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The Influence of Hospital Department Culture on Physicians' Job Satisfaction—An Empirical Study

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Doctor of Management

Supervisor:
PhD Nelson António, Professor,
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Jury:

PhD Renato Telo de Freitas Barbosa Pereira, Assistant Professor,
ISCTE University Institute of Lisbon
PhD Fernando Teixeira, , Adjunct Professor,
Instituto Politécnico de Beja
PhD Alvaro Rosa, Associate Professor with Habilitation,
ISCTE University Institute of Lisbon
PhD Wang Dong, Professor,
South Medical University
PhD Nelson António, Retired Full Professor,
ISCTE University Institute of Lisbon

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Declaration

I declare that this thesis does not incorporate without acknowledgment any material previously submitted for a degree or diploma in any university and that to the best of my knowledge it does not contain any material previously published or written by another person except where due reference is made in the text.

Signed: 赵彩莲 Date: 03.08, 2021

Name: Zhao Cailian

作者申明

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作者签名：赵彩莲 日期：2021年3月8日

姓名(拼音)：Zhao Cailian

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Abstract

Recently, with the development of economy and the innovation of science and technology in society, the competition in the medical market is becoming increasingly fierce, and human resources are becoming more and more important. The maximum development and utilization of human resources has become an important method to improve the core competitiveness of hospitals. With the continuous improvement of hospital management level, the status and importance of hospital culture has become increasingly prominent. Department culture is not only the foundation and key part of hospital culture, but also is a strong embodiment of hospital culture. Effective construction of department cultures, improvement of the job satisfaction of medical staff and promotion of the quality of medical work are of great significance to improve a hospital’s social and economic benefits.

In theory, the study of hospital department culture brings a new perspective to the research of traditional hospital human resources. In practice, it provides a new angle for hospital managers to develop higher-level medical staff. Therefore, research necessarily requires the integration of hospital department culture with physicians' job satisfaction.

Based on the relevant theories of hospital department cultures and physicians' job satisfaction, this thesis takes Grade-A tertiary hospitals in Hangzhou, China as examples, conceives and designs hospital department culture, designs and tests the measurement subscales of hospital department culture, introduces two mediating variables, namely professional identity and work engagement, and carries out research in the influence mechanism of hospital department culture on physicians' job satisfaction. Through questionnaire surveys and interviews of staff from some Grade-A tertiary hospitals, for instance, the First Affiliated Hospital of Medical College of Zhejiang University of China, model tests and data analysis are carried out for the proposed hypothesis. Finally, the following conclusions are drawn: hospital department culture is composed of material culture, behavior culture, system culture, spiritual culture and innovation culture; hospital department culture can significantly affect work engagement, professional identity and job satisfaction; work engagement plays a significant role in the intermediary relationship between hospital department culture and physicians' job satisfaction, and there is no necessary mediating effect of professional identity on hospital department culture and physicians' job satisfaction.

Keywords: hospital department culture, work engagement, professional identity, job satisfaction
JEL: I19, Y40

Resumo

Nos últimos anos, com o avanço da economia e a inovação da tecnologia, a competição no mercado médico se torna cada vez mais renhida e os recursos humanos constituem um recurso cada dia mais importante. Desenvolver e utilizar maximamente os recursos humanos é uma medida crucial para o aumento da competitividade essencial do hospital. A cultura do hospital desempenha um papel relevante no aumento do nível de gestão hospitalar enquanto que a cultural departamental que é considerada como a parte fundamental e importante da cultura do hospital é apresentação e aprofundamento da cultura hospitalar. O reforço da construção da cultura departamental, a elevação da satisfação profissional dos trabalhadores médicos e a promoção da qualidade dos trabalhos médicos se revestem de um significado considerável para aumentar a eficiência socioeconômica do hospital.

O estudo sobre a cultura departamental do hospital serve como uma nova perspectiva, na teoria, para os estudos tradicionais relacionados com os recursos humanos do hospital e, por outro lado, na prática, proporciona um novo ângulo para os gestores hospitalares administrarem e desenvolverem profissionais médicos de alto nível. Portanto, é necessário realizar estudos com base na combinação da cultura departamental hospitalar e satisfação profissional dos médicos.

Fundamentado na base teórica associada à cultura departamental do hospital e à satisfação dos médicos em relação ao trabalho, este estudo, tomando como exemplo um hospital de excelência da cidade de Hangzhou, China, trata da influência exercida pela cultura do hospital na satisfação profissional dos médicos por meio da construção e concepção da cultura departamental, da elaboração dos parâmetros de avaliação da cultura departamental e da introdução de duas variáveis mediadoras, ou seja, a identidade profissional e a dedicação ao trabalho. Através de questionários e entrevistas realizadas no Hospital Nº 1, afiliado à Faculdade de Medicina da Universidade de Zhejiang, a hipótese foi avaliada em modelos e os dados foram analisados. Foram obtidas as seguintes conclusões: (1) a cultura departamental do hospital é composta por cultura material, cultura acional, cultura institucional, cultura espiritual e cultura inovadora; (2) a cultura departamental exerce grande influência na dedicação ao trabalho, na identificação profissional e na satisfação em relação ao trabalho; (3) a dedicação ao trabalho faz um papel intermediário significativo na correlação entre a cultura departamental

e a satisfação no trabalho enquanto a identificação profissional não possui a mesma função na relação entre eles.

Palavras-chave: cultura departamental do hospital, dedicação ao trabalho, identificação profissional, satisfação no trabalho

JEL: I19, Y40

摘 要

近年来，随着时代经济的发展和社会科技的创新，医疗市场竞争日益加剧，人力资源变得越来越重要。最大程度的开发和利用人力资源已经成为提高医院核心竞争力的重要方法。随着医院管理水平不断提高，医院文化的地位和重要性日益突出，科室文化是医院文化的基础和重要组成，是医院文化的体现及深化。加强医院科室文化建设，提升医务人员工作满意度，改善医疗工作质量，对提高医院的社会效益和经济效益有着十分重要意义。

研究医院科室文化，理论上为传统医院人力资源研究增加一个新的角度，实践上为医院管理者提供新的视角来管理和开发更高水平的医务工作者。因此，十分有必要将医院科室文化与医生的工作满意度结合起来进行研究。

本研究立足于医院科室文化和医生工作满意度的相关理论，以中国杭州三甲医院为例，构思和设计医院科室文化，设计和检验医院科室文化测量分量表，引入职业认同和工作投入两个中介变量，开展医院科室文化对医生工作满意度的影响机理研究。通过对中国浙江大学医学院附属第一医院等三甲医院的问卷调查及访谈，对提出的假设进行模型检验、数据分析。最终得出以下结论：医院科室文化由物质文化、行为文化、制度文化、精神文化和创新文化构成；医院科室文化会显著影响工作投入、职业认同和工作满意度；工作投入在医院科室文化与医生工作满意度的中介关系中具有显著作用，但职业认同在医院科室文化与医生工作满意度之间没有必然的中介作用。

关键词：医院科室文化，工作投入，职业认同，工作满意度

JEL: I19, Y40

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I have been a medical administrator over the years, going through a tortuous course of learning and improvement. Still with all respect and admiration for knowledge and study, I enrolled in further education for my doctoral degree. I dare not to be sluggish in learning theories and pursue truth in practice.

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Though I have been in this industry for many years, I may not avoid all mistakes or errors in the thesis due to lack of sound foundation in theories. I would say these are all mine and welcome corrections from readers.

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从事医务管理工作风风雨雨年,带着对学问的崇敬,又走进科学殿堂,作为博士研究生,在理论与实践上勤学苦研,不敢懈怠。

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尽管有多年医务工作实践经历,但理论功底欠缺,论文难免偏颇之处,恳请批评指正。

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Contents

List of Tables

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List of Figures

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List of Abbreviations

AGFI: Adjusted Goodness-of Fit Index

AVE: Average Variance Extraction

CFI: Comparative Fit Index

CR: Composite Reliability

CITC: Corrected Item-total Correlation

df: degree of freedom

GFI: Goodness-of-fit Index

NHC: National Health Commission

NHM: National Health Ministry

RMR: Root Mean-square Residual

RMSEA: Root Mean Square Error of Approximation

SEM: Structural Equation Modelling

SFL: Standardised Factor Loading

TLI: Tucker-Lewis Index

MC: Material Culture

BC: Behaviour Culture

PC: Policy Culture

SC: Spiritual Culture

IC: Innovation Culture

DC: Department Culture

WE: Work Engagement

PI: Professional Identity

POB: Positive Organizational Behavior

JS: Job Satisfaction

WJX: Wen Juan Xing

TCM: Traditional Chinese Medicine

ENT: Ear-Nose-Throat

SICMH: Statistics Information Centre of Ministry of Health

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Chapter 1: Overview

1.1 Introduction

1.1.1 Research background

As the economy is growing, humans have become a critical part of resources. How to leverage this resource to a larger extent to enhance the core competitiveness of a hospital is of great strategic significance. The notion of "human-centered mindset" is gaining traction and the administrators in hospitals increasingly realize that staff satisfaction exerts a big impact on work efficiency. There are many factors contributing to staff satisfaction, and the impact of department cultures in hospitals is obvious (Zhang et al., 2014). This kind of culture is a culture stemming from an organization, and it has features like cohesion, guidance, cultivation, restraint and incentives. A sound department culture plays an important role in that it helps to raise the management level, competitiveness and reputation of a hospital (Xing, 2016, 2017). Therefore, more and more hospital administrators start to pay attention to the building of department culture by which to improve the job satisfaction of staff and accordingly the performance of the hospital in general, in the hope of bringing competitiveness to the organization.

