI=0.977, IFI=0.986, TLI=0.983, CFI=0.986; RMSEA=0.055)

4.1.4.2 Results of CFA of KPC subscale

Figure 4.2 presents the results of the CFA for the KPC scale. The chi-square value (χ^2) of the model is 311.653, with 56 degrees of freedom, and the *P* value is less than 0.001, indicating the statistical significance of the model. All fit indices indicate that the model demonstrates a good fit, with GFI = 0.953, NFI = 0.976, RFI = 0.967, IFI = 0.981, TLI = 0.973, CFI = 0.981, and RMSEA = 0.066. The observed item factor loadings for Acquisition, Conversion, Application, and Protection processes are all greater than 0.7.

A strong correlation exists among the Acquisition, Conversion, Application, and Protection processes, with covariances ranging from 0.90 to 0.96, all of which are statistically significant.

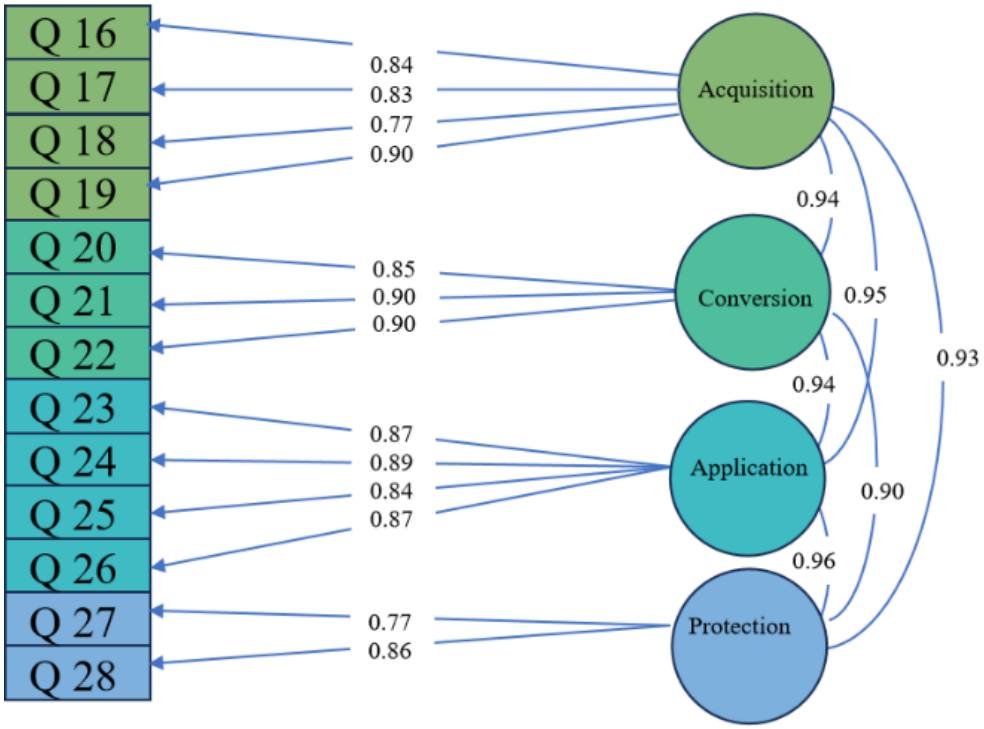

Figure 4.2 Results of CFA of KPC subscale

(Chi-square = 311.653, Degrees of freedom = 56, Probability level<0.001; GFI=0.953, NFI=0.976, RFI=0.967, IFI=0.981, TLI=0.973, CFI=0.981; RMSEA=0.066)

4.2 Study on KMC and physician job satisfaction in MCHIs

4.2.1 Basic information of the respondents

A total of 366 physicians from three MCHIS were surveyed using a structured questionnaire (see Annex G for details). The distribution of respondents from the three institutions was as follows: 231 from Institution 1, 101 from Institution 2, and 34 from Institution 3. The average age of the respondents was 39.99 years, and their average work experience was 14.37 years. The gender distribution showed that 277 respondents (75.68%) were female, while 89 (24.32%) were male. In terms of educational attainment, 152 respondents (41.53%) had a bachelor's degree or below, 189 (51.64%) had a master's degree, and 25 (6.83%) held a doctoral degree.

The distribution of professional titles was as follows: 58 respondents (15.85%) held junior titles, 151 (41.26%) held intermediate titles, 114 (31.15%) held associate titles, and 43 (11.75%) were full senior physicians. A total of 324 physicians (88.52%) did not hold any administrative position, while 42 (11.48%) served as department heads or ward heads. Regarding income, 107 respondents (29.23%) reported a monthly income of ⩽15,000 yuan, 105 (28.69%) earned between 15,001-20,000 yuan, and 154 (42.08%) earned more than 20,000 yuan per month.

In terms of night shifts, 176 respondents (48.09%) worked fewer than four-night shifts per

month, while 190 (51.91%) worked four or more night shifts. Additionally, 77 respondents (21.04%) reported working 40 or fewer weekly shifts, while 289 (78.96%) worked more than 40 shifts per week.

Table 4.1 provides a detailed summary of the respondents' profiles across the three MCHIS. Significant differences were observed in gender, educational background, and income levels across the three institutions. However, there were no significant differences in age, professional title, administrative position, work experience, number of night shifts, or working hours among the institutions.

Table 4.1 Basic information of the respondents in 3 MCHIs

	Institution 1	Institution 2	Institution 3	χ^2 test
Gender				*P=0.015*
male	49	25	15	
female	182	76	19	
Age (years old)				*P=0.183*
<35	66	34	8	
⩾35 and <45	110	45	12	
⩾45	55	22	14	
Work experience (year)				*P=0.052*
<10	66	38	8	
⩾10 and <20	113	38	12	
⩾20	52	25	14	
Education				*P<0.001*
Undergraduate and below	72	50	30	
Postgraduate (Master or PhD)	159	51	4	
Title				*P=0.260*
junior	33	20	5	
intermediate	92	40	19	
associate	77	32	5	
senior	29	9	5	
Duties				
no	209	89	26	*P=0.057*
yes	22	12	8	
Number of night shifts per month				*P=0.419*
<4	105	53	18	
⩾4	126	48	16	
Weekly working hours				*P=0.405*
⩽40 hours	45	22	10	
>40 hours	186	79	24	
Monthly income				*P<0.001*
⩽15000	48	34	25	
(15001~20000)	70	31	4	
>20000	113	36	5	

4.2.2 KMCs and physician job satisfaction in MCHIS

The mean scores of KMC, infrastructure capability subscale, process capability subscale, and each dimension across the three MCH institutions are presented in Table 4.2. Significant

differences were observed in KMC, subscale scores, and scores of each dimension among three institutions (ANOVA, *P<0.001*). The pairwise LSD analysis revealed that institution 2 had higher scores in KMC, bases setting competence, techniques, process competence, acquisition, application, and protection compared to institution 1 (*P<0.05*) and institution 3 (*P<0.05*). Additionally, institution 1 had higher scores than institution 3 (*P<0.05*). For structure, culture, and transformation, institution 2 outperformed institution 1 (*P<0.05*) and institution 3 (*P<0.05*), with no significant difference between institution 1 and institution 3 *(P<0.05*).

Physicians' IS, ES, and GS scores across the three MCH institutions are shown in Table 4.2. Difference in physicians' intrinsic, extrinsic, and GS among the institutions were evident (ANOVA analysis *P<0.001*). The pairwise LSD analysis showed that intrinsic and ES were higher in institution 2 than in institution 1 (*P<0.05*), while institution 3 also scored higher than institution 1 (*P<0.05*) for both intrinsic and ES. However, there was no significant difference in intrinsic, extrinsic, and GS between institution 2 and institution 3 (*P>0.05*).

Table 4.2 Results of the survey on KM capacity and doctors' job satisfaction in 3 MCHIS

	Institution1 $(\bar{X} \pm S)$	Institution2 $(\bar{X} \pm S)$	Institution3 $(\bar{X} \pm S)$	ANOVA analysis	LSD analysis result (P<0.05)
KMC	110.24±14.06	124.21±14.32	102.03±15.93	*P<0.001*	1 and 2,1 and 3, 2 and 3
KIC	58.69±7.60	66.23±7.78	55.56±10.75	*P<0.001*	1 and 2,1 and 3, 2 and 3
Technology	18.53±2.83	21.14±3.06	17.00±4.63	*P<0.001*	1 and 2,1 and 3, 2 and 3
Structure	16.16±2.08	18.06±2.16	15.74±3.04	*P<0.001*	1 and 2,2 and 3
Culture	24.00±3.32	27.03±3.32	22.82±3.98	*P<0.001*	1 and 2,2 and 3
KPC	51.55±6.94	57.98±6.93	46.47±6.39	*P<0.001*	1 and 2,1 and 3, 2 and 3
Acquisition	15.77±2.21	17.90±2.22	14.09±2.44	*P<0.001*	1 and 2,1 and 3, 2 and 3
Conversion	11.86±1.74	13.42±1.78	11.41±1.84	*P<0.001*	1 and 2,2 and 3
Application	15.98±2.25	17.74±2.40	14.47±2.00	*P<0.001*	1 and 2,1 and 3, 2 and 3
Protection	7.94±1.29	8.92±1.10	6.50±1.11	*P<0.001*	1 and 2,1 and 3, 2 and 3
IS	43.68±6.96	49.76±7.98	48.15±8.86	*P<0.001*	1 and 2,1 and 3
ES	20.71±4.50	24.32±4.81	23.35±4.67	*P<0.001*	1 and 2,1 and 3
GS	71.82±12.25	82.50±13.92	79.62±14.49	*P<0.001*	1 and 2,1 and 3

4.2.3 Correlation analysis of the dimensions of KMC in MCHIs

There are significant correlations among knowledge infrastructure capabilities, knowledge process capabilities and internal dimensions, with the correlation coefficients presented in Table 4.3. The correlation coefficients between technology, structure, and culture are all greater than

0.7, indicating a strong correlation. Similarly, the correlation coefficients for the processes of acquisition, conversion, application and protection also exceed 0.7, signifying a strong correlation. Additionally, the correlation coefficients between the process of acquisition, transformation, application and the dimensions of basic setup capacity are all higher than 0.7, reflecting a strong correlation.

Table 4.3 Correlation analysis of the dimensions of KMC

KMC	Technology	Structure	Culture	Acquisition	Conversion	Application
Technology						
Structure	0.801**					
Culture	0.774**	0.825**				
Acquisition	0.755**	0.745**	0.874**			
Conversion	0.732**	0.749**	0.844**	0.845**		
Application	0.709**	0.734**	0.844**	0.874**	0.876**	
Protection	0.634**	0.617**	0.675**	0.751**	0.725**	0.763**

**: *P<0.01*

4.2.4 Association analysis between KM capacity and physicians' job satisfaction in maternal and child health care institutions

The total score of KMC is significantly correlated with IS, ES, and GS (*P<0.01*). The correlation coefficients are presented in Table 4.4, and each coefficient greater than 0.7, indicating a strong correlation.

The scores of the basic setting ability subscale are correlated with IS, ES, and GS (*P<0.01*) The correlation coefficients, shown in Table 4.4, are all above 0.7, reflecting a strong correlation.

Process competence subscale scores are significantly correlated with IS, ES, and GS (*P<0.01*). As indicated in Table 4.4, the correlation coefficients between process competence, IS, and GS are all greater than 0.7, demonstrating a strong correlation.

The dimensions of technology, structure, culture, access, conversion, application, and protection are each significantly correlated with IS, ES, and GS (*P<0.01*), as shown in Table 4.4. The correlation coefficient of culture with IS and GS exceeds 0.7, indicating a strong correlation. Likewise, the correlation coefficients for conversion and application with IS and GS are also greater than 0.7, demonstrating a strong correlation.

Table 4.4 Correlation Analysis of KMC and Physicians' Job Satisfaction in MCHIs

	IS	ES	GS
KMC	0.771**	0.725**	0.769**
IC	0.762**	0.714**	0.758**
Technology	0.680**	0.643**	0.679**
Structure	0.695**	0.647**	0.689**
Culture	0.744**	0.697**	0.741**
PC	0.729**	0.689**	0.729**
Acquisition	0.693	0.653**	0.693**

Conversion	0.733**	0.699**	0.734**
Application	0.703**	0.665**	0.703**
Protection	0.540**	0.503**	0.537**

**: *P<0.01*

4.2.5 Analysis of the impact of physicians' basic characteristics in MCHIs on job satisfaction

Based on the previous analysis, significant differences were observed in the composition of gender, education, and income among personnel across the three institutions. However, there were no significant differences in the composition of age, title, position, years of work experience, number of night shifts, or working hours among the institutions. For the individual physician factors that showed no difference in composition between the institutions, combined data from all three institutions was used, the results are presented in Table 4.5.

Given the differences in gender, education, and income among the three institutions, the survey data for each institution were analyzed separately to assess the effects of gender, education, and income on IS, ES, and GS within each institution. The results of these separate analyses are shown in Table 4.6.

Table 4.5 The influence of physicians' basic information on physicians' job satisfaction 1

Factors and groupings	Number	IS $\bar{X}\pm S$	F/ t	P	ES $\bar{X}\pm S$	F/ t	P	GS $\bar{X}\pm S$	F/ t	P
Gender			1.664	0.198		1.975	0.161		2.184	0.140
Male	89	46.82±8.45			22.45±5.34			77.11±14.99		
Female	277	45.44±7.73			21.79±4.72			74.97±13.38		
Age (years old)			5.251	0.006		6.261	0.002		6.007	0.003
<35	108	47.28±7.51			23.15±4.61			78.61±13.11		
≥35 and <45	167	44.35±7.66			21.07±4.68			72.94±13.22		
>46	91	46.60±8.50			22.15±5.26			76.47±14.85		
Education			4.656	0.032		2.011	0.157		4.278	0.039
Undergraduate and below	152	45.89±8.70			22.13±5.22			75.88±15.03		
Postgraduate	214	45.69±7.34			21.82±4.62			75.21±12.88		
Title			4.129	0.007		4.660	0.003		4.614	0.003
Junior	58	47.74±7.56			23.60±4.27			79.60±12.75		
Intermediate	151	45.99±8.14			22.07±5.09			75.93±14.21		
associate	114	43.88±7.21			20.79±4.53			72.04±12.64		
senior	43	47.42±8.58			22.40±5.15			77.58±14.87		
Duties			0.929	0.336		0.576	0.448		0.510	0.476
No	324	45.61±8.00			21.87±4.90			75.25±13.90		
yes	42	47.07±7.27			22.55±4.71			77.36±12.99		
Work experience (years)		7.070		<0.001		7.941	<0.001		7.736	<0.001
<10	112	47.55±7.44			23.32±4.45			79.05±12.86		
10-19	163	44.12±7.84			20.98±4.83			72.60±13.60		
≥20	91	46.56±8.13			22.00±5.10			76.29±14.27		
Monthly income (ten thousand yuan)		4.025		0.019		4.691	0.010		4.655	0.010
⩽1.5	107	47.56±8.91			23.15±5.15			78.84±15.33		
1.5~2.0	105	45.33±7.97			21.54±5.05			74.59±13.92		
>2.0	154	44.84±6.95			21.40±4.43			73.78±12.17		
Number of night shifts per		0.954		0.329		1.416	0.235		1.114	0.292

month									
<4	176	46.35±8.18		22.09±5.16			76.22±14.35		
≥4	190	45.24±7.66		21.83±4.61			74.82±13.26		
Weekly working hours		0.382	0.537		0.891	0.346		0.004	0.952
≤40hours	77	47.60±8.21		22.95±4.59			78.58±13.60		
>40 hours	289	45.29±7.79		21.69±4.92			74.67±13.75		

Table 4.6 The influence of physicians' basic information on physicians' job satisfaction 2

Institution	Factors and groupings	IS $\bar{X}\pm S$	F/ t	P	ES $\bar{X}\pm S$	F/ t	P	GS $\bar{X}\pm S$	F/ t	P
1	Gender		1.275	0.260		1.800	0.181		2.503	0.115
	Male	44.67±7.61			21.49±5.12			73.69±13.85		
	Female	43.42±6.77			20.50±4.31			71.32±11.78		
	Education		0.603	0.438		1.903	0.169		1.251	0.265
	Undergraduate and below	42.38±7.36			20.19±4.94			69.83±13.17		
	postgraduate	44.28±6.71			20.94±4.29			72.72±11.75		
	Monthly income (ten thousand yuan)		0.129	0.879		0.479	0.620		0.283	0.754
	≤1.5	44.10±8.22			21.27±4.96			73.00±14.30		
	1.5~2.0	43.44±7.12			20.50±4.82			71.40±12.80		
	>2.0	43.65±6.31			20.60±4.09			71.58±10.99		
2	Gender		1.940	0.167		3.960	0.049		2.483	0.118
	Male	48.72±9.13			22.76±5.80			79.52±16.33		
	Female	50.11±7.60			24.83±4.35			83.47±13.00		
	education		0.557	0.457		0.256	0.614		0.289	0.592
	Undergraduate and below	49.54±8.28			24.26±4.97			82.36±14.41		
	postgraduate	49.98±7.74			24.37±4.69			82.63±13.56		
	Monthly income (ten thousand yuan)		3.778	0.026		3.667	0.029		3.884	0.024
	≤1.5	52.71±7.80			26.09±4.49			87.74±13.57		

	1.5~2.0	48.71±8,58			23.42±5.07			80.35±14.51		
	>2.0	47.89±6.94			23.42±4.51			79.39±12.60		
	Gender		0.002	0.969		1.106	0.301		0.159	0.693
	Male	50.67±8.29			25.07±4.54			84.27±13.84		
	Female	46.16±9.01			22.00±4.42			75.95±14.26		
	education		1.578	0.218		0.008	0.931		0.594	0.447
	Undergraduate and below	48.27±9.27			23.23±4.71			79.60±14.94		
3	postgraduate	47.25±5.74			24.25±4.92			79.75±12.29		
	Monthly income (ten thousand yuan)		0.624	0.542		0.760	0.476		0.644	0.532
	⩽1.5	47.20±8.55			22.76±4.68			77.96±14.27		
	1.5~2.0	52.25±5.74			25.25±3.20			85.75±9.95		
	>2.0	49.60±12.64			24.80±5.72			83.00±19.14		

4.2.6 Structural equation modeling of KMCs and physician job satisfaction in MCHIs

In accordance with the conceptual model, structural equation models were developed to analyze the influence of KMC on IS, ES, and GS. The model development involved multiple critical dimensions: KIC was consisted of Technology, Structure, and Culture, while KPC included Knowledge Acquisition, Knowledge Conversion, Knowledge Application, and Knowledge Protection. These dimensions were assessed through the KMC Scale (Q1-Q28) as observed variables.