The culture in different departments of hospitals is defined as stable special values and spirit that take shape and evolve in the process of providing healthcare services, and these values and spirit embody ethics, morality, code of conduct, mindset, new concepts in service sector as well as traditions from the hospital. It is the deep driving force for the sustained, stable and healthy development of a department, and it is also a reflection of the core competitiveness of the department. As an indispensable part of the contemporary hospital management theory, the hospital department culture can unify the various forces within the department under the guidance of common concepts, gather all staff together towards a common goal, and promote the comprehensive development of the department. Of course, the hospital department culture will be influenced by the national health policy, the hospital size and the hospital management system. Usually, the department culture in hospitals consist of spiritual culture, management and policy culture, behavioral culture and material culture. Among them, the spiritual culture is at the core of the department culture. It is composed of values and ethics of staff from the

department, and mission and vision of the hospital and other ideologies. Management and policy culture encompass the consciousness and philosophies of people, and it is the major form of spiritual culture as it includes the leadership mechanism, organizational structure and management policies. Behavioral culture comprises the mental attitude and inter-personal dynamics of staff in the department, and it consists of cultural phenomena such as hospital operations, training, publicity work, recreational and entertainment activities and inter-personal relations. The material culture is the most extended part of the department culture. It is the basis for people to directly feel and intuitively practice, mainly including the hospital physical appearance, hospital logo, hospital song, cultural communication network (Wang, 2013).

Competition among hospitals does not only occur in terms of economic indicators; competition happens in the sphere of superstructure as well, such as department culture. If the physicians' sense of service is quantified and built into the unique entity of a hospital, sustainable development of the hospital can be achieved. Being able to do this is at the core of modern hospital management. The building of department culture in hospitals is in the exploratory stages, and this systematic task warrants long and arduous efforts of all those interested in this topic. In the long-term practice, hospital administrators must build a good hospital department culture with "people-oriented" idea as the basic foothold (NHM, 2006), emphasizing the dominant position of physicians in medical activities, make every effort to mobilizing physicians' initiative, enthusiasm and creativity to carry out medical activities. The job satisfaction of employees is the core component of the "people-oriented" idea, so it is of great significance to pay attention to the job satisfaction of physicians (Zhang et al., 2014).

1.1.2 Theoretical background

The research into job satisfaction started in the 20th century. In the beginning of 20th century, the father of scientific management Taylor (1911) firstly proposed that raising the employees' salary would enhance their job satisfaction. In his famous book Job Satisfaction, Hoppock (1935) for the first time mentioned that "psychology and physical wellbeing could both affect job satisfaction, and job satisfaction is about the subjective perception of employees". He proposed various kinds of factors could impact job satisfaction, with which people can judge the management level of an organization. In the meantime, the study of job satisfaction could help the management to know the staff better to identify areas for improvement and make the right decisions. In recent years, more and more scholars pay attention to organizational culture and job satisfaction and start to explore the relationship between them. Schneider and Snyder (1975) collected empirical data showing the relationship between organizational culture and

job satisfaction. Kerego and Mthupha (1997) proposed that degree of satisfaction on the part of staff can be the basis for measuring organizational culture. Through a survey on 200 employees in a children protection organization, Sempane, Rieger, and Roodt (2002) found that the degree of satisfaction in employees of different levels was related closely to the organizational culture. Other studies and practices have shown that if the employees are satisfied with their work, they will invariably be more loyal to their organizations and work more proactively. On the contrary, if job satisfaction is low, staff will have low identification with the organization, and enthusiasm in work will decrease consequently (Shen, 2003). As more studies show that there is a phenomenon: job satisfaction of staff will influence the performance of businesses and personal engagement. "Human-centered mindset" centers around humans who could be patients as well as healthcare providers, but the latter is more often ignored in the promotion of this notion. Only if healthcare providers have better job satisfaction can they do a better job to serve the patients and ultimately the hospitals. Therefore, raising the job satisfaction of healthcare providers is a critical part of hospital management.

This research is based on the theory of hospital department culture and physicians' job satisfaction, taking a university affiliated hospital in China as an example, by constructing hospital department cultural and introducing two intermediary variables of professional identity and work involvement, to discuss the impact of hospital department culture to physicians' job satisfaction. It will provide effective and reliable assessment tools for diagnosing organizational culture in Chinese hospitals in the future and provide decision-making basis for health policy makers and hospital administrators.

1.2 Dilemma and research questions

1.2.1 Dilemma

With the liberalizing of the medical market, public-private joint venture hospitals and private hospitals have sprung up, attracting a large number of physicians from public hospitals. The competition between hospitals lies in the competition for talent and service quality. Due to the special nature of the medical industry, the medical talents require long period of education and high training costs. At the same time, physicians often face high occupational pressures and risks. Especially in recent years, violence against physicians occurred frequently, while the rights and interests of physicians have not been effectively guaranteed. As a result, physicians are not satisfied with their work, their mental burnout is becoming more and more serious, and

the situation of leaving or even giving up medicine is severe. Hospital culture in general increasingly influences job satisfaction. As a form of organizational culture, hospital culture has functions such as cohesion, directionality, discipline, regulation and incentives. just like corporate cultures do in businesses. A positive department culture is conducive to the improvement of hospital management and reinforcing the competitiveness of staff. At the same time, how to mobilize the enthusiasm and initiative of physicians, improve the satisfaction of employees by studying the culture of hospital departments, and maximize the retention, development and utilization of human resources in public hospitals have become an important subject standing in front of hospital administrators and health industry leaders. And it is also an important measure to enhance the core competitiveness of a hospital.

1.2.2 Research questions

At present, the research on the impact of hospital department culture on physicians' job satisfaction is still in its infancy. This study refers to the results of relevant organizational culture research at home and abroad, the relevant literature on organization management and operation characteristics of hospitals, professional identification and work involvement, and the satisfaction of physicians, and raised the following questions:

(1) What are the components and dimensions of hospital department culture?

(2) How does hospital department culture affect physicians' job satisfaction?

(3) What factors are constrained by physicians' job satisfaction?

(4) What is the relationship between professional identity, work involvement and physician job satisfaction?

1.3 Purpose and methods

1.3.1 Research purpose

(1) This research plans to explore into the components and dimensions of department culture in hospitals against the backdrop of Chinese culture; to develop local scales for measuring department culture in hospitals, and to provide effective and reliable assessment tools for diagnosing organizational culture in hospitals in the future.

(2) This research plans to validate the degree of influence on job satisfaction from department culture in hospitals; to validate the proposition that improving department culture

in hospitals could enhance physicians' job satisfaction, which could provide theoretical reference for developing hospitals.

(3) This research is to validate whether professional identity and work engagement regulate or mediate the relationship between department culture in hospitals and physician's job satisfaction. The conclusion may provide basis for policy makers and hospital administrators to make decisions.

This research involves the fields of organizational behaviour, human resource management of medical and health institutions, and studies the concepts and contents of hospital department culture, work involvement, professional identity and physician job satisfaction.

1.3.2 Research methods

Based on the study purposes, the author first has carried out exploratory factor analysis and confirmatory factor analysis regarding the dimensional components of department culture in hospitals, and then has found that via work engagement and profession identity, department culture in hospitals directly impact job satisfaction.

The thesis is grounded in disciplines like management science, psychology, organization behaviourism. Empirical methods such in-depth interviews and questionnaires were used to explore into the concepts and dimensions of department cultures in hospitals in China. Scales were developed. On the basis of the work above, hypotheses were proposed. Then, with mature scales available and newly designed scales, the theoretical hypotheses were validated and analysed, with which conclusions were obtained.

The following four methods were used to study the relationship between department cultures in hospitals and physicians' job satisfaction.

1.3.2.1 Literature review

By going through books, researches, web pages and literature in other forms in Chinese journal website, CNKI, National Library of China and Wan Fang Databases, theories about department culture in hospitals, job satisfaction, personal engagement and professional identity were studied by the author; on that basis, the current situation and development trend of department cultures in China and abroad were studied, which helped to establish the study framework of this thesis. The theoretical basis and methods were collected. Meanwhile, the features of the healthcare industry were analysed comprehensively.

1.3.2.2 Interviews

Interviews are important means in collecting data either in quantitative or qualitative research. In constructing the dimensions of department culture in hospitals and developing the scales, the interview method was used in collecting data. On the basis of theoretical analysis, expert consultation and interviews were used to discuss and analyse influencing factors about physicians' job satisfaction. Theoretical models about department culture's impact on job satisfaction were established.

1.3.2.3 Questionnaires

First hand data can be obtained through questionnaires which ensure authenticity and reliability of empirical studies. Following the basic rules of questionnaires, the author designed, improved and completed the questionnaires in line with the study hypotheses. The questionnaires include the open questionnaire regarding the department culture in hospitals and the structured questions for validating the hypothetical models. The structured questions were modified on the basis of an initial version so as to improve the recollection rate, reliability and speed of answering; with these questions, a formal questionnaire was finalized.

1.3.2.4 Empirical analysis

This study took Structural Equation Model (SEM) for analysing data and used AMOS20 to validate the scales for different components and the hypotheses in the models. In empirical studies, SPSS22was used; the statistical analysis methods included descriptive statistics, variance analysis and correlation analysis.

1.4 Technical route and structural arrangement

1.4.1 Technical route

First, the components of department culture in hospitals were reconstructed on the basis of previous studies and the current situation in China and the structure of such cultures were further explored; Second, work engagement and professional identity were used as mediating variables and their impact on physicians' job satisfaction were analysed so that a better understanding of department culture in hospitals and physicians' job satisfaction can be obtained; Third, the newly established dimensions of the department culture in hospitals and their impact on physicians' job satisfaction were expounded. The technical route of the study is shown in Figure 1.1.

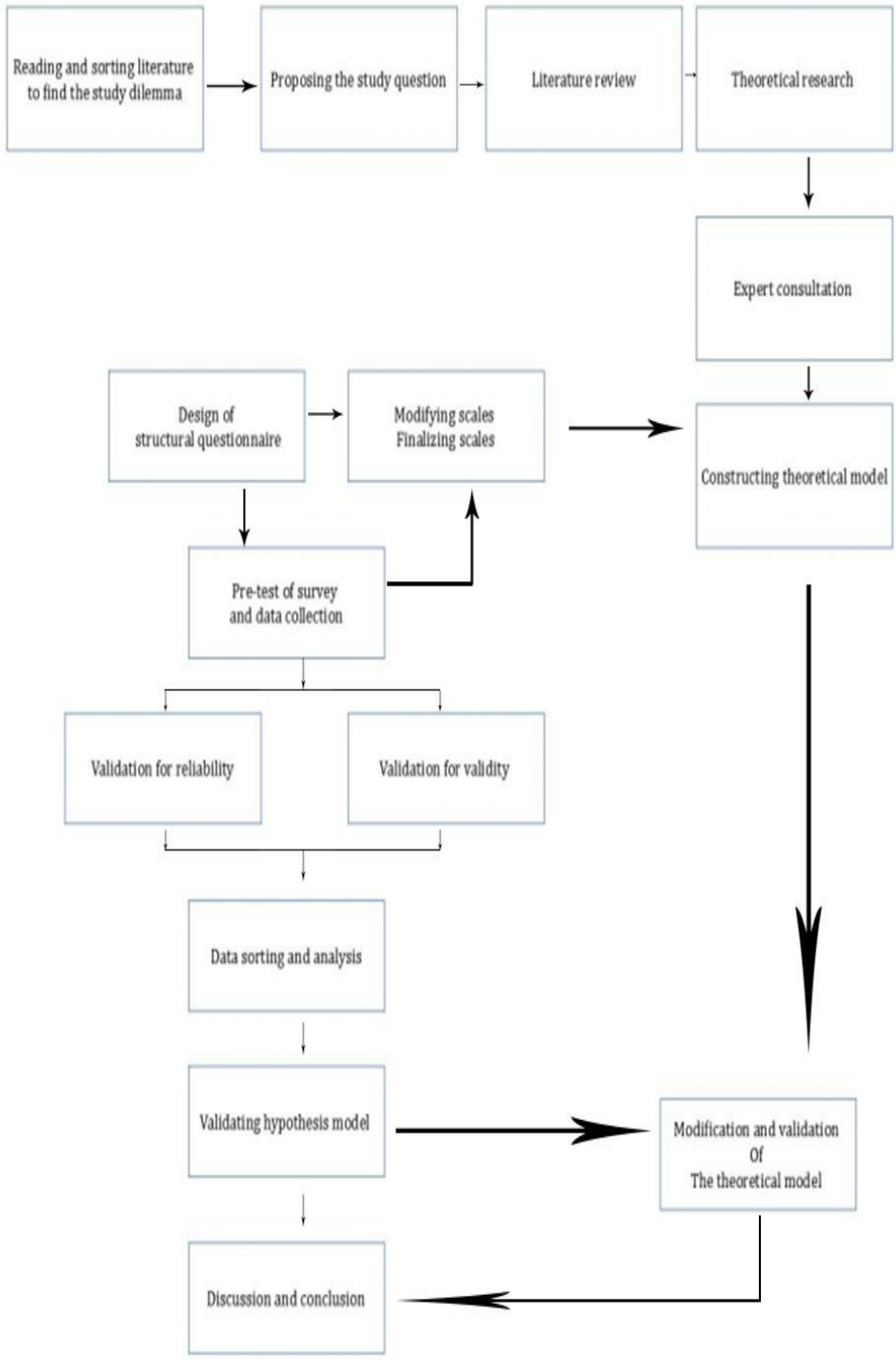


Figure 1.1 Technical Route of the Study

1.4.2 Structural arrangement

The thesis includes the following:

Chapter I Introduction. This chapter introduces the study background, importance of the study, difficulty and questions, methods and technical routes.

Chapter II Literature review. Chinese and overseas literature about work engagement, professional identity, job satisfaction, department cultures in hospitals were read and sorted, with which the study theme of the thesis was finalized.

Chapter III Study methods. This chapter includes the elaboration of the measurement of relevant concepts, designs of interviews and questionnaires. The validation methods for reliability and validity for the results were also introduced. Lastly the statistical methods were explained.

Chapter IV Components and structure analysis of department cultures. Firstly, department cultures in hospitals were rebuilt. With grounded theory, scales for measuring hospital department culture were designed; with pre-test and formal survey, the hospital department culture were validated in a structured way.

Chapter V Building the model in which department cultures in hospitals affect the physicians' job satisfaction.

Chapter VI Results of model validation and discussion.

Chapter VII Conclusions and outlook.

Chapter 2: Literature Review

2.1 Overview of department culture

2.1.1 Content and development of culture

2.1.1.1 Definition of culture

Originating from the West, cultural studies define culture as a multi-meaning concept. The original meaning of culture refers to the activities in material production and their results, which is mainly embodied in farming, breeding, domestication and other actions in the production in the agricultural society. In those activities, human beings domesticate and breed animals and plants of the natural world with the purpose of ultimately satisfying the needs of human beings themselves. However, with the development and transformation of the social economy, the connotation of culture has been constantly evolving, expanding and perfecting, that is, developing from the simple actions to the improvement of individual moral education and psychology as well as the respect and worship of gods and deities.

In his book called *L'idée de Culture,* Hell (1988) who is an expert of cultural concept in France pointed out that cultural concept had developed along with political ideas and its relationship with politics is a primitive and basic relative relationship. Hell's cultural concept took shape in the mid-nineteenth century based on the study and comparisons of encyclopaedia from different countries. Tylor (2005), the father of anthropology, gave definitions of culture twice, particularly for his well-known conclusion in his work *Primitive Culture*. He stressed that culture is complex, including knowledge, faith, art, morality, law, customs and the combination of all the abilities and customs that human beings acquired. For people nowadays, this is a classical definition of culture, which has impact to the study of culture later on. With the development of this discipline, scholars put forward that 'concrete stuff' should be added as a complement to cultural subjects based on the research of Tylor's study.

Kluckhohn (1986b), a contemporary American cultural anthropologist, conducted a study. He compared 161 definitions of culture and found that they share similar meaning but different research methods. He believed that culture is modelled behaviours and can be spread by various ways. Because of the differences of cultures, different cultural groups have their unique features. He also believed that culture is formed by two parts: one is a traditional part; the other is

people's choices and understanding. Based on this, his definition of culture is that culture is a survival system that is created by history. Some of them are visible patterns while others are hidden ones. It intends to be shared by a whole organization or shared by parts of an organization (Kluckhohn, 1986a). He introduced a hidden and a visible system of culture and these systems are very important to us. For the study of hospital department culture, this whole framework gives us enlightenment. Malinowski (1987) (1884-1942), a British anthropologist, was the founder of a school of cultural function. He explained the concept of culture from the viewpoint of 'meet the needs of human beings.' He believed that culture was changing and strongly dynamic. The dynamics of culture guides the direction of our study. One mainly studies its "function"(Malinowski, 1987). According to him, culture could be divided into two basic aspects: artefacts and customs. Based on this, it can be deconstructed into smaller parts or units. Culture can be further divided into four aspects: materials, spirit, languages and social organizations (Malinowski, 1987).

In China, the word "culture" is mentioned in *the Yi Jing*-usually translated into *Books of Changes* (Fuxi, ancient times in China) , the definition of humanitarian society is that it lets people know what should be done and what should not by education. People can change by observing the weather and climate. People can see the world by observing humanitarian society. (Liang, 1999) , who has the greatest influence on the definition of culture, defined the word culture in his book called the *Eastern and Western Culture and their Philosophy*: culture is the lifestyle of human beings. While others defined that culture is a complex created by human beings with different features (Sima, 1987).