Figure 4.3 presents the structural equation model depicting the relationship between KMC and IS. The model's fit indices suggest a good fit, as evidenced by the following values: the chi-square statistic is 1024.833 (*DF=360, p<0.*001), the Goodness of Fit Index (GFI) is 0.823, the Normal Fit Index (NFI) is 0.904, the Incremental Fit Index (IFI) is 0.935, the CFI is 0.935, the TLI is 0.927, and the RMSEA is 0.071.

According to the results of the path analysis, the standardized path coefficient for KIC affecting IS was found to be 0.798 ($P < 0.001$), indicating that KIC exerted a significant positive effect on IS and was among the most influential latent variables in the model. In comparison, the direct impact of KPC on IS was found to be insignificant, with a standardized path coefficient of 0.003 ($P = 0.982$), suggesting that it did not have a significant direct effect but influenced IS through indirect pathways.

Among the constituent dimensions of KIC, the impacts of Technology, Structure, and Culture on KIC were all found to be highly significant. Notably, the standardized loading value for Culture was the highest at 0.995 ($P < 0.001$), reflecting that Culture is a core element constituting KIC; the loading value for Structure was 0.959, and the loading value for Technology was 0.894, both of which are also important components of KIC.

The internal composition of KPC included Acquisition, Conversion, Application, and Protection, and these dimensions exhibited high loading values within the model, indicating that these processes serve as significant pillars of KPC.

The model validated the critical role of KIC in enhancing IS, particularly emphasizing the core status of Culture, while the influence of KPC on satisfaction may be more inclined to operate through indirect pathways.

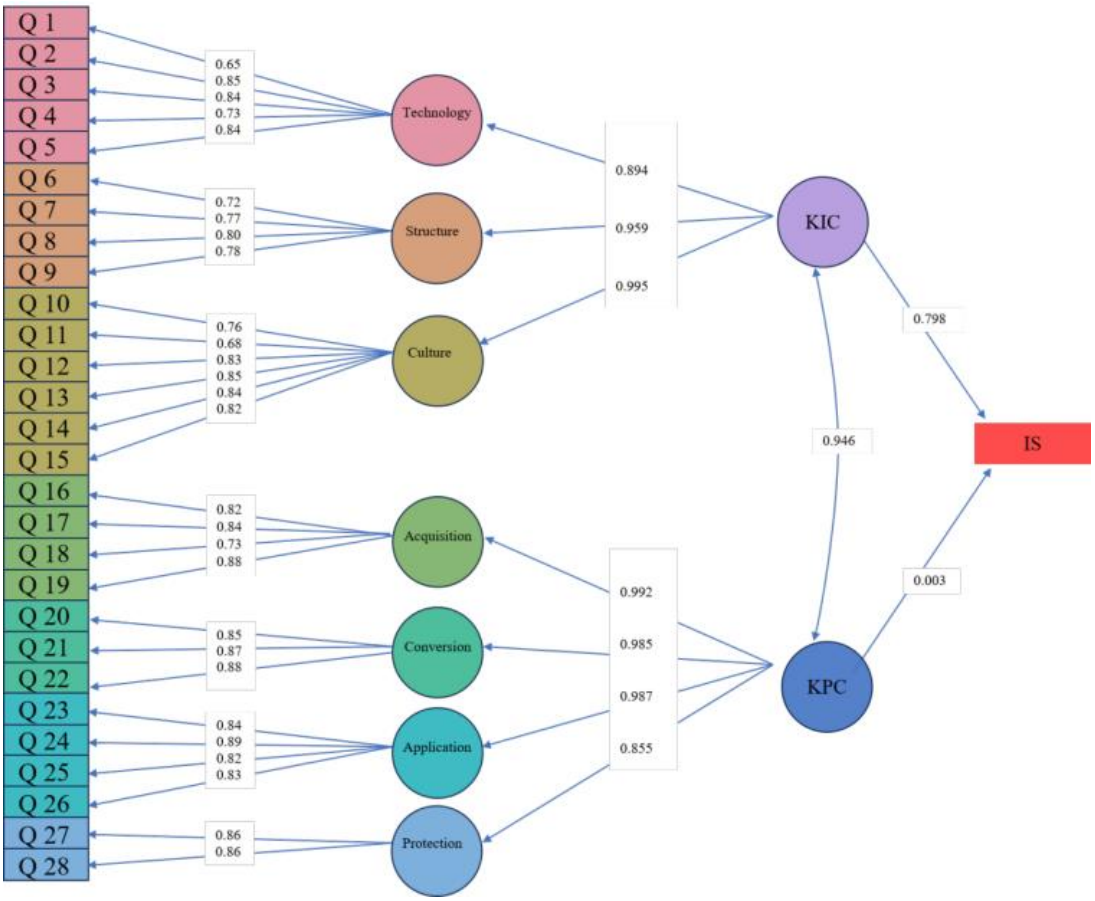

Figure 4.3 Structural equation model depicting the relationship between KMC and ES

As shown in Figure 4.4, the structural equation model illustrating the relationship between KIC and KPC with ES demonstrates a good fit, with a chi-square statistic of 1046.254 (*DF=360, p<0.001*). The model's fit indices are as follows: GFI = 0.819, NFI = 0.901, IFI = 0.933, CFI = 0.933, TLI = 0.924,and RMSEA = 0.072.

In terms of path analysis, the standardized path coefficient of KIC affecting ES was found to be 0.672 (P < 0.001), indicating that KIC had a significant positive impact on ES. Within the dimensional framework of KIC, Technology, Structure, and Culture were instrumental in its formation, with the standardized factor loading for Culture being the highest (0.996, P < 0.001), reflecting the influence of Culture on KIC. The standardized loadings were 0.893 for Technology and 0.959 for Structure, both of which significantly comprised essential components of KIC.

In contrast, the direct influence of KPC on ES was not significant, with a standardized path coefficient of only 0.085 (P = 0.598). However, the constituent dimensions of KPC, such as Knowledge Acquisition, Conversion, Application, and Protection, all exhibited high loading values, particularly Acquisition (0.992) and Application (0.987), indicating that these dimensions played important roles in the formation of KPC.

The results of the model confirmed the significant role of KIC in enhancing ES, particularly through the synergistic influence of Technology, Structure, and Culture, while KPC showed no significant direct impact on ES, thus having an indirect effect on ES through KIC.

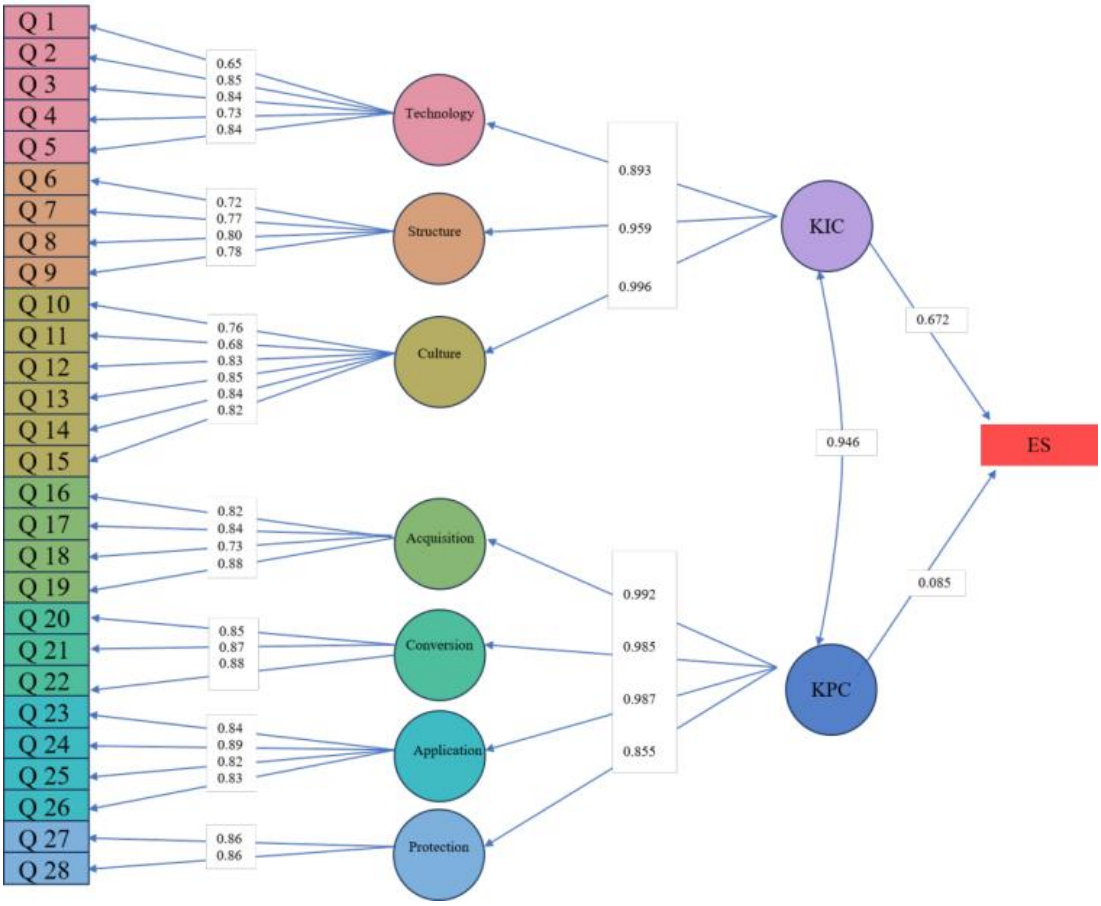

Figure 4.4 Structural equation model depicting the relationship between KMC and IS

The structural equation model representing the relationship between KIC and KPC on GS shows a good fit, as indicated in Figure 4.5. The chi-square statistic is 1036.624 (*DF=360, p< 0.001*), and the fit indices are as follows: GFI=0.821, NFI=0.903, IFI=0.934, CFI=0.934, TLI= 0.925, RMSEA =0.072.

The standardized path coefficient of KIC on GS was 0.750 (P < 0.001), indicating that KIC significantly positively influenced physicians' GS, serving as an important determinant of satisfaction. However, the path coefficient of KPC on GS was relatively low and not significant (standardized path coefficient of 0.050, P = 0.743), suggesting that KPC did not have a significant direct effect on GS, but rather affected GS indirectly through the mediating role of KIC.

Within the latent variable dimension, the three main components of KIC—Technology, Structure, and Culture—played a significant role in the composition of KIC. The standardized loadings for Technology ranged from 0.651 to 0.852 (assessed through Q1 to Q5), while the

standardized loadings for Culture ranged from 0.680 to 0.852 (assessed through Q10 to Q15), indicating that these items had high loading values, signifying their significant contribution to KIC. In the composition of KPC, the standardized path coefficients for Conversion and Application were found to be 0.985 and 0.987, respectively (both $p < 0.001$), demonstrating the importance of these dimensions within KPC.

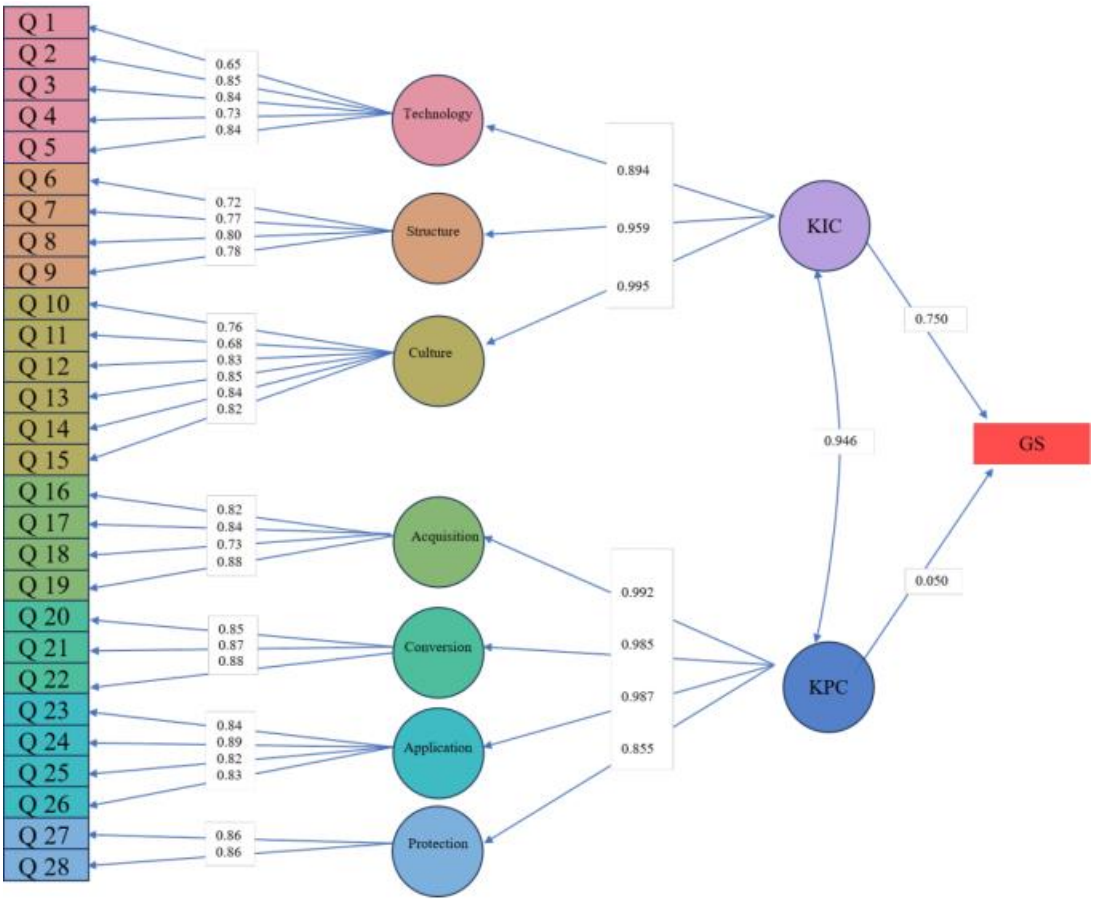

Figure 4.5 Structural equation model depicting the relationship between KMC and GS

Chapter 5: Discussion

The declining fertility rate and the reduction in the number of births in China have emerged as significant challenges that the country must address. In this context, MCHIS, which primarily offer obstetrics and maternity services, are facing operational difficulties and increased competition within the industry. Additionally, the postponement of childbearing has led to a rise in a higher proportion of older and high-risk pregnant women, further complicating medical quality management and risk response. This study proposes addressing the current challenges faced by MCHIS through the lens of KMC. Given the lack of systematic research on the KMC of Chinese hospitals, and the absence of evaluation tools tailored to this context, this study develops a reliable and valid scale to measure the KMC of Chinese hospitals. The research aims to explore KM theory and methodologies that are applicable to the specific conditions in China. Furthermore, by examining the impact of KMC on physician satisfaction in MCHIS, this study addresses the gap in direct research on the relationship between KM and Chinese physicians' job satisfaction. The findings explore the potential for improving medical staff satisfaction, enhancing healthcare service quality, and increasing patient satisfaction through strengthened KMCs, ultimately leading to better prospects and opportunities for organizational development.