The analysis of different concepts to culture shows that the broader and narrowed explanation are different. Chinese dictionary *Ci Hai- a compact edition* (1979) (abbreviated version) gives a broader explanation of culture. It states that culture is the sum of material and spiritual wealth in the history of human society and practice. The narrower definition is that culture is the sum of spiritual wealth in the history of human beings. Although the definition of culture is different from a various point of view, scopes and understandings, there are common points in its definition and the process of defining culture by authors: culture is ethical standards, behaviour conducts and customs all of which have kept developing incessantly. As parts of practice in society for a long time, culture is independently and objectively designed according to human beings' social activities. Culture plays normative, leading and promoting role. Culture is a dynamic concept.

2.1.1.2 Organizational culture

Organizations are social groups that members share the same goals. Because different groups share various objectives and faith, the organizational cultures are different. Up until now, people do not have a uniformed definition of organizational culture. For example, Hofstede, Neuijen, Ohayv, and Sanders (1990) believe that the collective programming of the mind that distinguishes the members of one organization from another, this included shared beliefs, values and practices that distinguished one organization to another. Organizational culture is the product of values, bravery, myth and faith (Deal & Kennedy, 2005). Organizational culture is the common faith system of its members (Spender, 1996). Organizational culture is the shared psychological order of all people (Hofstede, 1980). Organizational culture is a basic and set pattern that a group establishes, develops and forms when adjusting the external environment and internal integrated framework (Schein, 1987). When one takes a closer look, one can say that organizational culture has the following characteristics. First, members are encouraged to have bold innovation and take moderate risks. Second, members should be careful when doing things and try to make the least mistakes. Third, the final result is still the standard to decide whether members are successful or not. It is useless to have a seemingly hard-working process if the desirable results cannot be delivered. Forth, when making decisions, decision-makers can consider the feelings of the stakeholders. Fifth, an organization is a group, which means that we should not only think about individual's feeling. Sixth, members should have awareness of competing with others to make joint effort and achieve common progress. Finally, when pursuing progress, the stability of an organization should be paid more attention (Stephen, 1996, 2005). Organizational culture means that members share have a meaning-shared system, which makes their organization differentiate from others (Yang, 2006).

Based on the concepts mentioned above and my experience, this thesis proposes that organizational culture is a relatively stable group norm that gradually forms when adapting to the external environment and the internal integration process. It is also a mechanism that ensures the effective running of an organization. Basically, organizational culture is formed within a social and cultural organization. The interaction between the two is achieved by the social aspect of organizational culture. After defining the social layer, the communication mechanism between organizational management and social culture is established.

2.1.1.3 Hospital culture

According to the report of 19th CPC National People's Congress (2017), if we do not have high confidence in our culture and do not have lasting prosperity in culture, it will be impossible for

the Chinese nation to achieve great rejuvenation. Therefore, the development of culture is vital for a country's advancement. As an important part of the development of healthcare industry, hospital culture is also valued by medical executives at all levels.

Hospital culture is a way of expression and a kind of social phenomenon. Since the rise and development of corporate culture and organizational culture in the 1980s, it has gradually entered hospitals, attracted the attention of hospital managers, and became a young discipline (Cao, 2003).

The cultural connotation of hospitals in developed countries such as the United Kingdom and the United States has the following common characteristics: reflecting long traditions and perseverance, highlighting responsibilities and missions, bringing audience and employees care and warmth, which are distinctive hospital or professional features. It is embodied in the facts of respecting patients and protecting patient privacy when providing services to them. Medical staff cannot talk about the patients' conditions in public, disclose patient information without authorization, take photos without permission or use patient information without the patient's consent. During the rounds, the attending physician will take the initiative to introduce himself and the group members to the patient, listen patiently to the patient's complaints, and pay attention to the disadvantaged groups. Within such a culture, it is commonly accepted that a qualified doctor must have vision, openness, integrity, compassion, and continuous improvement in professionalism and excellence. Some hospitals with a long history pay special attention to the inheritance of hospital culture and retain many monumental buildings or artworks. For example, in the Massachusetts General Hospital, the "Ether Dome", where the first anesthesia-based operation in human history was done, was retained as a hospital history gallery. This kind of inheritance quietly tells new generations about the history and the hospital culture, and shows the milestones of hospital development, so that the culture can be passed on from one generation to another and keep abreast with the times.

The manifestations of overseas hospital culture include displaying hospital culture through environmental design and layout, focusing on people-orientation and unique charity culture. The display of hospital culture through environmental design and layout is mainly manifested in the theme of the hospital's architectural color, fragrance, temperature and humidity, and streamlined design. All are considered from the perspective of how to help patients recover or relieve their illness. People-oriented cultural expressions mainly include hospitals that embody the purpose and vision of caring for patients and employees, which can be seen anytime and anywhere, and can also be reflected in the behavior of employees and leaders. In the hospital, the charity culture is ubiquitous. Many hospitals have dedicated donor memorial windows and

other forms of commemoration of donors.

Domestic scholars' concepts of hospital culture mainly include groups, such as group consciousness, combination of material and spirit, and cultural management mode (Cao, 2003). With the development of business culture and organizational culture, this cultural element has gradually permeated through hospitals and it becomes the management culture of hospitals. Hospital management has gradually changed, from being system-oriented to people-oriented. Therefore, the content of hospital culture become abundant and extended. The content of hospital culture has gradually developed along with the hospital management. Different hospitals have their special cultures, such as values and behavior conduct (Chen, 2005). Li and Liang (2006) agreed with Chen's opinion. They believed that hospital culture is seen as established and respected standards for all medical staff, who have shared values and behavior conduct. Hospital culture is a special group awareness and it has developed from organizational culture and modern enterprise culture (Zhou, 2003). Sun (2008) writes hospital culture take shape with the establishment of hospitals, and is a product of adapting to the objective requirements of modern hospital management. Zhang et al. (2005) believe that hospital culture is the sum of material and spiritual results formed through long-term practice in the historical development of a hospital, and is the sum of common values, professional ethics, and norms of all medical staff. Ma (2020) believes that hospital culture is the soul, spirit and label of a hospital, and a concrete manifestation of the spiritual level of a hospital, which is maintained as the hospital evolves. Liu (2013) believes that hospital culture is the guiding ideology formed in the hospital's medical work. It is the image of the hospital built collectively in the management of the organization. The hospital culture is in the context of the times. In the continuous development of specific urban cultures, generations of people have boiled down their own management methods, behaviors, values, judgments, and distinctive cultural forms in their hospitals. Deng and Wu (2003) believes that hospital culture refers to the ideology of medical workers, as well as the corresponding systems and organizations. The attributes of hospital culture should refer to the field of spiritual production of medical workers. It is the ethics, concepts, beliefs, principles, theories and norms of medical workers, and their activities under the guidance of their respective moral consciousness, and the ethical relations between people. Relationship, the state of social morality, which belongs to the category of morality, is a superstructure on a certain economic basis. Its content is determined by certain material living conditions and evolves with changes in the material living conditions. Cao (2003) points out that the "concept of hospital culture" recognized by the industry refers to the sum of material wealth and spiritual wealth created by specific groups in the production and practices in medical

work and related fields. It is an industry culture with its own characteristics.

From these ideas, there are broad and narrow definitions of hospital culture. The broad one refers to the future plan and strategies for development. It is a broad concept with comprehensive content (Kou, 2003). The narrow one means the standards and values that medical staff comply with.

Hospital culture includes four parts. First, hospital groups share the common values, which is also one of the most important part of hospital culture. Second, standards and systems that hospital staff comply with in their daily routine are the cornerstone. The third part is the various hospital spirit, such as team spirit, innovation spirit and dedication spirit. The final part is the external environment and facilities of hospital (Wang, 2010). The development of hospital culture in China has constantly gone through reforms and innovations based on great experience from home and abroad.

The feature of hospital culture reflects such organizations hallmarks, pursuits, spirit, style and brand image (Wang, 2010). Due to the overall mental quality of hospital staff, it would generate positive and negative effect on aspects of their work in hospitals. Therefore, many experts said that hospital culture will be the soul of management for the survival and development of public hospitals

The role of hospital culture is a key element to promote the rapid development of hospitals, and cultural management is an inevitable trend of hospital management (Fang, 2012). Policies make it mandatory for people to meet the minimum requirements, while culture can guide people to achieve the highest pursuits (Shao & Pang, 2015). For a hospital, whether it is about quality management, scientific research and teaching, high-quality services, medical environment, or rules and regulations, all are closely related to the hospital culture. When humans raise a certain notion to the height of culture, culture will subconsciously exert an influence on staff and the day-to-day behaviors of an organization, and the highest level of hospital management could be reached if the hospital culture is a sound one. A hospital cultural could only take shape through decades or even hundreds of years of accumulation. If these culture concepts are only written on paper, then they become castles in the air. Therefore, only by implementing the hospital culture into the various work practices of the hospital and becoming the context of the conscious action of the hospital staff can it play its due role and promote the rapid development of the hospital.