5.1 Development of a KMC scale for Chinese hospitals

This study develops a KMC scale tailored for Chinese hospitals based on an extensive review of the literature. The conceptual model of KMCs is grounded in the theories of Nonaka (1994; 1998), and incorporates existing research models, such as those proposed by Gold (2001). By drawing upon the entries of KMC measurement scales used by foreign commercial organizations and considering the specific context of Chinese hospitals along with expert opinions, a preliminary KMC scale for Chinese hospitals was established. The initial entries were refined through Delphi expert consultations, followed by adjustments made based on a small-scale pre-survey and discussions with expert focus groups. Subsequently, a large-scale survey was conducted to assess the reliability and validity of the Chinese Hospital KM Scale. The results demonstrate that the scale processes good reliability and validity, making it suitable for evaluating the KMC of Chinese hospitals.

5.1.1 Rigor of the development process and effectiveness of the KMC Scale for Chinese hospitals

5.1.1.1 Rigor of the scale development method

In the literature review phase, building on Gold's (2001) finding that KMCs can be measured through two distinct constructs, the KMC scale was designed to encompass a subscale for KIC and a subscale for KPC. The KIC subscale comprises three dimensions: technical foundation, structural foundation, and cultural foundation. In contrast, the KPC subscale includes four dimensions: acquisition, transformation, application, and protection.

During the development of the scale entries pool, careful attention was paid to the meanings of each dimension, with consideration for the specific context of Chinese hospitals. Experts were invited to collaboratively formulate the entries based on the conceptual model, thereby avoiding commercial organizations' KMC scales that may involve descriptions of competitors, conflicting demands, proprietary information and other aspects inappropriate for the context of Chinese hospitals. Moreover, discussions with experts revealed that the concept of KM is not yet widely understood within domestic healthcare institutions in China. Therefore, it was essential for the entries of KMCs to provide clear and explicit guidance to prevent ambiguous interpretations. To enhance user comprehension, illustrative examples were incorporated, ensuring that respondents accurately grasp the meanings of the items and ultimately bolstering the validity of the scale.

During the Delphi expert consulting phase, 18 consulting experts were selected, including hospital leaders and heads from various departments such as hospital operations, information management, research and teaching management, case statistics, and medical quality management. Additionally, experts in clinical research, health policy and health management were involved, ensuring a wide range of professional backgrounds. The authority coefficients of the 18 experts range from 0.70 to 1.00, with an average authority coefficient of 0.86, indicating a high level of expertise. The professional backgrounds and authority levels of the experts were carefully considered to ensure the effectiveness of the consulting process.

In the Delphi consulting process, the average score of the expert ratings for importance and suitability score was used as the total score, with the mean and coefficient of variation of these scores serving as screening criteria. These were combined with the experts' qualitative feedback. After a rigorous screening and optimization process, the Kendall coordination coefficient for the expert importance score increased from 0.11 in the first round to 0.39 in the second round. Similarly, the Kendall coordination coefficient of expert appropriateness score increased from

0.13 in the first round to 0.42 in the second round. This indicated a significant improvement in the consistency of expert opinions, reaching a desirable level of agreement.

Following two rounds of Delphi expert consultation, a small pre-survey was conducted to further refine the scale. Respondents were individually asked whether they understood the scale entries and whether their interpretations aligned with the intended design. Focus group discussions were organized to review and optimize the scale entries in conjunction with the pre-survey results, ensuring that the entries were more easily understood by the respondents within the context of Chinese hospitals.

The results of the reliability analysis showed that the overall reliability of the Chinese Hospital KMC Scale developed in this study was Cronbach $\alpha = 0.979$, indicating excellent reliability. The subscales also showed strong reliability: KIC Scale had a Cronbach $\alpha = 0.965$; and the subscale KPC Scale had a Cronbach $\alpha = 0.966$.

The results of the CFA for the KIC scale indicate that the model exhibits a good fit. The GFI is 0.957, suggesting that the model effectively explains the observed data; the NFI and RFI are 0.982 and 0.977, respectively, indicating a high level of fit relative to the baseline model; the IFI is 0.986, indicating that the model demonstrates high fit quality when compared to the baseline model; the TLI is 0.983, further affirming that the model exhibits good fit quality; the CFI reaches 0.986, approaching 1, which reflects the ideal level of model fit; the RMSEA is 0.055, with a 90% confidence interval ranging from 0.049 to 0.061, which is below the commonly accepted threshold of 0.08, indicating good parsimony and low fitting error for the model. The fit indices of the KIC scale developed in this study, namely NFI, CFI, and RMSEA, outperform the fit indices of the KIC subscale developed by Gold (2001) (NFI=0.89, CFI=0.92, RMSEA=0.066). Regarding the factor load results, the three latent variables of KIC—Technology, Structure, and Culture—are significantly reflected by their observed variables, with factor loadings ranging from 0.72 to 0.93, demonstrating the high construct validity of the scale. Furthermore, the covariance results among the latent variables further validate their intrinsic connections, with a covariance of 0.80 between the technological foundation and structural foundation, 0.78 between the technological foundation and cultural foundation, and 0.97 between the structural foundation and cultural foundation, all of which are statistically significant. Overall, the results of the CFA indicate that the KIC scale has a reasonable structure and good applicability, effectively supporting the reliability and validity of the scale in measuring relevant constructs.

The CFA of the KPC subscale indicates that the model exhibits a good fit: GFI = 0.953,

indicating that the model can adequately explain the observed data; NFI and RFI are 0.976 and 0.967, respectively, indicating a high level of fit relative to the baseline model; IFI = 0.981, indicating a significant improvement in fit compared to the baseline model; the TLI is 0.973, further supporting the reliability of the model fit; the CFI is 0.981, close to 1, reflecting the ideal level of model fit; the RMSEA is 0.066, with a 90% confidence interval ranging from 0.059 to 0.074, suggesting good parsimony of the model. The fit indices of the KPC scale developed in this study, namely NFI, CFI, and RMSEA, surpass those of the KPC scale developed by Gold (2001) (NFI=0.87, CFI=0.91, RMSEA=0.076). From the factor loading results, the KPC subscale consists of four latent variables: Acquisition, Conversion, Application, and Protection. The observed items for each latent variable exhibit significant factor loadings, with the loading range for the Acquisition variable being 0.77 to 0.90, for Conversion 0.85 to 0.90, for Application 0.84 to 0.89, and for Protection 0.77 to 0.86, with all factor loadings exceeding 0.7, indicating good construct validity of the scale. Moreover, the covariance results among the latent variables indicate a high correlation among Acquisition, Conversion, Application, and Protection, with covariance values ranging from 0.90 to 0.96, all showing statistical significance. These results further validate the structural rationality of the KPC subscale and the intrinsic relationships among its four dimensions. Overall, the results of the CFA support the validity of the structure and content of the KPC subscale, indicating its effectiveness in measuring relevant constructs of KPC and providing a solid theoretical basis and data support for its practical application.

5.1.1.2 Analysis of the dimensions and entries of the developed scale

The Chinese Hospital KMC Scale developed in this study has 28 entries that assess KMC from two different constructs: KIC and KPC. Entries 1-5 focus on the technical foundation of KM, entries 6-9 address the structural foundation of KM, and entries 10-15 pertain to the cultural foundation of KM; entries 16-19 relate to the process of knowledge acquisition; entries 20-22 to knowledge transformation; entries 23-26 to knowledge application; and entries 27-28 to knowledge protection.

This study draws from previous literature to summarize the key factors influencing organizational KM into three aspects: environmental factors, organizational factors and IT. External environmental factors are those changes transmitted to the organization from outside, which can significantly impact the development and utilization of KM (Sang, 2021). These factors include laws and regulations (S. S. Kim & Y. J. Kim, 2017), and the social environment (Von Krogh, 2012), which are factors that beyond the organization's control. Organizational

factors primarily encompass organizational structure and organizational culture. Technology, structure, and culture are all factors within organization's control, allowing for enhancement and improvement. Together, these three dimensions form the basis of KIC.

The rapid development of information and communication technologies (ICT) is fundamentally changing the way of working (Dietz et al., 2022) , with technology now being regarded as an indispensable tool for KM. Given the diverse, complex and dynamic nature of medical knowledge, proper knowledge categorization is essential for efficient KM. As stated by Aldred (2002), knowledge in healthcare environments is distributed across multiple locations, managed by various individuals and institutions, and stored in numerous conceivable formats. Modern healthcare professionals are often overwhelmed by a vast amount of information, making it difficult to assess the specific information they need (Heathfifield & Louw, 1999). Therefore, scale entry 1, which evaluates whether a hospital has an effective KM system in place that allows for the collection, categorization, storage, and retrieval of knowledge, is important in the evaluation of a hospital's KMCs. IT research has shown that tools can facilitate knowledge externalization, internalization, and synthesis. For instance, large organizational databases accessible and understandable by all members, enhance explicit knowledge and internalization through distributed wireless computing. Additionally, technologies such as e-mail, corporate correspondence, and voice recognition technologies, which help encode tacit knowledge into explicit formats, facilitate knowledge externalization (Nonaka & Konno, 1998). Liebowitz (2001) and Marwick (2001) emphasize the importance of integrating knowledge technologies to support KM. Alavi and Leidner (2001) advocate the application of a range of information systems to manage the organizational knowledge used for support in order to enhance the organizational processes of creating, storing, retrieving, transforming, and applying. Dawesh and Sampson (2003) confirm that electronic databases are a major resource for clinicians. Hardware, bandwidth and network infrastructure (Aujirapongpan et al., 2010), along with social media, dynamic websites, and content repositories (Islam et al., 2015) are essential for performing KM tasks such as sharing, storing, disseminating and maintaining knowledge. ICT tools, especially the Internet, can facilitate the creation, storage, and sharing of tacit and explicit knowledge (Alavi & Leidner, 2001; Sousa & Rocha, 2019). Thus, scale entries 2-5 whether hospitals have the technological conditions such as hardware, software, networks, and databases to support collaboration among employees and between employees and people outside the hospital, to support collaboration among employees and between employees and external entities. These entries evaluate whether hospitals can enable employees in different locations to collaborate on research or training, and whether they

provide tools for employees to retrieve and acquire new knowledge in the healthcare sector. These capabilities are essential for effective KM and form the foundation for the 'combination' of explicit knowledge and the 'externalization' of tacit knowledge into explicit knowledge.

Organizational structure refers to the formal distribution of employment functions and administrative mechanisms to maintain consistency and integrate work activities (Ghani et al., 2000). Researchers have argued that structural factors such as incentive systems, job design, managerial support policies for managers, and rules, regulations, and practices may act as barriers to KM. This is largely due to the fact that organizational structure plays an important role in utilizing technology and communication networks and facilitating collaboration and knowledge sharing in organizations (Aujirapongpan et al., 2010; Pandey & Dutta, 2013). Organizational structure is considered to be an important aspect of facilitating knowledge flow in organizations through the use of organizational processes and systems of rewards and policies in order to reach agreement on how knowledge will be recognized and how it will subsequently flow throughout the organization (Sandhawalia & Dalcher, 2011).Therefore, scale entries 6-9 assess whether the hospital has established a system of training and continuing education, academic exchanges and collaborations, incentives for knowledge sharing (e.g., incentives for teaching, incentives for training), and incentives for innovation (e.g., incentives for inventions, incentives for scientific research, and encouragement to carry out research and development of new technologies and projects). These elements form the structural basis of knowledge acquisition, knowledge-sharing, and knowledge innovation respectively within the hospital. They also provide the basis for the 'internalization' of explicit knowledge into tacit knowledge.

Creating a culture that allows easy access to knowledge should be a top priority for management (Yeh et al., 2006). Organizational culture is crucial for knowledge sharing and teamwork (Cho, 2011). Masa'deh (2016) states that organizational culture not only defines the value and advantage of knowledge to the organization, it also affects the ability of employees to share knowledge. Organizational culture is crucial in encouraging interaction and collaboration among individuals, which is necessary for the flow of knowledge, providing individuals with the ability to self-organize their personal knowledge to facilitate problem solving and knowledge sharing (Almajali & Al-Lozi., 2019). One of the most important elements of knowledge sharing in culture is trust: a high level of trust reduces individuals' reluctance to share knowledge and reduces the risk associated with losing competitiveness (Kushwaha & Rao, 2015). Studies have identified top management support and organizational culture as important factors influencing firms' knowledge activities (Kang & Kim, 2007), and knowledge-based leadership can significantly enhance KMCs (Gürlek & Çemberci, 2020;

Pazmino-Santacruz & Afcha-Chavez, 2019). A study by Tagliaventi and Mattarelli (2006) found that knowledge exchange and knowledge-related interactions are greater. When professional groups share common values. Shared values and culture, commitment and support, minimizing concerns about power and status differences, and focusing on themes are the main contributing factors to KM success in healthcare institutions (Nicolini et al., 2008). On the contrary, a lack of trust, strategic breadth, and leadership are obstacles to KM success in healthcare institutions (Nicolini et al., 2008; Sensky, 2002; Lorence & Churchill, 2005). Booth (2001) argues that successful KM requires more than just addressing technical issues, it also necessitates an empowering culture that includes executive-level support and an environment that encourages the sharing of good practices. Furthermore, KM must be integrated with the organization's business objectives and managed similarly to other organizational resources. Entries 10-15 Colleagues' understanding of the importance of knowledge for the development of the hospital, colleagues' expectation of a high level of involvement in the acquisition, transformation and application of knowledge, and the value placed on staff training and learning; being rewarded, recognized or having better career prospects for one's professional expertise; the hospital's overarching vision and goals being clear; and senior management's emphasis on the role of knowledge in the development of the hospital all point to the cultural foundations of KM.

Nonaka (1994) classifies knowledge into two categories: tacit and explicit knowledge. Explicit knowledge is defined as knowledge that can be communicated using formal and organized language (Nonaka et al., 2006). This type of knowledge encompasses content that can be captured and disseminated through IT (Maertensson, 2000) It can be represented in various forms, such as text, computer code, pictures, program manuals, and diagrams, which can be formally conveyed to others (Dyck et al., 2005) Moreover, explicit knowledge can be encoded in different media, including paper documents, electronic databases and files as well as business operating procedures. In the context of healthcare industry, explicit knowledge can be expressed in the form of explicitly published textbooks, guidelines, specifications, protocols, procedures, and work instructions. Tacit knowledge is knowledge based on the knowledge of a person (Noe, 2002) and is hidden within the individual and consists of lessons learned, rules of thumb, specialized knowledge, intuition, judgments, skills, beliefs, personal experiences, values, and creative processes (Bollinger & Smith, 2001). Tacit knowledge is the hidden knowledge that appears in people's minds that is difficult to interpret and communicate, and the success of an organization depends on tacit knowledge (Singh, 2008). Tacit knowledge is particularly important in the healthcare industry environment, hidden within individual staff

members with extensive learning and work experience. Nonaka (1994; 1998) proposed four models of knowledge transformation: the socialization model, the synthesis model, the externalization model, and the internalization model. Nonaka (1994; 1998) argues that fundamentally, knowledge is created by individuals and that organizations cannot create knowledge without individuals. Organizations must cultivate individuals or foster an environment conductive to knowledge creation. The process of organizational knowledge creation is initiated by the expansion of the knowledge of individuals in an organization. The driving force in the process of organizational knowledge creation is the individual. Individuals accumulate tacit knowledge through direct 'hands-on' experience. The organization plays a key role in mobilizing the tacit knowledge possessed by individuals and provides the conditions for the creation of the organizational 'knowledge spiral' through socialization, combination, externalization, and internalization. Nonaka and Konno advocate the concept of Ba (1998) to describe the enabling environment for knowledge creation. The concept of Ba can be roughly translated into English as 'Place', Ba provides a platform for individual or collective knowledge enhancement, a shared space that serves as the basis for knowledge creation, which can be physical (e.g., an office), virtual (e.g., a teleconference), or mental (e.g., a shared experience), or any combination of these elements (Nonaka & Konno, 1998).

According to Alavi and Leidner (1999) , KM refers to the management of the process of acquiring, storing, transferring, sharing, applying, and innovating knowledge, which contributes to organizational innovativeness and competitiveness through the realization of the transformation of individual experience and organizational knowledge. The KM process is a systematic activity of organizational capabilities and is considered crucial (Alaarj et al., 2016; T. C. Chang & Chuang, 2011). KM processes exist naturally even without formal support and KM initiatives (Andreeva & Kianto, 2011), and thus the KM process is the focus of KM research (Shujahat et al., 2018).Gold (2001) summarizes the KM process as acquiring, transforming, applying, and protecting.

Entries 16-19 indicate that hospitals can develop new technologies based on existing ones, regularly assess the quality of healthcare to identify strengths and weaknesses, proactively collect feedback from attendees, and actively acquire cutting-edge knowledge about health services in the industry. These practices highlight the knowledge acquisition process, which involves leveraging existing organizational knowledge to discover new insights or investigate existing challenges internally to generate new knowledge, as well as acquiring new knowledge from external sources.

Entries 20-22 highlight the process of knowledge translation. Entry 20 indicates that

hospitals implement measures to transfer organizational knowledge to individual employees through various methods, including mentoring, training, and rotation programs. Training is an organized and planned process that typically involves intensive theoretical lectures or practical demonstrations focused on specific objectives relevant to the healthcare organization such as its systems, technical specifications, and operating instructions. Training materials may be presented in various formats, including printed documents, PowerPoint presentations, or videos. This training process involves the 'combination' of existing explicit knowledge, as well as the 'internalization' of explicit knowledge into tacit knowledge of the trainee. Tutoring is a systematic learning approach wherein senior physicians' mentor junior physicians through a combination of teaching and practical experience in clinical settings. This is vital for the professional development of junior physicians. Rotation programs involve the temporary assignment of physicians to different positions within the same healthcare institution. These positions often share relevance. For instance, obstetricians and gynecologists in the obstetrics and gynecology emergency, obstetrics and gynecology clinic, obstetrics and gynecology ward; pediatricians in pediatrics clinic and children's health care clinic. The rotations are designed for physicians to have a broader range of expertise and practice opportunities. Both tutoring and rotations establish a good "Ba" within the healthcare organization, facilitating closer interactions between new practitioners and experienced practitioners. This environment promotes the 'socialization' of tacit knowledge to tacit knowledge, allowing junior physicians to learn from their more experienced counterparts. Young physicians achieve this 'socialization by observing, imitating and practicing the procedures demonstrated by experienced physicians.

Hospitals implement various measures to convert employees' personal knowledge into organizational knowledge, including experience sharing, mentoring, and the initiation of new programs. These approaches serve to externalize the tacit knowledge possessed by knowledgeable employees into explicit knowledge, marking a critical step in the transformation of knowledge from individuals to the organization. Entry 22 indicates that hospital also employ measures, such as technology transfer, to convert peer knowledge into their own organizational knowledge. Technology transfer is an important process of knowledge transformation in healthcare institutions that follows knowledge acquisition, whereby an individual or a small number of individuals learn the skills of their peers before transferring them to the skills of their department or team. this process begins with the 'internalization' of individual knowledge and progresses through a hybrid process involving 'combination,' 'externalization', and 'socialization' of knowledge within the organization.

Entries 23-26 describe how hospitals implement mechanisms to learn from mistakes or

experiences and apply these lessons in practice; hospitals continuously update and revise diagnosis and treatment protocols, operational procedures, and guidelines based on the latest advancements in medical knowledge; through multidisciplinary collaboration, hospitals are able to solve complex and challenging problems; hospitals conduct comprehensively analyses of patients' needs, technological advancements, and industry trends to enhance the application of knowledge. Entries 27-28 focus on knowledge protection measures within hospitals. Hospitals employ encryption technologies, firewalls, intrusion detection systems, and access control mechanisms to safeguard sensitive information from unauthorized access. Hospitals implement intellectual property protection strategies, such as contractual agreements and patent protections, to ensure knowledge is not only applied effectively but also secured against misuse.

5.1.2 The significance of developing KMCs for Chinese hospitals

Currently, there is a notable lack of systematic research on the KMC of Chinese hospitals, alone with the absence of evaluation and measurement tool specific to these capabilities. This study aims to address this gap by developing a KMC scale tailored to the unique context of Chinese hospitals, demonstrating both strong reliability and validity. The findings lay a foundation for further in-depth investigations into the correlation of KM practices within Chinese hospitals. Moreover, this research provides essential insights and references that can guide management practice aimed at enhancing KMCs in these institutions.

5.1.2.1 Impact on theoretical research

In the era of knowledge economy, the ability to manage knowledge is increasingly important (Mila Kavali et al., 2023). Effective management of intellectual capital is a key challenge for institutions (Walczak, 2005) and is essential for organizational performance (Caputo, 2017; Santo, 2005). KM is the ability of an organization to create, acquire, distribute, and transform knowledge into market competitiveness (Walters, 2002) and effective KM is necessary for the competitive sustainability of an organization (Kavalic et al., 2021)

The healthcare industry, being highly knowledge-intensive, depends heavily on the efficient management of medical knowledge, which is often dispersed and fragmented (Meijboom et al., 2004). This makes it necessary for healthcare services to adopt processes for acquiring, transforming, and applying knowledge. The phenomenon of 'Information overload' (Brien & Cambouropoulos, 2000; Hall & Walton, 2004) further amplifies the need for improved KMCs in the healthcare sector. Hospitals, as complex systems integrating technological, industrial, and scientific processes (Kannampallil et al., 2011), face unique challenges in this regard. While

many researchers have proposed various KM frameworks or applications for healthcare environments (Delesie & Croes, 2000; M. R. Lee et al., 1999; Liebowitz, 2010; Torralba Rodriguez et al., 2003), there remains a lack of consensus among current scholars and researchers regarding the key components of KMCs. Moreover, no systematic research has been conducted on KMCs in Chinese hospitals, and there is currently no measurement tool available for evaluating KMCs within this specific context.

This study draws on Gold's (2001) definition of KMC to measure KMC from two different perspectives, designing a KMC scale. The scale comprises a KIC subscale (with three dimensions: technological foundation, structural foundation, and cultural foundation) and a KPC subscale (with four dimensions: acquisition, transformation, application, and protection). The development of the scale followed a rigorous process, with stringent tests for reliability and validity, proving the accuracy and applicability of the KMC scale for Chinese hospitals. The study also indirectly demonstrated the relevance of Gold's (2001) framework for defining KMCs in Chinese hospital context.

In developing the Chinese Hospital KMC Scale, the study tailored its approach to the specific context of Chinese hospitals. It analyzed various areas related to KM in these institutions, such as strategic management, quality management, operations management, information management, medical research, and medical education. From these areas, the study extracted evaluation indicators related to the acquisition, transformation, application, and protection of knowledge in the technical, institutional, and cultural aspects of knowledge infrastructure and process capabilities. Clear descriptions and examples were used to establish scale items based on these indicators.

By developing the Chinese Hospital KMC Scale, this study actively explores a theoretical research methodology of hospital KM suited to China's specific context. It also lays the foundation for further in-depth research on the relevance of KM practices in Chinese hospitals.

5.1.2.2 Implications for management practices

The KM capacity scale of Chinese hospitals developed in this study has significant practical guidance for improving the KM capacity of Chinese hospitals. In recent years, China has experienced a notable decline in its birth rate, which presents a growing challenge. In 2020, the birth rate fell below 10 per 1,000 for the first time, dropping to 8.52 per 1,000. By 2022, the number of births fell below 10 million, with a birth rate of 6.77 per 1,000. In 2023, the number of births decreased further to 9.02 million, with a birth rate of 6.30 per 1,000. This decline in fertility and the number of births poses significant challenges for China. Maternity and child

healthcare institutions, which primarily offer obstetrics and maternity services, are particularly affected by these demographic changes. They now face operational and developmental difficulties, compounded by an increasing number of elderly and high-risk pregnant women due to delayed childbearing. This trend has raised the complexity of managing healthcare quality and responding to risks. In such a context, enhancing the KMCs for these institutions is crucial for promoting quality, innovation, and performance.

The ability to manage knowledge is increasingly important in today's knowledge economy (Mila Kavali et al., 2023) . Research has shown that a high level of KM improves strategic decision-making, job quality, performance, and innovation (Abubakar et al., 2019; Bloodgood, 2019; Cabrilo & Dahms, 2018; Matricano et al., 2019; Meher & Mishra, 2019; Peruffo et al., 2018; G. Santoro et al., 2019) , thus affecting the competitiveness of institutions (Barley et al., 2018; Iqbal et al., 2019; Kavalic et al., 2021; Sahibzada et al., 2020; Teixeira et al., 2018). Kavalic et al. (2021) argued that effective KM is a necessary condition for competitive sustainability of organizations. KM can promote innovative behavior of employees (S. Tsai, 2018) and can contribute to the enhancement of employee motivation (Da Silveira, 2019). Bloodgood et al. (2021) argued that the power of knowledge affects the degree of strategic positioning of the organization, which in turn affects the performance of employees. The determinants of knowledge have an impact on the non-financial performance of the company such as learning, growth and all internal processes of employees (Abdollahbeigi & Salehi, 2021). Numerous studies have shown that KM has a constructive impact on the performance or efficiency of organizations (Gold, 2001; Iqbal et al., 2019) KM enables organizations to achieve high levels of organizational performance (Al-Hakim et al., 2016; Iqbal et al., 2019).

Exploring strategies for Chinese MCHIS to address their current challenges from the perspective of KMCs holds great practical significance. On one hand, utilizing the KMC scale developed in the study, MCHIS can assess their current level of KMC. On the other hand, the scale's specific components provide a basis for targeted improvements in capacity. For instance, MCHIS can establish an effective KM system to collect, categorize, store and retrieve knowledge, whole enhancing their IT capabilities to support internal and external collaboration and learning among staff. Additionally, MCHIs should develop and refine systems that encourage and regulate the acquisition, transformation and application of knowledge. Creating a learning organizational culture that emphasizes the importance of continuous learning and nurturing knowledge-based talent is crucial for improving the knowledge infrastructure capabilities. Simultaneously, MCHIs should focus on the specific processes and outcomes related to knowledge acquisition, transformation, application and protection to enhance their

knowledge process capabilities.

5.2 The impact of KMCs on physicians' job satisfaction in Chinese MCHIs

This study confirms that the KMCs of Chinese MCHIS significantly influence physicians' job satisfaction. Drawing on the two-factor theory of job satisfaction research (Herzberg, 1964, 1966) and integrating the conceptual models of Shujahat et al. (2018), Masa Deh et al. (2019), and Umar et al. (2020), the study developed a conceptual framework exploring the relationship between KMC and physicians' job satisfaction. By applying the KMC scale, specifically developed for Chinese hospitals, to MCHIS, the study conducted an empirical investigation in three such institutions in Shenzhen, China. The results of the analysis demonstrated that KMC directly affects physicians' job satisfaction in these institutions. Multiple indices of model fit (such as χ^2, GFI, CFI, TLI, and RMSEA) indicate that the model adequately reflects the relationship between KMC and satisfaction; thereby providing a solid theoretical foundation and data support for subsequent research.

5.2.1 Suitability of the Minnesota Short Form Scale for measuring physician job satisfaction in Chinese MCHIS

This study examines physician job satisfaction using the two-factor theory (Herzberg, 1964), which describes employee motivation in terms of 'satisfaction and dissatisfaction', 'health factors and incentives', and their relationship (Goetz et al., 2012). Herzberg (2003) argues that the opposite of job satisfaction is not dissatisfaction but rather a lack of satisfaction, in other words, satisfaction and dissatisfaction are not on a single continuum, they are two distinct states. Fred (2011) explains, 'the opposite of employee satisfaction is not dissatisfaction but the absence of satisfaction; the opposite of dissatisfaction is not satisfaction but the absence of dissatisfaction'. According to the two-factor theory (Fred, 2011), health factors, which include elements such as safety and security, working conditions, management systems, job status, and interpersonal relationships (with superiors, peers, and subordinates), serve as preventive factors related to the work environment. These factors do not directly motivate employees but can prevent dissatisfaction and help maintain the status quo when adequately addressed. In contrast, motivators such as achievement, recognition, the nature of the work itself, responsibility, job development, and growth are related to the work itself or the content of the work. When these factors are adequately satisfied, they can enhance motivation, but their absence does not create dissatisfaction in the same way that the health factors might.

In this study, the Minnesota Short Form Scale of Satisfaction was used to measure physician satisfaction. The Minnesota Satisfaction Short Form Scale is currently the most widely used satisfaction measurement tool and has been extensively applied by researchers globally across various professions (Tavacıoğlu et al., 2019; Rogowska & Meres, 2022; Danacı & Yazır, 2022). It includes applications not only for physicians, nurses, radiographers, therapists, but also for other healthcare providers, reflecting its versatility in measuring job satisfaction in diverse settings in China and worldwide (Akyurt, 2021; J. Chen et al., 2022; Dinibutun, 2023; Dziedzic et al., 2023; Erten et al., 2022; Hemmati-Maslakpak et al., 2021; Heydari et al., 2022; Jiang et al., 2019; Kavurmaci et al., 2022; Kiliç Barmanpek et al., 2022; Koroma et al., 2021; Lakatamitou et al., 2020; D. Liu et al., 2021; M. Liu et al., 2023; Manookian et al., 2023; Sharmin et al., 2023; Teixeira et al., 2018; Uzdıl et al., 2023; Q. Wang et al., 2023; Zikusooka et al., 2021; H. R. Rostami et al., 2021).

The Minnesota Satisfaction Short Form Scale is grounded in two-factor theory and includes assessments of both health care and motivational factors (Moorman, 1993). The 12 items that measure IS primarily assess an employee's contentment with the job 's specific characteristics. These items include factors such as the job's busyness, opportunities for individual performance, variety in tasks, teamwork, ethical alignment of tasks, job stability, the capacity to assist others, delegating tasks, utilizing personal abilities, exercising independent judgment, working autonomously, and the sense of accomplishment derived from work. These 12 items correspond to the motivational factors identified in the two-factor theory, which encompass sense of accomplishment, recognition, the nature of work, responsibility, job development, and professional growth. Conversely, the six entries measuring ES mainly evaluate aspects of employees' job satisfaction unrelated to job content, such as income, promotion opportunities, and management practices. These items assess factors including supervisor treatment, managerial decision-making competence, implementation of policies, compensation and workload, opportunities for career advancement, and recognition for work performed, corresponding to the healthcare factors of the two-factor theory.

The Minnesota Satisfaction Short Form Scale yields a total score ranging from 0 to 100, with higher scores indicating greater job satisfaction. A total score of less than 40 signifies dissatisfaction or strong dissatisfaction, 40–59 indicates uncertainty, 60–79 reflects basic satisfaction, and scores above 80 represent high job satisfaction (L. Zhou & Wang, 2018). In this study, the mean value of GS for institution 1 was 71.82, which falls into the basic satisfaction category and is lower than the results of several satisfaction studies involving medical staff in Chinese public hospitals (X. Li et al., 2022) . The mean value of GS of

organization 2 was 82.50, indicating high satisfaction. The mean value of GS of Institution 3 was 79.62, indicating basic satisfaction.

The analysis of variance in satisfaction levels across the three MCHIs showed that there are significant differences in IS, ES and GS between Institution 1 and Institution 2; as well as between Institution 1 and Institution 3. Institution 1 reported lower levels of intrinsic, extrinsic, and GS compared to Institution 2 and Institution 3.

The analysis also shows that there is no significant difference between Institution 2 and Institution 3 in terms of IS, ES and GS.

5.2.2 The Chinese Hospital KMC Scale and its application to MCHIS in China

Survey data collected from three maternity and child healthcare institutions show a strong correlation between the three dimensions of the KIC subscale: technical foundation, structural foundation, and cultural foundation. Similarly, there is a strong correlation among the acquisition, conversion, application, and protection process within the knowledge process capability subscale. Furthermore, the acquisition, conversion, and application process within the KPC subscale are closely correlated with the three dimensions of the foundation setting capability subscale. However, the protection process of the KPC subscale shows a weaker correlation with the 3 dimensions of the infrastructure capability subscale.