The hospital culture has the following characteristics: 1) Non-replicability: A hospital's culture develops with the establishment and development of the hospital, and is reflected in all aspects of the hospital's work, and it is passed on over time. It has obvious characteristics of the

hospital and is difficult to be imitated by competitors. 2) Uniqueness: The hospital culture is related to the specific hospital service environment. The specific patient groups it serves and the medical staff with special skills are the most important components of the hospital culture. 3) Dynamic nature: The provision of preventive health care services is dynamic, which is embodied in the fact that the patients' conditions will change at any time, and the diagnosis and treatment methods and technologies will continue to improve with the advancement of science and technology. 4) Continuity: The hospital culture is accumulated and inherited in the continuous medical services, and it is disseminated in this process, which improves the core competitiveness of the hospital. 5) Value: The value of medical and health services is reflected in the rescue of the dying and the healing of the wounded. It is recognized and appreciated by patients, family members and the society. It is also the most direct way for hospitals to gain a competitive advantage among their peers (Liu, 2013).

Therefore, many experts clearly stated that hospital culture will be the "management soul" for the survival and development of public hospitals. On the base of these opinions and the study feature of this thesis, hospital culture refers to the united cognition, understanding, pursuits and behavior conducts that hospital staff have gradually formed with the development of society and economy.

2.1.1.4 Department culture

Hospital department culture is the basic unit and an important part of the hospital culture. The beliefs and values of employees in the basic unit of a department directly affect the practice behavior of physicians, the operations, the development of the discipline, talent training and sustainable development, and also the physicians' job satisfaction and happiness (Ji et al., 2016).

Well-known medical institutions in developed countries such as the United Kingdom and the United States attach great importance to the construction of department culture that highlights the characteristics of the discipline. Some well-known disciplines are usually named after a certain discipline creator or outstanding contributor, accompanied by paintings, prizes, objects, and previous leaders and professors' photos and text introductions, which show the department's leadership in a certain field and encourage the residents, attending physicians, and chief physicians of the department to inherit and sustain their traditions, clarify responsibilities and missions so that they can continue to innovate and pursue excellence. At the same time, it gives patients and their families the information and determination to overcome the disease.

It is known to all that any public Grade-A tertiary hospital in China is composed of many clinical departments, medical technology departments, administrative departments, logistics

departments and inpatient nursing departments. Among them, clinical departments include the Department of Internal Medicine (which can be divided into Cardiovascular Department, Respiratory Department, Digestive System Department, etc.), the Department of General Surgery (which can be divided into Hepatobiliary and Pancreatic Surgery Department, Cardiovascular Surgery Department, Orthopedics Department, Urology Department, etc.), Obstetrics and Gynecology Department, Ear-nose-throat Department, Ophthalmology Department, Pediatrics Department, etc. Medical technology departments include Clinical Laboratory, Radiology Department, Ultrasonography Department, Endoscopy Center, etc. Department culture in this thesis does not refer to the culture of a specific department in a hospital, but to the concept that is generally accepted by medical staff during the long-term treatment and service, and it changes with the times and the development of the subjects. For this reason, the construction of department culture should also be established, standardized, and made consistent throughout the whole process of constructing hospital culture (Sha, 2016).

Different scholars have put forward the following definitions of department culture from different perspectives. Zhu (2009) believes that department culture is the foundation and an important part of hospital culture, as well as the embodiment and deepening of hospital culture. In addition to cultural commonality, it also has the characteristics and individuality of the department itself. Yang (2008) pointed out that department culture is a cultural system that has its own characteristics and is recognized by all employees in the process of long-term medical work and management practice. Cao (2003) believes that department culture represents the image and mental outlook of the department, and it reflects the overall atmosphere, mental state of the department and the common values and attitudes of all members. It is the foundation for the survival of the department and the spiritual power and comprehensive result of the construction and development of the department. Huang, Xie, and Feng (2017) believe that department culture has evolved from hospital culture. It is shaped, cultivated, and refined by a department in long-term medical practice activities. It is a concentrated expression of the department's business technology and spiritual outlook. The department culture is the foundation and an important part of the hospital culture, and it complements the hospital culture. Department culture can truly implement the content and spirit of hospital culture and is the foundation for hospital culture to take root. The extent of its construction directly affects the effect of hospital culture construction (Shao & Pang, 2015). Department culture puts management behaviors through the perspective of culture. It is an atmosphere that relies on the consistent goals, beliefs and spirits, and infiltrates all behaviors of the department staff, which is the soul of the development and growth of the department (Qiang, Bi, & Zhang, 2017). The

core factors of department culture have two major aspects: the first aspect is about the growing power of the department itself, including the cohesiveness of the department, talent incentive mechanism, sustainable development ability; the second aspect is about external competitiveness of the department, which includes the credibility and reputation of the department (Xing, 2016). The culture of a department can unite members from different levels and different categories, allow the members of the department to form common values in a subtle way, so that the department members can consciously develop dedication to the department and the motivation of the benign competition. It is conducive for the department to establish a good social image, stimulate the innovation function of the department, attract talents, and enhance development strength (Li, 2011). An excellent department culture is like a driver, which can lead the team to become stronger and successful.

A sound hospital department culture is the inheritance, support, extension and innovation of hospital culture. It is the "common language" recognized and owned by all members of the department, and it is the guide and internal motivation for the sustainable development of the unit (Xing, 2016). The connotation of the construction of department culture is to consider the management behavior of the department from a cultural perspective, fully respect the values of people, attach importance to the integrity of human nature and the diversity of modern people's needs, and use common values, beliefs, harmonious interpersonal relationships, and positive and enterprising spirit to achieve the management goals of the department. Department culture has a spiritual connotation that permeates all activities of the department, and it is the soul of the department. A department without culture is a department with no future (Yang, 2008)

2.1.2 Composition and characteristics of hospital department culture

2.1.2.1 Components of hospital department culture

When reading researches, researchers commonly agree that culture can be divided at four levels: material culture, policy or institutional culture, behavioral culture and spiritual culture (Chen, 2005). To be more specific, first, material culture means things appeared in physical forms, such as hospital names, hospital logo, the layout of hospitals, hospital equipment and hospital websites. The integration of these materials is the basic guarantee of public service. Second, the representation culture. This phenomenon can be shown in medical activities, such as the attitude towards patients, medical technology and public relations. This is a window representing a whole hospital and personalization and it is also a feedback of hospital spiritual culture. Third, policy and institutional culture at the middle management level are illustrated in norms and

regulations, management standards and behavior conduct. In addition, because hospitals are technology-, labor- and intellect-intensive, it is necessary to have common culture to form better restriction and norms. Finally, the deeper spiritual culture. Unlike the three factors mentioned above, spiritual culture is an ideology that has been built by medical staff' ideas, opinions and behaviors. Unlike the policy or institutional culture, spiritual culture has fixed features, which should be nurtured and developed because this is the core of hospital culture.

The four parts of department culture forms a whole. Material culture is the basic and manifestation of spiritual, institutional and behavioral culture. Institutional culture is the manifestation of hospital spiritual culture. Institutional culture influences behavioral culture and it reflects the spirit of hospitals. Spiritual culture is the primary part of hospital culture.

2.1.2.2 The feature of hospital department culture

On the one hand, hospital culture is subordinate to social culture, so it has the same cultural attributes as the culture of other industries. On the other hand, hospital culture is formed in the hospital, so it is an industry culture with the characteristics of a hospital. Therefore, the hospital department culture also has its own characteristics as follows:

(1) Social Feature. Hospital department culture has taken shape in the development of history and society. On the one hand, it is influenced by the joint actions of subjects and objects. It is not only shaped by society but also by medical staff and hospital managers. On the other hand, hospitals develop along with and in modern society. They cannot develop without society and society's recognition. They need to meet the expectation of stakeholders. Therefore, hospital culture should integrate with the advancement of society, including economy, politics, society, ecology and culture.

(2) Being humanitarian. Hospitals are people-centered, so the understanding of hospital department culture can be summarized as the culture about people. To this end, hospital departments should not only pay attention to the economic benefits and profit maximization, but also care about people's needs, including the needs of service providers (i.e., members of the department) and service users (i.e. the patients and their families), so as to realize the economic benefit and social mission (Xiao, 2004).

(3) Times. The hospital department culture has gradually developed with the influence of a particular history, scientific research and ideology, which shows the spirit of the time. Modern society advances rapidly and culture develops via human innovation. The system of healthcare has been reformed and medical science and technology continue to develop. All these bring opportunity and new technology to hospital culture. As a product of the times, hospital

department culture should keep pace with the times to adapt to changes and keep improving itself. Hospitals will lose vitality and trust from people if they are out of times.

(4) Practice. Medical and social practice is the foundation of the emergence, innovation and development of department culture. Hospitals, as the primary place of medical institutions, consider people's health, save lives and serve for the people in a wide range of aspects, from the process design for diagnose, treatment and care, the regulation of operation, discipline development to personal style. Hospitals meet the basic requirements of social culture and have their styles.