The analysis of variability in KMCs among the 3 MCH institutions showed that there were differences in overall KMCs, knowledge infrastructure capabilities, and knowledge process capabilities between Institution 1 and Institution 2, Institution 1 and Institution 3, as well as Institution 2 and Institution 3. Institution 2 demonstrated the highest levels of overall KM capacity, knowledge infrastructure capacity, and knowledge process capacity, followed by Institution 1, with Institution 3 exhibiting the lowest levels.

Significant differences were observed between Institution 1 and Institution 2, Institution 1 and Institution 3, as well as Institution 2 and Institution 3 across the dimensions of the technology infrastructure, acquisition process, application process, and protection process. Institution 2 scored the highest in these dimensions, followed by Institution 1, while Institution 3 had the lowest scores. For the dimensions of structural basis, cultural basis, and conversion process dimensions, there were differences between Institution 1 and Institution 2, and between Institution 2 and Institution 3, but no significant differences were found between Institution 1 and Institution 3.

5.2.3 The study fully considered the effects of control variables

Given the numerous factors that can influence physicians' job satisfaction, this study incorporated a range of control variables identified through an extensive literature review. These included gender, age, length of service, educational attainment, title, position, number of night shifts per month, weekly working hours, and monthly income. A total of nine factors were included as control variables in a multifactorial analytical model, designed to assess the impact of KM capacity on physicians' job satisfaction in Chinese MCHIs.

5.2.3.1 Variables with constitutive differences among the 3 institutions

Differences in the composition of physicians regarding gender, education, and income were observed among the 3 institutions. Consequently, a stratified analysis was conducted based on the institution.

The analysis examining the effect of gender on satisfaction for the survey data of the 3 institutions separately showed that the influence of gender on IS, ES, and GS was not statistically significant in institutions 1, 2, and 3. When pooling the survey data from the 3 institutions and analyzing the effect of gender on satisfaction in a single-factor analysis, the results showed that the gender did not have a statistically significant impact on IS, ES and GS. These findings are consistent with existing studies that have investigated physician satisfaction in Guangzhou or the broader Guangdong region (Hao et al., 2022; L. Zhou & Wang, 2018). The results differ from previous studies that reported women's job satisfaction to be higher than men's (X. Li et al., 2022; YF. u et al., 2019), as well as those that found the opposite trend, with women's job satisfaction lower than men's (Zhu et al., 2020). These discrepancies may be attributed to regional differences in social norms and concepts. Both F. Yu et al. (2019) and X. Li (2022), conducted surveys across various regions in the eastern, central, and western China, while Zhu et al. (2020) focused on the western region of Chongqing, which is distinct from the region investigated in this study. Shenzhen, where this study was conducted, is situated at the forefront of China's reform and opening-up policies, in close proximity to Guangzhou, as studied by L. Zhou and Wang (2018), and within the Guangdong region studied examined by Hao et al. (2022).

Separate analyses of the survey data from the 3 institutions, examining the effect of educational attainment on satisfaction showed that educational attainment did not have a statistically significant effect on IS, ES, or GS in Institution 1, Institution 2, and Institution 3. However, when pooling the survey data from the three institutions, the results showed that educational attainment influenced IS and GS, but no significant effect on ES. The discrepancy

between the pooled and stratified analyses is likely due to the difference in the educational level of the physicians across the 3 institutions. In Institution 1, 68.83% of the physicians had postgraduate education, compared to 50.50% in Institution 2 and only 11.76% in Institution 3. Consequently, when physician satisfaction in Institution 1 is low, the aggregated and combined data reflect a lower level of satisfaction for physicians with postgraduate education compared to those with undergraduate degrees or less. This suggests that the institution itself became a confounding factor, introducing a bias in the relationship between education level and satisfaction.

In this study, survey data from three institutions were analyzed separately. The effect of income on satisfaction showed no statistically significant difference between income and satisfaction in Institution 1, and Institution 3. However, in Institution 2, income was found to affect IS, ES, and GS, with higher-income physicians reporting lower levels of satisfaction across all three dimensions. This finding contrasts with previous studies conducted in different disciplines and regions of China (B. Liu et al., 2020; Hao et al., 2022; Yao et al., 2020; L. Yang et al., 2020), which concluded that higher income generally increases physicians' job satisfaction.

The reason for the different findings may lie in the operational realities of medical institutions, where income levels are often tied to the technical difficulty and workload associated with a physician's role. Higher income often correlated with more demanding and complex work, increased responsibilities, and a heavier workload. This variability in workload and income levels between institutions may explain the differing impacts of income on satisfaction. For instance, in 2023, the per capita annual outpatient and emergency room visits per physician were 0.24 million, with 73.44 annual inpatient visits per physician in Institution 1; 0.28 million outpatient and emergency room visits with 99.16 annual inpatient visits per physician in Institution 2; and 0.26 million outpatient and emergency room visits, with 37.40 annual inpatient visits per physician in Institution 3. As a result, physicians in Institution 2 experienced the highest workload among three MCH institutions. Although Institution 1 and Institution 2 share similar organizational structures and fee schedules for healthcare services, the heavier workload in Institution 2 likely increased physicians' income expectations. However, the income distribution across three levels in Institution 1 is 20.78% (low), 30.30% (medium), and 48.92% (high), while in Institution 2 it is 33.66% (low), 30.69% (medium), and 35.64% (high). This discrepancy suggests that despite higher workloads, physicians in Institution 2 earned less than their counterparts in the same industry and level with smaller income gaps between different levels. Therefore, the observed effect of income on satisfaction in Institution

2 is likely a result of confounding bias, caused by differences in workload and occupational tasks rather than income alone. this conclusion aligns with previous research (W. Han et al., 2023), which measured satisfaction based on the equivalence between income level and workload, categorizing this relationship into three levels: equivalent, general, and unequal. The study found that the income level and workload equivalence had a significant impact on physician's job satisfaction. Similar findings were reported by Chen, N. and Chen, X. (2020), who identified workload as a more influential factor than income on job satisfaction, with job stress playing a significant role in job satisfaction. Jin et al. (2018) also concluded that job stress significantly affects job satisfaction.

Pooling the survey data from three institutions, the test result revealed that income influenced IS, ES, and GS. However, the difference between the pooled analysis and the stratified analysis of Institution 1 and 3 can be attributed to confounding bias introduced by the variations between the institutions. These variations acted as confounding factors.

5.2.3.2 Variables that did not constitute differences between the 3 institutions

There were no significant differences in age, title, position, years of experience, number of night shifts, or hours worked among the three institutions.

Test results revealed that the number of night shifts per month, and weekly working hours did not significantly affect IS, ES, or GS. This finding do not aligns with previous studies (B. Liu et al., 2020; W. P. Chang & Chang, 2019; Guo et al., 2020; Y. Lu et al., 2016; Ma et al., 2021; Mulligan et al., 2023; S. Wu et al., 2019; Yao et al., 2020; F. Yang & Li, 2016; C. Yu et al., 2020; F. Yu et al., 2019; Zou et al., 2019). According to the results from a prior study by Jin et al. (2019) , variations in the number of night shifts per month and weekly working hours did not lead to differences in the intensity of occupational tasks among medical staff in Shenzhen. This may explain the absence of statistically significant differences in the effects of the number of night shifts per month and weekly working hours on IS, ES, and GS.

No statistically significant effect of job duties on IS, ES, or GS was found in this study, which contrasts with the findings of Fred (2011). This discrepancy may be due to regional differences among the study participants. Job responsibilities, associated benefits, and potential income levels vary across regions within healthcare institutions, which could explain the differing results.

Additionally, age, length of service, and job title, influenced IS, ES, and GS. Specifically, satisfaction decreased with increasing age, length of service, and job title, but rebounded as these factors continued to rise, eventually contributing positively to satisfaction. Physicians

with 10-19 years of service had lower job satisfaction compared to those less than 10 years of service. However, no significant difference in was observed between physicians with 20 or more years of service and those with less than 10 years of service. Overall, the job satisfaction of physicians exhibited a 'U'-shaped trend relative to years of service. This finding aligns with previous research (L. Zhou & Wang, 2018) . Physicians with 10-19 years of service are typically in the growth phase of their careers, and form the core workforce in hospitals, facing significant pressures related to raising children, supporting elderly family members, and maintaining family relationships. She (2019) also supports the view that job satisfaction does not follow a simple linear trajectory; initially, job satisfaction is high when an employee begins a new job, but it tends to decline sharply as time progresses. As employees gain more work experience, job satisfaction gradually increases again.

5.2.4 KMCs of Chinese MCHIS affect physicians' job satisfaction

This study confirms that the KIC and KPC of Chinese MCHIs directly affects physicians' IS, ES, and GS; while the KPC indirectly impacts physicians' IS, ES, and GS through KIC.

5.2.4.1 The research model demonstrates a good fit

The study constructs a structural equation model of KMC on IS, ES, and GS based on a conceptual model with a two-tier factor theoretical framework. The KIC subscale is divided into three dimensions: Technology, Structure, and Culture, which are assessed through Q1 to Q5, Q6 to Q9, and Q10 to Q15, respectively. The KPC subscale is categorized into four dimensions: Acquisition, Conversion, Application, and Protection, assessed through Q16 to Q19, Q20 to Q22, Q23 to Q26, and Q27 to Q28, respectively. The three dimensions of KIC are reflected through a second-order factor, KIC, while the four dimensions of KM processes are represented by another second-order factor, KPC. The fitted structural equation model of KMC for physicians' IS, ES, and GS in MCHIs in China demonstrates good fit.

The structural equation model linking KMC to IS shows key fit indices, such as GFI (0.823), NFI (0.904), IFI (0.935), and CFI (0.935), which are close to or exceed the recommended threshold of 0.90, indicating that the model fits the data well. The TLI value is 0.927, indicating a high explanatory power of the model after adjusting for degrees of freedom; while the RMSEA is 0.071, suggesting that the model's error is controlled within a reasonable range (< 0.08).

The primary fit indices of the structural equation model linking KIC and KPC to ES, such as GFI (0.819), NFI (0.901), IFI (0.933), and CFI (0.933), are close to or exceed the

recommended threshold of 0.90, demonstrating that the model possesses good explanatory power and fit quality. The TLI value is 0.924, indicating a high structural efficiency of the model; while the RMSEA value is 0.072, which falls within the acceptable range (<0.08), further validating the reasonableness of the model fit.

The structural equation model of KIC and KPC for GS exhibits good overall fit; with key fit indices such as GFI (0.821), NFI (0.903), IFI (0.934), and CFI (0.934) being close to or exceeding the recommended threshold of 0.90, indicating that the model fits well with the data. The TLI is 0.925, suggesting a high structural efficiency of the model, while the RMSEA is 0.072, indicating that error is controlled within a reasonable range.

5.2.4.2 Knowledge infrastructure capabilities of MCHIs in China affect physician job satisfaction directly

This study confirms that the KIC of MCHIs in China has a direct positive impact on physicians' IS, ES, and GS. Among the constituent dimensions of KIC, Technology, Structure, and Culture play a crucial role in KIC.

The two-factor theoretical model is the most widely used theory in current research on the impact of KM on job satisfaction (Umar et al., 2020). Based on the two-factor theory, previous studies have concluded that KM affects motivational factors by providing employees with five basic motivational elements (P. F. Drucker, 1999; C. H. Liu et al., 2017; Palvalin, 2017; Palvalin et al., 2017; Shujahat et al., 2018; Turriago-Hoyos et al., 2016). These elements include: providing employees with the necessary autonomy in their work; fostering learning and knowledge-rich environments, which have a significant impact on the KM process of knowledge workers; enabling knowledge workers to engage in different knowledge activities, thereby stimulating their intrinsic motivation to maintain and create knowledge (Nonaka & Takeuchi, 1995) ; assigning employees responsibility for acquiring, sharing and utilizing knowledge; and offering supportive work facilities. Moreover, KM ensures the provision of rewards, support, and fairness, thereby allowing institutions to offer healthcare factors that mitigate employee dissatisfaction (Donate & Guadamillas, 2015; P. F. Drucker, 1998, 1999; Kulkarni et al., 2006). Physicians' intrinsic job satisfaction aligned with the motivational factors of achievement, recognition, the nature of work, responsibility, job development, and job growth as outlined in the two-factor theory. Specifically, the technological base, which is one of the main supportive work facilities and motivational factors within the two-factor theoretical framework, directly impacts the nature of physician's work, collaboration with colleagues, knowledge acquisition, and other aspects related to professional development and growth;

therefore, the technological base enhances physicians' intrinsic job satisfaction. Extrinsic job satisfaction for physicians is largely influenced by factors such as supervisory treatment, managerial competence in decision-making, policy implementation, compensation and workload, opportunities for career advancement, and recognition for work performed, which correspond to the healthcare factors identified in the two-factor theory. The knowledge and technology infrastructure established in MCHIs, especially effective KM systems, directly affects the productivity of physicians and their ability to meet work-related objectives. Studies have concluded (Kianto et al., 2019; Da Silveira, 2019) that KM has a positive impact on employee productivity, and the increased productivity contributes to employees feeling more valued and effective, thereby enhancing their satisfaction. Furthermore, a study of pharmacists in Jordanian pharmacy chains showed (Rateb et al., 2022) that there is a correlation between pharmacists' satisfaction and ICT use. Additionally, research by Masa'deh et al. (2019) found that technological infrastructure has a significant and positive impact on job satisfaction, which is consistent with the findings of this study.

Studies have concluded that employees' knowledge and skills affect job satisfaction (Alonso et al., 2019; Davila et al., 2019; Hendri, 2019). Physicians as knowledge-based professionals working in hospitals, where such talent is concentrated, have a particularly strong need for continuous learning, skill enhancement, career development, and self-realization (Fu et al., 2023). Interviews with physicians in tertiary public hospitals in China regarding job satisfaction (Ma et al., 2021) found that most doctors believe salary and benefits meet only basic needs. More importantly, they seek a robust platform for professional development and recognition, which includes an opportunity for scientific research and innovation, overseas training, and peer-to-peer learning. Similarly, a survey of GPs' job satisfaction in Guangdong found (Hao et al., 2022) that those who frequently engaged in self-learning had higher GS than those who did not have this habit. In this study, the structural basis of KM focuses on the training and continuing education system, academic exchange and cooperation system, knowledge sharing reward system, and innovation incentive mechanism. These systems create a supportive platform for professional growth and align with the motivational factors that correspond to IS. This structural basis provides employees with autonomy in their work, which activates motivational factors, enhancing their sense of control and intrinsic power, ultimately leading to increased job satisfaction (Kianto et al., 2019; Da Silveira, 2019). This finding is consistent with other research suggesting that motivational job designs based on knowledge sharing positively impact individuals (Kavalic et al., 2023) and that employees are more likely to share knowledge when they perceive benefits from it (Lyu et al., 2020).

The structural equation model of KMC and physician satisfaction in this study indicates that culture is a core element of KIC. A high level of KM culture in a healthcare institution is one where employees recognize the importance of knowledge hospital development, are highly engaged in knowledge practices, and receive rewards, recognition, or improve career prospects for their expertise. This culture promotes a learning-rich environment that empowers employees to acquire, share, and apply knowledge, which directly contributes to physicians' IS by addressing motivational factors such as achievement, recognition, and responsibility. Furthermore, a strong KM culture ensures that physicians are rewarded for their expertise, are aligned with the hospital's vision of becoming a knowledge-based institution, and have access to fair opportunities to practice and apply their knowledge—all of which are closely related to ES and protective factors. Prior research has also shown (Masa'Deh et al., 2019) that the cultural foundations of KM have a significant positive effect on job satisfaction, which is consistent with the results of this study.

5.2.4.3 Knowledge process capabilities indirectly affects physician job satisfaction in Chinese MCHIs

This study confirms that the KPC of MCHIs in China has no significant direct effect on physicians' IS, ES, and GS, but impacts IS through indirect pathways. Knowledge Acquisition, Conversion, Application, and Protection are crucial pillars of KPC.

Health factors and motivational factors are two important corollaries of Herzberg's two-factor theory (Herzberg, 1964, 1966). Studies have concluded that the KM process mitigates dissatisfaction and enhances satisfaction through motivational factors (Sahibzada et al., 2020; Shujahat et al., 2018). KM processes serve as contextual features of the work environment that can enrich work experiences and increase job satisfaction (Morgeson & Humphrey, 2006). T. N. Kumar (2018) demonstrated that KM practices—such as knowledge creation, acquisition, acceptance, storage, sharing, and application—have a significant effect on job satisfaction. Furthermore, various knowledge practice processes impact job satisfaction; for instance, the knowledge acquisition process affects employees' job satisfaction (Gangi et al., 2019; Kianto et al., 2016; Umar et al., 2020; G.Wang et al., 2019), while the knowledge application process (Imran et al., 2017;Umar et al., 2020) also contributes positively to job satisfaction. In contrast, the knowledge protection process has been shown to affect job satisfaction as well (Byrd & Turner, 2001; Y. Huang et al., 2019). Studies conducted on medical staff showed that knowledge creation, retention and application positively affect job satisfaction, while no significant relationship exists between knowledge transformation and job satisfaction (Fadaie et al., 2023).

Additionally, a study on the Romanian healthcare system staff found (Popa et al., 2018) that knowledge acquisition and utilization had a significant positive impact on employee satisfaction, whereas knowledge sharing was associated with decreased satisfaction.

This study explored the impact of the knowledge process on physicians' job satisfaction, revealing that KPC does not have a significant direct effect on job satisfaction but instead influences it indirectly through knowledge base setting capability as a mediator. This is consistent with the advocacy of the Ba concept proposed by Nonaka and Konno (1998).

Ba serves as a platform for the enhancement of individual or collective knowledge, functioning as a shared space foundational to knowledge creation. It can be a physical space, a virtual space, a mental space, or any combination of these three, and it proposes four types of Ba corresponding to the SECI model (Nonaka & Konno, 1998). This concept of Ba encompasses the technological infrastructure, organizational structure, regulations, and other hardware and software conditions of the organization, particularly the essence of organizational culture. Only by providing a conducive Ba can the realization of the SECI model be facilitated, thereby achieving knowledge conversion and creation, and fostering the growth of both individual and organizational knowledge. This is because all knowledge processes must occur within the platform and atmosphere of Ba.

The SECI model describes how knowledge is shared, transformed, and created between individuals and between individuals and organizations through the processes of Combination, Socialization, Internalization, and Externalization. Kianto et al. (2016) demonstrated that knowledge sharing within an organization is a key KM process for enhancing employee satisfaction. Multiple researchers have acknowledged that knowledge sharing affects employee job satisfaction(Kianto et al., 2016;Malik & Kanwal, 2017), which in turn, positively affects the job satisfaction of knowledge workers (Umar et al., 2020). Furthermore, knowledge-sharing behaviors are closely linked to the organization's technology, regulations, and culture.

5.2.5 Implications for studying the impact of KMCs on physician job satisfaction in Chinese MCHIS

5.2.5.1 Implications for theoretical research

Although it has been established that KM provides the best knowledge to knowledge workers and can significantly increase their satisfaction (Biasutti & Heba, 2012; Kianto et al., 2016), knowledge worker satisfaction can be improved within an organization with the application of KM (Kianto et al., 2016; Sahibzada et al., 2020). However, the impact of KM on job satisfaction

cannot be easily predicted (Epaminonda et al., 2021).

In healthcare research, increasing attention has been given to the effect of KM on job satisfaction (Fadaie et al., 2023; Popa et al., 2018; Rateb et al., 2022). Nevertheless, there is a lack of studies that specifically examine the relationship between KM and job satisfaction among Chinese physicians. Therefore, this study contributes to advancing theoretical research on the influence of KMCs on physician's job satisfaction in Chinese healthcare institutions.

5.2.5.2 Implications for management practices

Physician job satisfaction is crucial for the management of healthcare institutions. On the one hand, job satisfaction forms the foundation for delivering high-quality healthcare services (Alotaibi et al., 2023), serves as an important predictor of patient care quality (Soriano-Vázquez et al., 2023). It directly influences patient safety and the quality of healthcare services (Kader et al., 2021). Improving job satisfaction is essential for enhancing healthcare service quality (Y. Li, 2021) plays a significant role in the efficient functioning of healthcare institutions (Verulava, 2024). Moreover, there is a strong correlation between physician job satisfaction and patient satisfaction (Deshmukh et al., 2023). On the other hand, low job satisfaction among medical professionals increases burnout (Samadi et al., 2023; K. Zhang et al., 2023) and influences higher turnover intentions (Xu et al., 2023).

With the declining fertility rate in China, competition among MCHIS has intensified. Amid operational and developmental challenges, these institutions can enhance the quality of healthcare services and improve patient satisfaction by increasing physician job satisfaction. This, in turn, can lead to better development prospects and opportunities for the institutions. Given the current state of research both domestically and internationally, and considering the survival and developmental challenges faced by Chinese MCHIs, this study explores strategies that can leverage KM to enhance physicians' job satisfaction.

To improve physicians' job satisfaction in MCHIS, it is essential to address both motivational factors and hygiene factors, ensuring while ensuring hygiene factors are adequately addressed (Fred, 2011; R. Zhang, 2020). MCHIs should work to enhance their IT capabilities, providing physicians with convenient, efficient, and accessible communication platforms. This would facilitate continuous access to and acceptance of new knowledge and technologies, as well as the sharing and application of knowledge. In addition, healthcare institutions should refine their KM systems by improving incentive structures that encourage knowledge sharing and creation. They should also implement ongoing training and education programs to meet physicians' professional growth needs. It is essential to cultivate an

organizational culture that respects knowledge, values learning, and encourages knowledge sharing and creation. Actively promoting a 'BA' environment conducive to knowledge transformation can significantly enhance job satisfaction.

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Chapter 6: Conclusions

Based on a comprehensive review of existing literature, this study developed a conceptual model of KMCs in Chinese hospitals drew upon Nonaka's (1994; 1998) theory and synthesizing established models such as Gold's (2001). The resulting Chinese Hospital KMC Scale was created, and its reliability and validity were assessed through a large-scale survey. Furthermore, this study utilized the two-factor theory of job satisfaction (Herzberg, 1964, 1966) and combined with the conceptual models of Shujahat et al. (2018), Masa Deh et al. (2019), Umar et al. (2020), and Kavalic et al. (2023) to formulate a conceptual model and research hypotheses positing that KMCs influence physicians' job satisfaction. The developed KMC scale was subsequently applied in an empirical study of three MCHIS in Shenzhen, China. The results confirmed that KICs in Chinese MCHIs directly influence physicians' intrinsic, extrinsic, and overall job satisfaction, while KPCs exert an indirect effect on satisfaction through mediating roles of infrastructure capabilities, thereby addressing the research hypotheses. Theoretical contributions Firstly, this study develops a measurement scale to assess KMCs in Chinese hospitals, addressing the critical research gap in this field. Secondly, it advances the theoretical understanding of the relationship between hospital KMCs and physicians' job satisfaction in the Chinese context. Practical implications, from a practical perspective, the newly developed scale provides a reliable tool for evaluating KMCs in Chinese hospitals, enabling targeted improvement strategies. Additionally, this research offers a novel perspective for enhancing physicians' job satisfaction through the systematic enhancement of organizational knowledge management practices.

6.1 Research findings addressing the research questions

6.1.1 High reliability and validity of the developed KMC scale for Chinese hospitals

Grounded in a comprehensive literature review, this study designed a research program that proposed a conceptual model and research hypotheses informed by both international and domestic advancements in KMCs and job satisfaction. In the first phase of the study, a literature review, along with existing measurement scale entries for KMCs in commercial organizations, and expert consultation, facilitated the development of a preliminary scale. This scale was

organized into two subscales and seven dimensions, forming the foundation for a KMC scale tailored for Chinese hospitals. Subsequently, a Delphi expert consultation was conducted to evaluate the importance, appropriateness and overall scores of each scale item, leading to a systematic screening, modification, and optimization of the entries. A small-scale pre-survey and expert focus group discussions, further refined the scale, resulting in the construction of the Chinese Hospital KMC Scale. The Chinese Hospital KMC Scale's reliability and validity were subsequently validated through a survey of 1,037 staff members from 49 healthcare institutions across three economically diverse regions of China: the eastern coastal region, the central inland region, and the western remote region. The results showed that the scale possesses strong reliability and validity.

6.1.2 The KMCs of MCHIs in China have a direct or indirect impact on physicians' job satisfaction

In the second phase of the study, an empirical investigation was conducted in three MCHIS in Shenzhen, each with different scales of development and histories. The study applied the Chinese Hospital KMC Scale to examine the relationship between KMCs and physician job satisfaction. This study analyzed the impact of KMCs in MCHIs on physician job satisfaction. The results indicate that knowledge infrastructure capabilities directly affect physicians' IS, ES, and GS. Knowledge process capabilities indirectly influence physicians' IS, ES, and GS through knowledge infrastructure capabilities.

6.2 Theoretical contributions

In the era of knowledge economy, effective KM is a prerequisite for the sustainable competitiveness of organizations (Kavalic et al., 2021), and the ability to manage knowledge is becoming increasingly important (Mila Kavali et al., 2023). The healthcare industry is a typical knowledge-intensive sector, where healthcare services heavily rely on complex and dispersed expertise (Meijboom et al., 2004). 'Information overload' (Brien & Cambouropoulos, 2000; Hall & Walton, 2004) further exacerbates the challenges of KM. On one hand, while many researchers have proposed various KM frameworks within healthcare settings (Delesie & Croes, 2000; M. R. Lee et al., 1999; Liebowitz, 2010; Torralba Rodriguez et al., 2003), there remains a lack of consensus in academia regarding the specific dimensions of KMCs, particularly in the context of localized studies and assessment tools for Chinese hospitals. On the other hand, although existing studies have confirmed that KM enhances satisfaction among knowledge

workers by providing optimal knowledge resources (Biasutti & Heba, 2012; Kianto et al., 2016), and with the application of KM, knowledge worker satisfaction can be improved within organizations (Kianto et al., 2016; Sahibzada et al., 2020)(Kianto et al., 2016; Sahibzada et al., 2020), its impact on job satisfaction remains complex and context-dependent (Epaminonda et al., 2021).

Based on Gold's (2001) conceptualization of KMCs, this study measures these capabilities from two distinct dimensions: KIC and KPC. KIC includes technological foundations, structural foundations, and cultural foundations, while KPC encompasses acquisition, transformation, application, and protection. By integrating real-world scenarios from various fields, such as strategic management, quality management, operational management, information management, medical scientific research, and medical education in Chinese hospitals, key indicators were extracted, and scale items were constructed. Through a rigorous scale development process and stringent tests of reliability and validity, the effectiveness and accuracy of the KMC scale for Chinese hospitals were demonstrated, addressing the long-standing absence of quantitative tools for assessing KMCs in this context and laying a foundation for subsequent in-depth research.

Additionally, this study explores the impact of KMCs on physician job satisfaction within Chinese MCHIs, advancing theoretical research on the relationship between KMCs and physician job satisfaction in China's healthcare system.

6.3 Practical Implications

Considering declining fertility rates and a decreasing number of births, China's MCHIS are encountering operational and developmental challenges. Concurrently, the age at individuals choose to give birth has been progressively delayed, leading to an increase in high-risk pregnancies and associated medical complexities. Consequently, the challenges associated with managing medical quality and responding to risks have intensified. To address these issues, MCHIS must enhance their KMCs to foster the quality of healthcare services, innovation, and performance. By improving medical staff satisfaction, these organizations can elevate the quality of healthcare services and increase patient satisfaction, thereby positioning themselves for better development prospects and opportunities.

Studies have shown that a high level of KM improves strategic decision making, quality of work, performance and innovation (Abubakar et al., 2019; Bloodgood, 2019; Cabrilo & Dahms, 2018; Matricano et al., 2019; Meher & Mishra, 2019; Peruffo et al., 2018; G. Santoro et al.,

2019), thus affecting the competitiveness of organizations (Barley et al., 2018; Iqbal et al., 2019; Kavalic et al., 2021; Sahibzada et al., 2020; Teixeira et al., 2018). The KMC scale developed in this study serves as a practical framework for enhancing the KMCs of Chinese hospitals. Utilizing this scale, MCHIS can assess their current level of KMC. Based on the entries in the KMC scale, MCHIs can strategically target areas for competency improvement. For example, they can establish an effective KM system to collect, categorize, store and retrieve knowledge, while enhancing IT capabilities to support both internal and external collaboration and learning. MCHIs should establish and refine systems that encourage and regulate the acquisition, transformation and application of knowledge. Establishing a learning-oriented organizational culture and emphasizing the importance of continuous learning behaviors and knowledge-based talent will also be crucial. By implementing these strategies, organizations can improve their KIC.

This study investigates the impact of KMCs on doctors' job satisfaction within Chinese MCHIS, considering both domestic and international research and the challenges these organizations face in terms of survival and development. Job satisfaction is an important foundation for health systems to provide high-quality services to patients (Alotaibi et al., 2023), and is recognized as an important predictor of the quality of patient care (Soriano-Vázquez et al., 2023) which directly affects patient safety and the quality of healthcare services (Kader et al., 2021), plays an important role in improving the quality level of healthcare services (Y. Li, 2021). Furthermore, job satisfaction is an essential factor for the effective functioning of healthcare institutions (Verulava, 2024)and a positive correlation exists between physician job satisfaction and patient satisfaction (Deshmukh et al., 2023). Conversely, low job satisfaction among medical professionals can lead to increased levels of burnout (Samadi et al., 2023; K. Zhang et al., 2023), and negatively affects their tendency to remain their positions (Xu et al., 2023).

Guiding by Herzberg's Two-Factor Theory, this study confirms that KIC in Chinese MCHIs directly and positively influence physicians' IS, ES, and OJS. Among the three dimensions of KIC, technology, structure, and culture, each plays a critical role in shaping satisfaction outcomes. Physicians' IS aligns with Herzberg's motivators. Technology, structure, and culture satisfy physicians' needs for professional growth and self-actualization by providing autonomy (such as space for innovation), learning opportunities (such as academic exchange), and empowerment (such as incentives for knowledge sharing). ES relates to hygiene factors, where KIC mitigates dissatisfaction by ensuring supportive facilities (technological systems), enforcing equitable policies (structural systems) and providing cultural recognition. The

conclusions of this study resonate with prior studies(Masa'Deh et al., 2019; Kianto et al., 2019; Da Silveira, 2019; Rateb et al., 2022; Alonso et al., 2019; Hendri, 2019; Lyu et al., 2020; Kavalic et al., 2023).

This study further revealed that KPC in Chinese MCHIs do not exert a direct significant effect on physicians' IS, ES, or OJS but instead indirectly influence IS through mediating pathways. KPC encompasses four dimensions: knowledge acquisition, conversion, application, and protection. In alignment with Nonaka and Konno's (1998) concept of Ba—a platform (physical, virtual, or mental) corresponding to the SECI model, this study emphasizes that effective knowledge processes depend on organizational infrastructures. Specifically, knowledge acquisition, conversion, application, and protection in Chinese MCHIs are constrained by technical infrastructure limitations (such as databases), influenced by structural foundations (such as underdeveloped training systems or innovation incentive policies), limited by cultural barriers (a low-trust environment hindering open knowledge sharing). Notably, knowledge-sharing behaviors are closely intertwined with organizational technology, institutional policies, and cultural norms. It is consistent with prior studies (Kianto et al., 2016； Malik & Kanwal, 2017; Umar et al., 2020).

To enhance physicians' job satisfaction in Chinese MCHIs, it is imperative to address both hygiene factors and motivators, with a stronger emphasis on fulfilling motivator-related needs (Fred, 2011； R. Zhang, 2020). Chinese MCHIs should prioritize investments in healthcare digitization to enhance the efficiency of knowledge acquisition and application. This involves establishing convenient, efficient, and rapid information and communication platforms for physicians, enabling them to continuously access and adopt new knowledge and technologies, as well as share and apply knowledge collaboratively. By optimizing KM systems (such as information tools and collaborative platforms), the work efficiency and goal achievement capabilities of physicians can be enhanced, directly impacting their IS regarding the needs for the work itself and personal development.

Chinese MCHIs should establish comprehensive systems and mechanisms for KM. On one hand, it is essential to improve the incentive system for knowledge sharing and creation; on the other hand, the implemention of training and continuing education mechanisms is equally important. By establishing a normalized mechanism for academic exchange and a rewards system for knowledge contributions — including training programs, academic exchange mechanisms, and innovation incentives, can offer physicians valuable career development platforms and opportunities for knowledge sharing, thereby enhancing their IS related to a sense

of achievement and responsibility.