2.1.3 Influencing factors

When searching for papers, it is found that there are few papers related to the influencing factors of hospital department culture. Hospital department culture is the basis of hospital culture and a branch of organizational culture. Zhang et al. (2014) believes that the cultural thinking of hospitals' managers plays a guiding role to hospital culture. There are three aspects for the influencing factors in organizational culture. First, the influence of external and internal factors to one organization. For survival and development, one organization should adapt to the external environment of society, being a part of society and integrate its internal structure to do so. During this process, the values, work methods and basic ideology can be gradually constructed. Second, people understand culture from different points of view. Although society, the nation of culture and organizational culture of are different levels, the three have effects on each other. Finally, leaders' wills and morality (Tang, 2017). They decide the form of organizational culture of a public department.

2.1.4 The effects and results

Department culture is the foundation and an important part of hospital culture, and it is the basis for hospital culture to be fully developed (Shao, 2015). Department cultures are the carriers of the principles and content of hospital culture, so they are based on the common values of the hospital in general. The culture nurtures, educates and motivate medical staff, allowing them to play a role in the management of culture. The roles can be seen in the following six aspects:

(1) Playing a guide role. Hospital department culture is an important way to reflect the values of a hospital and is also a crucial window to show a hospital's style. By developing good hospital department culture, we not only enable patients to feel respected and loved but also allow staff to have a positive and correct direction that they can work hard and to help adopt

correct values. For hospitals, the most important function of hospital department culture is to tell all medical staff what values they should take and what actions they should carry. The culture is the direction of their ideas and actions. All the strategies for development, goal positioning, rules and regulations, norms for technology and the design of departments should be guided by this core value.

(2) Playing a cohesive role. With the development of society and economy, the physical appearance of hospitals, medical equipment and patents' thoughts will change. In this circumstance, only if members of departments have formed the common value can the departments develop strong capabilities to cope with problems and challenges. It means that everyone thinks together, pool wisdom and work together. The shared values can form an intangible force. The good relationship between medical staff allows people to align with the hospital's goals, standards and ideas, which brings about a strong cohesion.

(3) Playing a limiting role. The hospital department culture enables hospitals to have standard codes of conduct, allowing medical staff to understand what they can and cannot do. It helps to set norms, standard and bottom lines, with which medical staff work for the common goal.

(4) Playing a motivating role. Although material motivation, as tangible incentives, is important, the motivation from hospital department culture, as intangible incentives, is subtler and durable than material motivation. When material incentives cannot act as a driving force, the intangible cultural incentives can act as a brand-new motivation. The new motivating factor encourages member staff to work hard and shoulder responsibility for hospitals' reputation and mission. Once this incentive become internalized, it will have a more powerful force. A sound hospital culture and good reputation will be spread in society through various channels. With a good culture, there would be an atmosphere of departments learning from each other and improve, word of mouth among patients, professional talents rushing in, medical brands standing out, and finally there will be a virtuous circle. The healthy and sustainable development of the department can be achieved (Ji et al., 2016).

(5) Playing a coordinating role. With the common norms, member staff would form tacit understanding and their relationship would be improved. The relationship is not confined with leaders and subordinates but includes physicians and patients and colleagues. People are the foundation of department, so the foundation of department management is the management of people. The conducive role of department culture construction for department management is because there should be a focus on the cultivation of department spirit and emphasis on the notion of "people-orientation" (Ji et al., 2016).

(6) Playing a radiating role. Hospitals are social organizations that cater to different groups of people and receive popular attention. People concern and learn about hospitals by different media and make choices accordingly. Therefore, once the hospital culture has been built, its influences are not just confined within the hospital but spill into the society (Du, 2015).

2.1.5 Summary

Hospital department culture is part of hospital culture and it is also a vital channel to realize and spread hospital culture. The development of department culture needs the joint effort of staff and staff at different levels need to make contributions during this process. They should have a full awareness of the content and effects and comply with them. Departments should realize department culture to improve their soft power.

2.2 Research on physicians' job satisfaction

Job satisfaction involves multiple areas, such as behavior and management. Job satisfaction would influence attitudes and willingness to work, which has an impact on an organization's development. According to a research into the pattern of 'member staff-clients-companies' interests carried out by Sears Corporation in America (Rucci, Kirn, & Quinn, 1998), when job satisfaction increases by 5%, the client satisfaction would increase by 1.3% and the company's profit would increase by 0.5%. Therefore, it is highly relevant to have deeper studies of the job satisfaction of medical staff, restrictive factors and implications and improve their job satisfaction.

2.2.1 The concept of physicians' job satisfaction

Job satisfaction was first mentioned in a report of Hawthorne experiment (1927-1932). Emotions would have negative effect on work behavior; however, it is the workers' social and mental quality that determine whether they are satisfied with their work (Mayo, 1945). Hoppock (1935) gave the basic concept of job satisfaction in his thesis: it lied in the workers' mental and physical satisfaction, which means the subjective impression of workers toward their job. Based on Porter (1968) views, whether a person feels satisfied with his/her job depends on the gap between the real salary and the expected salary of a job. When the gap is smaller, job satisfaction is higher and vice versa. Job satisfaction is importantly associated with different work values, cultural relations and personal expectations. It is also a conclusion followed by the explanation

of the work nature (Smith et al., 1969). Job satisfaction can be seen as employees' positive or negative attitude toward their job (Campbell et al., 1970). According to Vroom (1962, 1964), an American psychologist, job satisfaction refers to the feelings or emotional reaction to the position that employees are in. For Locke (1976), job satisfaction depends on employees' satisfaction and work values. The definition of job satisfaction is the extent an employee has enthusiasm to his/her work and the true feelings of assessing work experience (Cavanagh, 1989, 1992).

According to Xu (1977), a Chinese scientist, job satisfaction refers to employees' feelings and emotional reaction to their job. And this feeling or satisfaction relies on the gap between their expectation and the reality. The concept of overall job satisfaction means that the feelings and attitude of member staff to all factors related to work, such as the job and the work environment (Xu & Shen, 2001). Huang and Xing (2002) believed that the so-called "job satisfaction" means employees' satisfaction to their career and it is the overall assessment of their work, primarily about comparing salary, the job itself and promotion opportunities. Tian (2016) believes that job satisfaction is a direct manifestation of emotions. If a high sense of accomplishment and identification is obtained at work, staff's positive work emotions can be generated. Dong (2017) dynamically defined the concept of job satisfaction from the perspective of an individual and her work. Satisfaction changes in real time, so ways of satisfaction testing can be changed. Cheng (2018) believes that job satisfaction is to reflect the employee's work attitude.

A Taiwanese researcher Xu (1977) divided job satisfaction into three aspects: the definition of comprehensiveness, the gap between the expectation and the reality and multi-levels. The definition of multi-level gains is more accepted than the rest of the two. Cavanagh's (1989, 1992) definition about job satisfaction is cited by most scholars who study the job satisfaction of medical staff. According to Kettinge, Geiger, and Davit (1988), they believed that nurses' job satisfaction refers to the level of satisfaction when they finish their work. A Chinese scientist Shen (2014) thought that satisfaction means the general attitude of nurses toward their job and their feelings to medical work or work experience. Zhang (2009) thought that the job satisfaction for medical staff refers to the overall satisfaction health professionals gain when they compare the direct and indirect aspects of their work (including themselves, the nature of their job, personal relationship, career plan and management method). In this respect, healthcare professionals have reasonable overall assessment of a variety of results, which are subject to comparisons. According to Wang, Ma, and Xu (2014), medical staff' job satisfaction is their attitude, feelings and experience to their career, work environment, the job and all aspects of

their work. It is also their attitude and feelings to the comparison of their devotion and gains, the gap between their expectation and the reality.

Wu and Gong (2015) pointed out in the establishment of the hospital's job satisfaction, the satisfaction indicators mainly include the following five factors, including: job satisfaction (work suitability, responsibility proportional to compensation, job challenge, competency); overall satisfaction towards the organization (understanding about the organization, organizational engagement); welfare (satisfaction with quality of environment, scheduling, completeness of equipment, satisfaction with welfare and benefits); report and feedback (recognition, career accomplishment, salary fairness, promotion opportunities); interpersonal relationship (cooperative harmony, information openness). These factors are those that affect job satisfaction in general. Zhang et al. (2017) and others conducted a research on the job satisfaction of Grade-A tertiary hospitals in China. In her study, the country was divided into three regions: the east, the middle and the west. A job satisfaction survey questionnaire was designed based on the Minnesota Satisfaction Questionnaire. The researcher conducted a satisfaction survey of 15,715 medical staff, studied the satisfaction of different professional groups, and compared the results, and proposed innovative medical talent management models and suggestions for improving satisfaction.

Gao (2016) took a tertiary hospital in Shanghai as the research object. He obtained 6 first-level indicators that affect job satisfaction through reference to the research literature of job satisfaction, and obtained 20 second-level indicators through the Delphi method. He designed a job satisfaction survey questionnaire, which he put to 3000 employees; he used SPSS to analyze the results. The results showed that in the hospital the item with the lowest satisfaction was the welfare and benefits, and the item with the highest satisfaction was the hospital's cultural attachment. According to the actual situation of the hospital, several countermeasures were proposed to strengthen cohesion and increase satisfaction.

2.2.2 Theories about physicians' job satisfaction

Many studies about job satisfaction from China and abroad can be divided into two categories: the content and the process. For the content, it usually focuses on the reasons of job satisfaction and related factors. The representative theories are Maslow's hierarchy of needs, Alderfer's EGR theory, McClelland's Achievement Motivation and Herzberg's Two Factor Theory. For the process, researches and discussions primarily concentrate on variables, such as expectation, needs and practicality and the process of job satisfaction after work interaction. The typical theories include Vroom' s Expectancy Theory and Adams's Equity Theory.

2.2.2.1 EGR theory

According to Maslow's hierarchy of needs, Alderfer (1969, 1972) pointed out in his book *Empirical Testing of New Theories for Humans Needs* that in short, ERG theory means the needs for Existence, Relatedness and Growth. Because medical staff' needs are multi-tiered, it is necessary to meet the needs of health professionals by improving their satisfaction in an all-rounded way.

2.2.2.2 McClelland's Need Theory of Motivation

McClelland (1961) a professor from Harvard University, carried detailed research of the middle-class and pointed out that when the basic needs of survival for human beings are met, three things become the most important: achievement (success), affiliation (friendship) and power. The need for achievement means that people want to be successful so they want to do things better. The need for power refers to influence or control on others and not to be controlled. The need for affiliation refers to build friendly and intimate personal relationship. Health professionals intend to set goals and work conditions so that they can independently solve problems and enjoy more autonomy. However, they require gains when they achieve their objectives and demand to be respected. At the same time, they have to bear criticism if they fail to complete their tasks.

2.2.2.3 Vroom' s Expectancy Theory

American psychologist Vroom (1964) put forward his Expectancy Theory in his book called Work and Motivation. It means that job satisfaction depends on whether the reality meets their expectation. If the reality is better than their expectation, they will feel satisfied and vice versa. Therefore, Chinese researcher Zhang (2011) believed that there are at least two factors determining job satisfaction: one is the results and another one is the expected result. For Vroom, people always hope that the rewards they get can meet their expectations.

2.2.2.4 Equity Theory

American psychologist Adams (1965) proposed his theory that the career motivation is not just influenced by the absolute salary but the relative salary. Wang (1991) believes that the absolute salary means employees' salary and the actual salary they get. Because of the relatively inequality of salary, it will affect employees' job satisfaction.

2.2.2.5 Hierarchy of Needs Theory

Maslow (1943), an American psychologist, proposed in his book *A Theory of Human*

Motivation that human needs can be put into five layers of a pyramid that contains, from bottom to top, physiological needs, safety needs, love and belonging needs, esteem needs and self-actualization needs. Among the needs, physiological needs are the most fundamental ones, while self-actualization needs are the highest-level ones. These five types of needs fall into a hierarchy from low level to high level, and they are pursued one after another, yet they remain interdependent.Maslow (1954) believed that all humans wanted their needs to be satisfied. And if a job can satisfy certain needs of theirs, they will feel a sense of job satisfaction. Therefore, the job that can help someone fulfil needs will bring higher job satisfaction to that person.

Besides, many scholars suggested Situational Models, including situational reality theory, Quarstein, Mcafee, and Glassman (1992) and job satisfaction prediction model (Glisson & Durick, 1988). According to Chen (2008), satisfaction was affected by the interaction between tasks' characteristics, organizations and individuals.

2.2.3 The measurement of physicians' job satisfaction

Job satisfaction is the subjective evaluation and emotional experience of employees on the work and working environment. This study discusses the job satisfaction survey scale of physicians，the scales include:

(1) The McCloskey/Mueller satisfaction scare (MMSS). The survey of clinical nurses' satisfaction was created by American researchers Mueller and McCloskey (1990). The table includes social welfare, classes, the balance between work and family, relationship between colleagues, interaction opportunity and career perspective. There are 31 items containing eight aspects, including recognition and reward, manipulation and control and responsibility. It is evaluated by five-rank point of Likert, from very satisfied (5-points) to very unsatisfied (1-point). The higher the points in the table, the more satisfied health workers feel. The coefficient of the whole scale Cronbach Alpha was 0.89 and each scale Cronbach Alpha was 0.60-0.84. MMSs is now the most used measurement scale of job satisfaction for clinical nurses.

(2) Measure of job satisfaction (MJS). MJS, a 'multi-dimensional' scale, was adopted by Traynor and Wade (1993). It is used to measure the job satisfaction of community nurses, covering personal satisfaction, the amount of work, professional support, salary, professional development perspective and the level of satisfaction. This scale is credible and effective. MJS is a commonly used tool to measure the job satisfaction of community nurses.

(3) The Misener nurse practitioner job satisfaction scale. MNPJSS, based on MMSS, is a common tool to assess the job satisfaction of nurses. It combines with Herzberg, Mausner, and

Snyderman (1959) Two Factor Theory, integrating the deep discussion and research of nurses' job satisfaction and the feature of nurses. This tool uses six levels of "Likert" scaling and includes eight factors: the relationship between cooperative subjects/colleagues, abilities to cope with work challenges, the level of work engagement, interactions with professionals, society and the public, professional development, time and interests, a total of 44 indicators.

(4) Scale to measure the satisfaction of medical staff in Xinjiang, China. Cheng, Yue, and Li (2011) applied factor analysis. They took six dimensions as assessment indicators: social status, salary, work environment, management system, career development and safety guarantee. Their analysis is basically consistent with general assessment indicators both at home and abroad. The scale can measure the job satisfaction of health workers. The measured content of items is consistent with the scale.

(5) Scale to measure the satisfaction of medical staff in Guanzhong, China. This scale was compiled by Zhang et al. (2014) with the reference to Job Description Indicator (JDI). This survey of health professionals' job satisfaction covers a wide range of factors, including health workers' opinions to the work condition (job requirement and tasks that will be completed), personal factors (feelings and enthusiasm toward their work), rewards, promotion, work environment, the relationship between colleagues and institutional policies. Likert 5-point scoring is a primary method that measures employees' satisfaction. It shows that employees are satisfied with their job if the points are higher and vice versa. In addition, Likert 5-point scoring can be used to measure the work feature of employees and personal factors. The higher points an employee gets, the higher compliance he/she has.

Apart from these measurements, Cao and Yu (2000) designed a survey based on Maslow's (1943, 1954) hierarchy of needs and Herzberg, Mausner, and Snyderman's (1959) Two Factor Theory, covering nine areas: personal and career development opportunity, work time and condition, the feature of career, recognition and appreciation, a sense of success, salary and allowances, personal relationship, hospital management and policy and the balance between work and family. Hu (2007) created a scale with eight aspects containing 38 items. It covers work recognition, management, the job itself, salary and welfare, the amount of work, the relationship between colleagues, personal development and the balance between work and family.

2.2.4 Influencing factors for physicians' job satisfaction

For the measurement factors that influence job satisfaction, many Chinese and international scholars have carried out exploration and in-depth studies and the representative study is to

identify factors that affect job satisfaction: the work itself, promotion, salary, the relationship between colleagues and the management from supervisors (Smith et al., 1969). Vroom (1964) has summarized seven factors that influence job satisfaction: enterprise management, organization, work content, promotion, salary, work environment and work relationship. According to a survey conducted by Herzberg, Mausner, and Snyderman (1959), there were two major factors making workers feel satisfied or unsatisfied: motivation and healthcare. Locke (1976) summarized them as personal variables, such as work autonomy, stress, expectation and personal value, self-esteem and gender. Arnold and Feldman (1982) believes that job satisfaction was affected by work, supervisors, rewards, promotion, work environment and work team. According to Lu, Shi, and Yang (2001), they believed that factors that influence job satisfaction are management measures, enterprise management, work rewards, work cooperation and work itself.

Factors that affect health professionals' job satisfaction, the representative study is Pfaff's (1987) research. The research points out that factors that influence nurses' job satisfaction include recognition, responsibility, success, progress and work itself. Primary factors that affect physicians' job satisfaction are autonomy, their relationship with colleagues and patients, social status, salary, work condition, internal level of satisfaction, the distribution of time and supports from administration (Konrad et al., 1999).

Chinese scholars Yang et al. (2006) conducted a survey for medical staff working in a Tertiary Hospital in Beijing. The survey focused on whether health workers are satisfied with their work or not. They found that salary, team cohesion and democratic governance measures are the three main factors affecting their job satisfaction. The study about the job satisfaction for healthcare professionals in five hospitals included a wide range factors, from job stability, personal career development, work engagement, the work itself, salary and the distribution system of salary, career risks, the personal quality of managers, social recognition, team work, the management system of hospitals and personal relationship (Sun, Shi, & Li, 2006). According to Chen, Fu, and Long (2007), there are a number of factors affecting medical staff's job satisfaction: leadership's style, the work itself, work condition, salary, promotion, interpersonal relationship, individual's characteristics and the future development of hospitals. Xu (2007) conducted a research and empirical analysis for five private hospitals in the city of Shanghai, Hangzhou and Suzhou, and found that the main factors included salary, learning, the future development of career and the degree of fairness in management system. However, his study highlighted the fairness of salary, the respect from managers, the relationship between supervisors and subordinates and trust. Gao (2009) believed that there are three categories of

factors affecting nurses' job satisfaction: the first one is the work itself (the frequency and the work intensity of night shifts). The second one is work environment related to nurses (personal stress, salary, leadership's style, personal career development and interpersonal relationship). The third one is personal factors, including age, job title, work time, marriage, personality and education.