Critically, Chinese MCHIs should cultivate an organizational culture that respects knowledge, prioritizes learning, and incentivizes knowledge sharing and creation. This involves promoting a knowledge-oriented set of values (such as rewards for knowledge contributions and an equitable practice environment), which directly meets physicians' IS regarding recognition and professional prospects, as well as their ES concerning the fairness of management decisions and opportunities for promotion. Advocating an organizational culture where 'knowledge sharing equals value' actively facilitates a 'BA' that is conducive to the processes of knowledge sharing, transformation, and creation.

6.4 Limitations of the study

This study empirically investigates the relationship between KMCs and physician job satisfaction in Chinese MCHIs in Shenzhen, which vary in scales and development history. However, these institutions may not be representative of MCHIs in other regions of China.

The focus of this research is to explore pathways for enhancing employee satisfaction in Chinese MCHIS from the perspective of KM. It specifically targets physicians, omitting an examination of the relationship between KMCs and job satisfaction among nursing staff, medical technicians, and other roles within MCHIS.

This study has not yet addressed the need for further research on strategies to improve employee satisfaction based on KMCs in maternal and child health care institutions.

6.5 Future Prospects

In the future, a larger-scale study can be conducted to validate the applicability of the KM scale in Chinese hospitals. The research could be extended to a broader range of MCHIS throughout China to further explore the relationship between KMC and physicians' job satisfaction Additionally, future studies should investigate the impact of KMCs on the job satisfaction of nurses, medical technicians and other staffs within these institutions. Further empirical research is also needed to identify specific measures and strategies for improving employee satisfaction through the enhancement of KMCs in MCHIS.

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Annex A: Quantitative Table of the Basis for the Expert's Judgment on the Indicator

Basis of judgment	The extent to which the basis of judgment influences the expert's judgment		
	Large	Medium	Small
Theoretical Analysis	0.3	0.2	0.1
Practical experience	0.5	0.4	0.3
Peer understanding	0.1	0.1	0.1
Intuition	0.1	0.1	0.1

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Annex B: Basic Information on the Three Maternal and Child Health Insitutions

Hospital Number	Year of Establishment	Building area (10,000 square meters)	Number of Physicians (person)	Number of deliveries in 2023 (10,000)	Volume of outpatient emergency treatment in 2023 (10,000 visits)	Number of hospital discharges in 2023 (10,000)	Equal Distribution Sample Size
1	1979	14	821	1.63	195.62	6.03	231
2	1993	7.89	358	1.16	99.14	3.55	101
3	2013	1.40	123	0.05	32.11	0.46	34

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Annex C: Delphi Expert Consultant Profiles

N	Age	E*	S*	Working Experience (years)	Familiarity Factor	Expert judgment factor self-assessment Theoretical analysis	Practical experience	Peer understanding	Expert intuition	Authority factor
1	≥40 and <50	2	1	>20	0.80	0.20	0.50	0.10	0.10	0.85
2	≥50	3	1	>20	0.80	0.30	0.40	0.10	0.10	0.85
3	≥50	2	2	>20	0.80	0.30	0.40	0.10	0.10	0.85
4	≥40 and <50	3	3	>20	0.80	0.20	0.40	0.10	0.10	0.80
5	≥50	2	3	>20	0.80	0.20	0.40	0.10	0.10	0.80
6	≥40 and <50	2	4	>20	0.80	0.20	0.50	0.10	0.10	0.85
7	≥30 and <40	2	4	11-15	0.80	0.20	0.40	0.10	0.10	0.80
8	≥50	3	5	>20	0.80	0.30	0.40	0.10	0.10	0.85
9	≥40 and <50	2	6	15-20	1.00	0.30	0.50	0.10	0.10	1.00
10	≥30 and <40	2	7	6-10	0.50	0.20	0.50	0.10	0.10	0.70
11	≥40 and <50	2	7	15-20	0.80	0.20	0.40	0.10	0.10	0.80
12	≥40 and <50	2	7	15-20	1.00	0.20	0.50	0.10	0.10	0.95
13	≥30 and <40	2	8	15-20	0.50	0.30	0.50	0.10	0.10	0.75
14	≥50	1	8	>20	0.80	0.30	0.50	0.10	0.10	0.90
15	≥40 and <50	3	9	15-20	1.00	0.30	0.50	0.10	0.10	1.00
16	≥30 and <40	3	10	11-15	0.80	0.30	0.40	0.10	0.10	0.85
17	≥40 and <50	3	10	15-20	1.00	0.30	0.50	0.10	0.10	1.00
18	≥50	3	11	>20	0.80	0.20	0.50	0.10	0.10	0.85

E*: education 1=undergraduate; 2=bachelor; 3=doctorate
S*: specialization 1=Strategic management of hospitals
2=Hospital operations management
3=Hospital informatization management
4=Hospital research and teaching management
5=Patient case statistics
6=Healthcare quality management
7=C linical medicine

8=Nursing care
9=Health policy research
10=Health management research
11=Medical research

Annex D: Expert Ratings and Adjustment Results in the First Delphi Round for Scale Dimensions and Entries

Dimension or entry	Importance			Appropriateness			Overall			Changes in dimensions and entries after the first round of Delphi expert consultation
	$\bar{X}$	s	CV	$\bar{X}$	s	CV	$\bar{X}$	s	CV	
Technologies	4.56	0.62	13.52%	4.39	0.61	13.85%	4.47	0.55	12.41%	Reservations
Structures	4.56	0.62	13.52%	4.33	0.59	13.71%	4.44	0.51	11.50%	Reservations
Culture	4.39	0.78	17.72%	4.39	0.61	13.85%	4.39	0.65	14.91%	Reservations
Acquisition	4.33	0.84	19.39%	4.22	0.88	20.80%	4.28	0.81	18.90%	Reservations
Transformation	4.33	0.77	17.70%	4.17	0.86	20.58%	4.25	0.79	18.60%	Reservations
Application	4.67	0.49	10.39%	4.44	0.62	13.85%	4.56	0.48	10.57%	Reservations
Protection	4.22	0.81	19.15%	4.00	0.91	22.69%	4.11	0.81	19.81%	Reservations
Q1	4.33	0.84	19.39%	3.94	0.87	22.12%	4.14	0.78	18.90%	Reservations
Q2	4.17	0.62	14.84%	4.11	0.76	18.45%	4.14	0.66	15.94%	Reservation, optimized expression
Q3	4.00	0.59	14.85%	4.11	0.68	16.45%	4.06	0.59	14.58%	Reserved, optimized expression
Q4	3.94	0.87	22.12%	3.72	0.96	25.74%	3.83	0.87	22.81%	Merged with entry 5
Q5	4.00	0.84	21.00%	3.78	0.94	24.96%	3.89	0.85	21.85%	Merge with entry 4
Q6	4.11	0.68	16.45%	4.17	0.79	18.86%	4.14	0.70	16.99%	Reserve
Q7	3.89	0.76	19.50%	3.56	0.92	25.92%	3.72	0.71	19.12%	Delete
Q8	3.94	0.94	23.77%	3.28	0.83	25.21%	3.61	0.72	19.90%	Delete
Q9	3.67	1.03	28.06%	3.67	0.84	22.91%	3.67	0.91	24.75%	Delete
Q10	4.39	0.70	15.90%	4.28	0.67	15.64%	4.33	0.62	14.27%	Retain
Q11	4.28	0.75	17.58%	3.94	0.87	22.12%	4.11	0.74	17.97%	Reservation
Q12	4.28	0.89	20.92%	3.94	0.94	23.77%	4.11	0.83	20.25%	Reserved, Optimized Expression
Q13	4.39	0.78	17.72%	3.89	1.02	26.30%	4.14	0.84	20.22%	Retain, Optimize Expression
Q14	3.94	0.94	23.77%	3.67	1.08	29.58%	3.81	0.96	25.15%	Delete
Q15	4.22	0.81	19.15%	3.78	1.00	26.56%	4.00	0.84	21.00%	Delete
Q16	3.78	0.88	23.25%	3.72	0.89	24.04%	3.75	0.79	21.08%	Delete
Q17	4.28	0.57	13.43%	4.22	0.65	15.32%	4.25	0.55	12.92%	Retain

Q18	4.28	0.75	17.58%	4.11	0.68	16.45%	4.19	0.67	15.91%	Reservation
Q19	4.56	0.62	13.52%	4.39	0.61	13.85%	4.47	0.55	12.41%	Delete
Q20	4.28	0.75	17.58%	4.11	0.68	16.45%	4.19	0.69	16.43%	Delete
Q21	3.78	0.73	19.38%	3.50	0.92	26.39%	3.64	0.72	19.89%	Delete
Q22	4.33	0.69	15.83%	4.06	0.73	17.89%	4.19	0.62	14.82%	Reservations
Q23	3.89	0.90	23.15%	3.78	0.81	21.40%	3.83	0.80	20.98%	Delete
Q24	4.28	0.67	15.64%	4.22	0.65	15.32%	4.25	0.60	14.12%	Reservations
Q25	4.17	0.71	16.97%	3.94	0.64	16.20%	4.06	0.62	15.18%	Reservations
Q26	4.22	0.73	17.34%	4.06	0.73	17.89%	4.14	0.70	16.99%	Delete
Q27	3.89	0.90	23.15%	3.44	0.86	24.84%	3.67	0.59	16.20%	Delete
Q28	4.39	0.70	15.90%	4.28	0.67	15.64%	4.33	0.59	13.71%	Reservation
Q29	3.89	0.76	19.50%	3.56	0.92	25.92%	3.72	0.73	19.67%	Delete
Q30	3.94	0.64	16.20%	3.61	0.98	27.10%	3.78	0.71	18.84%	Delete
Q31	4.22	0.88	20.80%	4.06	0.87	21.52%	4.14	0.84	20.22%	Retain, optimize expression
Q32	3.72	0.89	24.04%	3.67	0.97	26.46%	3.69	0.88	23.73%	Delete
Q33	3.78	0.88	23.25%	3.89	0.90	23.15%	3.83	0.82	21.46%	Delete
Q34	4.17	0.99	23.64%	4.11	0.90	21.90%	4.14	0.85	20.64%	Delete
Q35	4.06	0.87	21.52%	3.39	0.85	25.08%	3.72	0.67	17.98%	Delete
Q36	4.11	0.90	21.90%	3.94	0.87	22.12%	4.03	0.81	20.18%	Delete
Q37	4.17	0.92	22.17%	4.11	0.83	20.25%	4.14	0.85	20.64%	Retain
Q38	4.22	0.73	17.34%	3.94	0.80	20.34%	4.08	0.73	17.94%	Delete
Q39	4.39	0.70	15.90%	4.06	0.64	15.76%	4.22	0.62	14.77%	Delete
Q40	4.11	0.90	21.90%	3.89	0.90	23.15%	4.00	0.86	21.44%	Delete
Q41	4.33	0.59	13.71%	4.17	0.71	16.97%	4.25	0.62	14.69%	Reservation
Q42	4.28	0.57	13.43%	4.11	0.76	18.45%	4.19	0.64	15.37%	Reservations
Q43	4.28	0.57	13.43%	4.11	0.68	16.45%	4.19	0.60	14.25%	Reservations
Q44	4.11	0.68	16.45%	4.11	0.58	14.18%	4.11	0.61	14.78%	Reservations
Q45	3.94	0.80	20.34%	3.67	0.97	26.46%	3.81	0.75	19.72%	Delete
Q46	4.06	0.87	21.52%	3.94	0.87	22.12%	4.00	0.80	20.11%	Delete
Q47	3.83	1.04	27.21%	3.72	0.96	25.74%	3.78	0.99	26.17%	Delete
Q48	4.00	0.84	21.00%	3.83	0.92	24.09%	3.92	0.84	21.56%	Delete
Q49	4.06	0.87	21.52%	4.00	0.84	21.00%	4.03	0.83	20.63%	Delete
Q50	4.06	0.87	21.52%	4.06	0.87	21.52%	4.06	0.86	21.10%	Delete
Q51	4.00	0.91	22.69%	3.72	0.83	22.20%	3.86	0.72	18.74%	Delete
Q52	4.11	0.76	18.45%	3.94	0.80	20.34%	4.03	0.76	18.79%	Retain

Q53	4.17	0.79	18.86%	4.11	0.76	18.45%	4.14	0.76	18.44%	Delete
Q54	4.00	0.77	19.17%	3.56	0.86	24.06%	3.78	0.75	19.90%	Delete
Q55	3.78	0.65	17.12%	3.67	0.91	24.75%	3.72	0.69	18.56%	Delete

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Annex E: Expert Ratings in the Second Delphi Round for Scale Dimensions and Entries

Entry	Importance			Appropriateness			Overall		
	$\bar{X}$	s	CV	$\bar{X}$	s	CV	$\bar{X}$	s	CV
Q1	4.89	0.32	6.61%	4.06	0.73	17.89%	4.47	0.32	7.15%
Q2	4.17	0.71	16.97%	5.00	0.00	0.00%	4.58	0.35	7.71%
Q3	4.11	0.76	18.45%	4.94	0.24	4.77%	4.53	0.36	8.01%
Q4	4.11	0.76	18.45%	4.06	0.80	19.78%	4.08	0.49	12.06%
Q5	4.11	0.76	18.45%	4.89	0.32	6.61%	4.50	0.42	9.34%
Q6	5.00	0.00	0.00%	4.83	0.38	7.93%	4.92	0.19	3.90%
Q7	4.94	0.24	4.77%	4.06	0.73	17.89%	4.50	0.38	8.52%
Q8	4.11	0.68	16.45%	4.06	0.73	17.89%	4.08	0.46	11.31%
Q9	4.11	0.68	16.45%	4.06	0.73	17.89%	4.08	0.43	10.50%
Q10	4.83	0.38	7.93%	5.00	0.00	0.00%	4.92	0.19	3.90%
Q11	4.94	0.24	4.77%	4.83	0.51	10.64%	4.89	0.27	5.61%
Q12	5.00	0.00	0.00%	4.89	0.32	6.61%	4.94	0.16	3.27%
Q13	5.00	0.00	0.00%	4.89	0.32	6.61%	4.94	0.16	3.27%
Q14	4.78	0.55	11.48%	4.94	0.24	4.77%	4.86	0.29	5.91%
Q15	4.28	0.75	17.58%	5.00	0.00	0.00%	4.64	0.38	8.10%
Q16	4.17	0.71	16.97%	4.00	0.59	14.85%	4.08	0.55	13.45%
Q17	4.89	0.32	6.61%	4.06	0.80	19.78%	4.47	0.47	10.48%
Q18	4.94	0.24	4.77%	4.89	0.32	6.61%	4.92	0.19	3.90%
Q19	4.22	0.65	15.32%	4.06	0.73	17.89%	4.14	0.51	12.30%
Q20	4.17	0.79	18.86%	4.11	0.83	20.25%	4.14	0.54	12.98%
Q21	4.89	0.32	6.61%	4.00	0.77	19.17%	4.44	0.45	10.13%
Q22	4.11	0.68	16.45%	4.17	0.79	18.86%	4.14	0.51	12.30%
Q23	5.00	0.00	0.00%	4.89	0.32	6.61%	4.94	0.16	3.27%
Q24	4.83	0.38	7.93%	5.00	0.00	0.00%	4.92	0.19	3.90%
Q25	4.94	0.24	4.77%	5.00	0.00	0.00%	4.97	0.12	2.37%
Q26	4.11	0.76	18.45%	4.17	0.79	18.86%	4.14	0.38	9.08%

Q27	4.11	0.76	18.45%	4.11	0.76	18.45%	4.11	0.56	13.55%
Q28	4.17	0.79	18.86%	4.22	0.81	19.15%	4.19	0.60	14.25%

Annex F: Harmonization Coefficients and Test Results for Two Rounds of Delphi Consultation

Enquiry	Evaluation	Kendall's Coefficient of Coordination (W)	χ^2	P Value
First round	Importance Rating	0.11	104.20	<0.001
	Appropriateness Rating	0.13	128.67	<0.001
Second round	Importance Rating	0.39	189.64	<0.001
	Appropriateness Rating	0.42	205.31	<0.001

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Annex G: Knowledge Management Capability Scale for Chinese Hospitals

Please select the most appropriate option for each question based on your personal experience. This questionnaire is anonymous and ensures your privacy. In this survey, 'knowledge' refers to any skill or information that can be used for decision-making and problem-solving. Knowledge management is the process of acquiring, storing, transferring, sharing, applying and innovating knowledge to promote organizational innovation and competitiveness through the transformation of personal experience and organizational knowledge.

(Options: 1. Strongly disagree; 2. Disagree; 3. Uncertain; 4. Agree; 5. Strongly agree)

	Entry
1	My hospital has established an effective knowledge management system to collect, categorize, store and retrieve knowledge.
2	My hospital has the hardware, software, networks and databases to support collaboration among staff.
3	My hospital has the hardware, software, networks and databases in place to support collaboration between staff and external parties.
4	My hospital has the technology to enable employees in different workplaces to participate in the same study or training program.
5	My hospital has the technology to support staff in retrieving and accessing new knowledge in the health sector.
6	My hospital has a system for training and continuing education.
7	My hospital has systems in place for academic exchanges and collaborations.
8	My hospital has a system of incentives for knowledge sharing (e.g. teaching incentives, training incentives)
9	My hospital has established incentives for innovation (e.g., invention incentives, research incentives, incentives to develop new technologies and projects).
10	My colleagues understand the importance of knowledge in the development of the hospital.
11	My colleagues expect a high level of involvement in the acquisition, translation and application of knowledge.
12	My hospital places a strong emphasis on staff training and learning.
13	My colleagues are rewarded, recognized or offered better career prospects for their individual expertise.
14	My hospital's overall vision and goals are clear.
15	In my hospital, senior management explicitly emphasizes the role of knowledge in the hospital's development.
16	My hospital is capable of developing new technologies based on existing ones.
17	My hospital regularly evaluates the quality of healthcare to identify strengths and weaknesses.
18	My hospital has measures in place to proactively collect feedback from patients.
19	My hospital has measures in place to proactively acquire knowledge about the state-of-the-art of health services in the industry.
20	My hospital has measures in place to transfer knowledge from the hospital to individual staff members (e.g., mentoring, training, rotations,).
21	My hospital has measures in place to facilitate the transfer of knowledge from individual staff members to the insitiutional (e.g., experience sharing, expert mentoring, launching new programs).
22	My hospital has measures in place to convert peer knowledge into insitiutional knowledge (e.g., introduction of technology).

23	My hospital has measures to learn from mistakes or experiences and apply those lessons.
24	My hospital is able to update and revise treatment protocols, operating procedures and work instructions based on the latest knowledge.
25	My hospital is able to solve complex and difficult problems through multidisciplinary collaboration.
26	My hospital is able to synthesize and analyze information on patient needs, technological developments, and industry trends.
27	My hospital utilizes encryption technology, firewalls, intrusion detection systems, access controls, and other measures to prevent unauthorized access to knowledge.
28	My hospital has intellectual property protection measures (e.g., contractual protection, patent protection)

Annex H: Reliability of the Dimensions of the Chinese Hospital Knowledge Scale

Scale	Dimension	Corresponding Entries	Cronbach α
Knowledge Infrastructure Capabilities (KIC)	Technological Foundations	1-5	0.895
	Structural Foundations	6-9	0.953
	Cultural Foundations	10-15	0.969
Knowledge Process Capabilities (KPC)	Acquisition Processes	16-19	0.896
	Transformation Processes	20-22	0.909
	Application Processes	23-26	0.926
	Conservation Processes	27-28	0.788

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Annex I: Questionnaire on KMCs and Physician Satisfaction in Chinese MCHIs

This questionnaire is anonymous and your privacy will be fully protected. Your responses will contribute to our study on knowledge management capabilities and physician satisfaction in Chinese maternal and child healthcare institutions. Thank you for your participation!

Part I: Basic Information
1.Name of the hospital:
2.Department: _____
3.Years of working experience: _____ years
4.Gender: ① Male ② Female
5. Age: _____ years
6. Education: ① Bachelor's Degree or below ② Master's Degree ③ Doctor's Degree
7. Title: ① Junior and below ② Intermediate ③ Associate ④ Senior
8. Position: ① no position ② department head / ward head
9. Average monthly income (Yuan): ①≤15000 ②15001~20000 ③>20000
10. night shift (times / month): ① <4 ② ≥4
11. Weekly working hours: ① ≤40 hours ②>40 hours

Part II: Hospital Knowledge Management Capabilities
In this survey, 'knowledge' refers to any skill or information that can be used for decision-making and problem-solving. Knowledge management is the process of acquiring, storing, transferring, sharing, applying and innovating knowledge to promote organizational innovation and competitiveness through the transformation of personal experience and organizational knowledge. Please select the option that best reflects your personal situation from the following options: 1. Strongly disagree; 2. Disagree; 3. Uncertain; 4. Agree; 5. Strongly agree.

	Entry
1	My hospital has established an effective knowledge management system to collect, categorize, store and retrieve knowledge.
2	My hospital has the hardware, software, networks and databases to support collaboration among staff.
3	My hospital has the hardware, software, networks and databases in place to support collaboration between staff and external parties.
4	My hospital has the technology in place to enable employees in different workplaces to participate in the same study or training program.
5	My hospital has the technology in place to support staff in retrieving and accessing new knowledge in the health sector.
6	My hospital has a system for training and continuing education system in place.
7	My hospital has systems in place for academic exchanges and collaborations.
8	My hospital has a system of incentives for knowledge sharing (e.g. teaching incentives, training incentives)
9	My hospital has established incentives for innovation (e.g., invention incentives, research incentives, incentives to develop new technologies and projects).
10	My colleagues understand the importance of knowledge in the development of the hospital.
11	My colleagues expect a high level of involvement in the acquisition, translation and application

	of knowledge.
12	My hospital places a strong emphasis on staff training and learning
13	My colleagues are rewarded, recognized or offered better career prospects for their individual expertise
14	My hospital's overall vision and goals are clear
15	In my hospital, senior management explicitly emphasizes the role of knowledge in the development of the hospital
16	My hospital is capable of developing new technologies based on existing ones.
17	My hospital regularly evaluates the quality of healthcare to identify strengths and weaknesses.
18	My hospital has measures in place to proactively collect feedback from patients.
19	My hospital has measures in place to proactively acquire knowledge about the state-of-the-art of health services in the industry.
20	My hospital has measures in place to transfer knowledge from the hospital to individual staff members (e.g., mentoring, training, rotations,).
21	My hospital has measures in place to facilitate the transfer of knowledge from individual staff members to the insitiutional (e.g., experience sharing, expert mentoring , launching new programs,.).
22	My hospital has measures in place to convert peer knowledge into insitiutional knowledge (e.g., introduction of technology).
23	My hospital has measures to learn from mistakes or experiences and apply those lessons.
24	My hospital is able to update and revise treatment protocols, operating procedures and work instructions based on the latest knowledge.
25	My hospital is able to solve complex and difficult problems through multidisciplinary collaboration.
26	My hospital is able to synthesize and analyze information on patient needs, technological developments, and industry trends.
27	My hospital utilizes encryption technology, firewalls, intrusion detection systems, access controls and other measures to prevent unauthorized access to knowledge.
28	My hospital has intellectual property protection measures (e.g., contractual protection, patent protection.)

Part III Job Satisfaction

Please select the option that best matches your satisfaction with your current job from the job status evaluation questions below. (Options: 1. very dissatisfied; 2. dissatisfied; 3. neutral; 4. satisfied; 5. very satisfied)

	Entry
1	The extent to which my work keeps me engaged.
2	Opportunities at work to perform tasks independently.
3	Frequent chances to take on diverse tasks.
4	The opportunity to collaborate as part of a team.
5	The attitude of management towards staff.
6	The competence of managers in decision-making.
7	The ability to perform tasks that align with my personal values.
8	The job's provision of steady employment.
9	The opportunity to assist others in the workplace.
10	The opportunity to organize tasks for others.
11	The chance to utilize my abilities in my role.
12	The implementation of unit policies in practice.
13	The compensation I receive for my work.
14	Opportunities for career advancement.
15	Opportunities to apply my judgment.
16	Opportunities to work in a manner that suits me.
17	The working conditions and environment.
18	The relationships among coworkers.
19	Recognition for a job well done.

20	The sense of fulfillment derived from my work.

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Annex J: Factor Loadings and Path Coefficients of KMCs on the IS of Physicians in Chinese MCHIs

Dependent	Relationship	Independent	Standardized Coefficient	Path	SE	Z	P-value
	=~	Q1	0.65		0.033	19.915	< 0.001
	=~	Q2	0.852		0.018	46.69	< 0.001
Technology	=~	Q3	0.843		0.019	44.415	< 0.001
	=~	Q4	0.732		0.027	27.275	< 0.001
	=~	Q5	0.836		0.019	44.17	< 0.001
	=~	Q6	0.718		0.028	25.515	< 0.001
Structure	=~	Q7	0.765		0.024	31.296	< 0.001
	=~	Q8	0.805		0.021	37.47	< 0.001
	=~	Q9	0.776		0.024	32.77	< 0.001
	=~	Q10	0.765		0.023	33.165	< 0.001
	=~	Q11	0.68		0.029	23.077	< 0.001
Culture	=~	Q12	0.83		0.018	46.593	< 0.001
	=~	Q13	0.851		0.016	53.322	< 0.001
	=~	Q14	0.842		0.017	50.016	< 0.001
	=~	Q15	0.825		0.018	45.056	< 0.001
	=~	Q16	0.819		0.019	44	< 0.001
Acquisition	=~	Q17	0.842		0.017	50.211	< 0.001
	=~	Q18	0.729		0.026	28.139	< 0.001
	=~	Q19	0.883		0.013	65.97	< 0.001
	=~	Q20	0.852		0.016	52.55	< 0.001
Conversion	=~	Q21	0.87		0.015	56.304	< 0.001
	=~	Q22	0.876		0.015	58.733	< 0.001
	=~	Q23	0.838		0.017	49.218	< 0.001
Application	=~	Q24	0.886		0.013	68.404	< 0.001
	=~	Q25	0.819		0.019	43.609	< 0.001
	=~	Q26	0.832		0.018	46.996	< 0.001
Protection	=~	Q27	0.86		0.02	43.184	< 0.001
	=~	Q28	0.862		0.02	43.562	< 0.001
	=~	Technology	0.894		0.016	56.464	< 0.001
KIC	=~	Structure	0.959		0.013	73.215	< 0.001
	=~	Culture	0.995		0.008	127.996	< 0.001
	=~	Acquisition	0.992		0.007	132.481	< 0.001
KPC	=~	Conversion	0.985		0.009	105.845	< 0.001
	=~	Application	0.987		0.007	135.583	< 0.001
	=~	Protection	0.855		0.021	41.003	< 0.001
IS	~	KIC	0.798		0.151	5.289	< 0.001
IS	~	KPC	0.003		0.153	0.022	0.982
KIC	~~	KPC	0.946		0.009	101.668	<0.001

Note: =~ denotes the factor loading relationship (i.e., the measurement relationship between latent variables and observed variables), ~ indicates the path relationship (i.e., the causal or associative path between latent variables), and ~~ signifies the correlation relationship.

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Annex K: Factor Loadings and Path Coefficients of KMCs on the ES of Physicians in Chinese MCHIs

Dependent	Relationship	Independent	Standardized path coefficient	SE	Z	P-value
	=~	Q1	0.652	0.033	20.015	< 0.001
	=~	Q2	0.852	0.018	46.717	< 0.001
Technology	=~	Q3	0.844	0.019	44.521	< 0.001
	=~	Q4	0.731	0.027	27.154	< 0.001
	=~	Q5	0.835	0.019	43.966	< 0.001
	=~	Q6	0.72	0.028	25.627	< 0.001
Structure	=~	Q7	0.766	0.024	31.281	< 0.001
	=~	Q8	0.805	0.022	37.343	< 0.001
	=~	Q9	0.775	0.024	32.633	< 0.001
	=~	Q10	0.766	0.023	33.264	< 0.001
	=~	Q11	0.681	0.029	23.175	< 0.001
Culture	=~	Q12	0.83	0.018	46.523	< 0.001
	=~	Q13	0.853	0.016	53.678	< 0.001
	=~	Q14	0.84	0.017	49.226	< 0.001
	=~	Q15	0.824	0.018	44.677	< 0.001
	=~	Q16	0.819	0.019	44.04	< 0.001
Acquisition	=~	Q17	0.842	0.017	50.273	< 0.001
	=~	Q18	0.729	0.026	28.115	< 0.001
	=~	Q19	0.882	0.013	65.891	< 0.001
	=~	Q20	0.852	0.016	52.641	< 0.001
Conversion	=~	Q21	0.869	0.015	56.124	< 0.001
	=~	Q22	0.876	0.015	58.738	< 0.001
	=~	Q23	0.839	0.017	49.347	< 0.001
Application	=~	Q24	0.887	0.013	68.528	< 0.001
	=~	Q25	0.819	0.019	43.538	< 0.001
	=~	Q26	0.831	0.018	46.831	< 0.001
Protection	=~	Q27	0.86	0.02	43.186	< 0.001
	=~	Q28	0.862	0.02	43.523	< 0.001
	=~	Technology	0.893	0.016	55.95	< 0.001
KIC	=~	Structure	0.959	0.013	72.572	< 0.001
	=~	Culture	0.996	0.008	126.983	< 0.001
	=~	Acquisition	0.992	0.007	132.545	< 0.001
KPC	=~	Conversion	0.985	0.009	105.934	< 0.001
	=~	Application	0.987	0.007	135.596	< 0.001
	=~	Protection	0.855	0.021	40.944	< 0.001
ES	~	KIC	0.672	0.16	4.2	< 0.001
ES	~	KPC	0.085	0.161	0.527	0.598
KIC	~~	KPC	0.946	0.009	101.710	<0.001

Note: =~ denotes the factor loading relationship (i.e., the measurement relationship between latent variables and observed variables), ~ indicates the path relationship (i.e., the causal or associative path between latent variables), and ~~ signifies the correlation relationship.

Annex L: Factor Loadings and Path Coefficients of KMCs on the GS of Physicians in Chinese MCHIs

Dependent	Relationship	Independent	Standardized path coefficient	SE	Z	*P*-value
Technology	=~	Q1	0.651	0.033	19.966	< 0.001
	=~	Q2	0.852	0.018	46.751	< 0.001
	=~	Q3	0.844	0.019	44.494	< 0.001
	=~	Q4	0.732	0.027	27.249	< 0.001
	=~	Q5	0.835	0.019	43.996	< 0.001
	=~	Q6	0.72	0.028	25.617	< 0.001
Structure	=~	Q7	0.766	0.024	31.319	< 0.001
	=~	Q8	0.805	0.022	37.381	< 0.001
	=~	Q9	0.775	0.024	32.668	< 0.001
	=~	Q10	0.765	0.023	33.082	< 0.001
Culture	=~	Q11	0.680	0.029	23.105	< 0.001
	=~	Q12	0.830	0.018	46.700	< 0.001
	=~	Q13	0.852	0.016	53.536	< 0.001
	=~	Q14	0.841	0.017	49.626	< 0.001
	=~	Q15	0.825	0.018	45.024	< 0.001
Acquisition	=~	Q16	0.819	0.019	44.044	< 0.001
	=~	Q17	0.842	0.017	50.222	< 0.001
	=~	Q18	0.729	0.026	28.099	< 0.001
	=~	Q19	0.882	0.013	65.933	< 0.001
Conversion	=~	Q20	0.852	0.016	52.528	< 0.001
	=~	Q21	0.870	0.015	56.298	< 0.001
	=~	Q22	0.877	0.015	58.859	< 0.001
Application	=~	Q23	0.839	0.017	49.355	< 0.001
	=~	Q24	0.887	0.013	68.480	< 0.001
	=~	Q25	0.819	0.019	43.516	< 0.001
	=~	Q26	0.831	0.018	46.896	< 0.001
Protection	=~	Q27	0.860	0.020	43.171	< 0.001
	=~	Q28	0.862	0.020	43.528	< 0.001
KIC	=~	Technology	0.894	0.016	56.271	< 0.001
	=~	Structure	0.959	0.013	72.876	< 0.001
	=~	Culture	0.995	0.008	127.974	< 0.001
	=~	Acquisition	0.992	0.007	132.445	< 0.001
KPC	=~	Conversion	0.985	0.009	106.009	< 0.001
	=~	Application	0.987	0.007	135.734	< 0.001
	=~	Protection	0.855	0.021	40.926	< 0.001
GS	~	KIC	0.750	0.150	4.985	< 0.001
GS	~	KPC	0.050	0.152	0.328	0.743
KIC	~~	KPC	0.946	0.009	101.718	<0.001

Note: =~ denotes the factor loading relationship (i.e., the measurement relationship between latent variables and observed variables), ~ indicates the path relationship (i.e., the causal or associative path between latent variables), and ~~ signifies the correlation relationship.