2.2.5 The results of job satisfaction

The study conducted by Newman, Maylor, and Chansarkar (2002) stated that nurses' job satisfaction, the quality of care provided by nursing workers and patients' satisfaction are inter-related and interdependent. When nursing care providers are not satisfied with their job, it would directly lead to negative work attitude which then negatively affects work efficiency and service quality. This would slow down patients' recovery. As a result, patients would be unsatisfied with the hospital and medical staff. Tzeng, Ketefian, and Redman (2002) did surveys for nurses' job satisfaction and patients' satisfaction to hospitals respectively. By measuring 520 nurses and 345 patients, they found that there was a significant positive correlation between nurses' job satisfaction and patients' satisfaction.

Similarly, Khowaja, Merchant, and Hirani (2005) used a satisfaction measurement table and an absence rate survey. By the mathematical analysis of multiple linear regression, they found that nurses' job satisfaction is a key factor leading to absence rate. In addition, researches proved that employees' job satisfaction is highly correlated with their turnover rate (Griffeth, Hom, & Gaertner, 2000). Researchers Pathman et al. (2002) also showed that factors that make physicians decide whether they quit or not were related to their dissatisfaction to salary and team relationship. Tang, Liu, and Zhou (2002) also explained that there was a significant negative correlation between respondents' job satisfaction and their turnover rate in Tang's survey and analysis of job satisfaction of contracted nurse. Shao et al. (2004) surveyed medical staff in a hospital in Shenzhen City by using Minnesota Satisfaction Questionnaire, Organizational Commitment Questionnaire and the Intension of Turnover Survey. This research illustrated that there is positive correlation between job satisfaction and the promises of organizations. However, their job satisfaction is negatively correlated with their turnover. Zhu (2009) suggests that nurses' job satisfaction is strongly positively correlated with organisational commitment and strongly negatively correlated with resignation intention.

Some researches demonstrate that those who are unsatisfied have job burnout (Barrick, 1989; Cordes & Dougherty, 1993). Job satisfaction has become a key factor for the turnover and absence rate of nursing practitioners. This is also a primary indicator for patients'

satisfaction with a hospital (Kangas, Kee, & McKee-Waddle, 1999). According to Newman et al. (2002), the job satisfaction of nursing practitioners is highly related to the medical service, work attitude, efficiency, turnover and patients' satisfaction.

2.3 Research on professional identity

After 1980s, the Chinese medical system has been reformed in order to implement the concept of socialist market economy proposed by Xiaoping, Deng. However, this led to an increasing conflict between physicians and patients. People gradually have negative attitudes to physicians and the practice environment has deteriorated. Physicians' responsibility and sense of mission are less firm than it was in the past. This is a problem that is worth of reflections.

2.3.1 Conceptual contents of professional identity

According to Holland, Gottfredson, and Power (1980), people have clear awareness to the objective of their work, ability and the degree of interest and this awareness has been unchanged for a long time. This is the definition of professional identity. Sudak (1983) pointed out that personal development and different life circles have professional identity and ability for development. However, Coldron and Smith (1999) believed that everyone had the right to show his/her opinions. They thought that professional identity was not concrete, not always the same and not unique. Professional identity is a path that people seek in the face of others or in a work environment. Professional identity is a way that people show themselves. In this way, people prove that they are different from others. Their understanding of practice, self-ability to development and judgement for career values are different from others. To be more specific, professional identity includes the common value shared with peers, ability, faith, skills and attitude (McGowen & Hart, 1990). Savickas (1985) pointed out that Holland's opinion cannot tackle the problems of occupational psychology so he complemented and extended the concept. He proposed that professional identity is an individual's development experience which was a self-idea that gains gradual improvement with uniqueness and individualism. This is also a structure making individuals to build career concepts and have hobbies related to career during the improvement of the structure. These hobbies are biased and tentative. Professional identity is a measurement of individual's importance and interests. It is also a measurement of the ability to get along with peers (Moore & Hofman, 1988).

Wei (2008) had different opinions from international scholars. In Wei's study, it was said that professional identity is a complex unity with multiple levels. This recognition includes

whether people understand their career, have good experience and feelings, preference and complex feelings or not. This is a different unity with a social attribute. Along with professional identity, it is the characteristics of special career and personal feelings toward career instability. According to Zhang (2008), professional identity is positive feelings towards a person's job that he/she does. This identity is about the past experience and also about the current feelings. Fang et al. (2018) in the relative field believed that professional identity is positive feelings towards a person's job that he/she insists to do. This is the first step of work improvement and it is also the foundation whether a person can improve himself/herself in the career path or not. Being a physician is a special job and should be discussed independently. Whether physicians are positive to their work or not would directly influence the social value he/she harbors. Professional identity is a term about mentality and its explanation is individual's positive attitude and assessment to their work value (Yuan & Wang, 2015). Qu et al. (2017) believe that physicians' professional identity refers to their opinions, attitude, job satisfaction and the degree of identity to the medical work they have. Ji et al. (2015) believe that professional identity refers to an individual's positive evaluation of the occupation they are engaged in. It is a process or activity that a person actively or passively recognizes the occupation. Jiang et al. (2020) think that a physician's professional identity mainly refers to the perception, attitude, satisfaction and cognition of the work he is engaged in. The special job attributes entail that physician should always maintain a calm, rigorous, persistent, and serious work attitude. However, physicians' thoughts, concepts and emotions affect their work attitude to a certain extent, which could trigger conflicts between physicians and patients. Maintaining a high degree of professional recognition can help physicians adjust their mentality, overcome difficulties, and reduce their willingness to quit. Different demographic characteristics also lead to differences in various dimensions of professional identity. For example, men's professional awareness, behavior and identity are stronger than that of women, which may be due to the difference in physical strength and endurance; the older the worker, the greater the professional affiliation and the higher the professional identity would be. This is in line with the reality.

Physicians' diagnosis and treatment behaviors are inseparable from the cooperation of patients. A good physician-patient relationship is also conducive to the formation of physicians' professional values, and can also enhance his professional awareness and professional identity. The older the individual, the presence of a spouse, the higher the income, the lower the educational background, the fact of formal employment relations to the hospital, the higher the professional identity would be. The older physicians may stick to their professional aspirations better, and would have high respect for the doctor profession; they tend to think that their work

is challenging, so they can obtain a higher professional identity; while the younger physicians may not have career planning, and they would be easily distracted by other choices, so it is easier for them to doubt their own careers and even have a willingness to quit; physicians with a spouse have a relatively stable life, and have corresponding family support, which helps to enhance their professional identity; family physicians with higher incomes, as they have a certain degree of financial security, believe that their own job efforts match their income, and thus they have better professional identity with the work of General Practitioners (Jiang et al., 2020).

2.3.2 The dimensional composition of professional identity

At present, the professional identity scales generally are based on Professional Identity Scale created by Mael and others on the basis of the Organizational Identity Scale. This identity scale is used in a large number of studies and has high reliability and validity. Typical items include "When I hear others complimenting my current occupation, I feel like they are complimenting me" and so on. The internal consistency reliability (α coefficient) of the scale is 0.858 (Li, Zhang, & Shen, 2007). In conclusion, when one is to summarize different scholars' opinions, professional identity can be divided into three, four, five and six dimensions respectively.

2.3.2.1 Three dimensions

According to Holland's (1993) theory, professional identity can be divided into three categories: goals, interests and talent, based on a theory of mutual choice between people and profession. Arthur's (1995) Self-identification Scale for Nurses includes three dimensions of professional practice, satisfaction and communication, which has a total of 27 items. Chinese scholars Wang, Jia, and Yue (2010) have carried out survey and research. Their subjects included 216 nurses who worked in a tertiary hospital in Beijing for at least over a year. They found that the three dimensions in professional identity were self-concept, a sense of motivation and a sense of achievement.

2.3.2.2 Four dimensions

A Chinese scholar Liu (2007) has carried out a research on teachers. He divided teachers' professional identity into four categories: motivation, concept, emotion and value. He also merged the state of identity and trend and summarized them as situation. Si and Zhang (2017) has conducted a survey of professional identity for physicians in a tertiary hospital in the city of Chengdu.

2.3.2.3 Five dimensions

A Chinese scholar Chai (2012) has conducted a research related to nurses' professional identity in Taiyuan city and the sample size was 800. He divided the research results into five dimensions: identity assessment, social support, individuals' review, solutions to difficulties and interpersonal communication. Zhang and his team (2013) had carried out a survey of professional identity for physicians at each tier of hospitals in the city of Nanjing, using five dimensions: identity, behavior, value, emotion and promise.

2.3.2.4. Six dimensions

Cowin (2001) also did a survey and research for nurses' professional identity but he applied six dimensions with 36 different criteria. The six dimensions are concerns to patients, communication between colleagues, interpersonal relationship, self-quality, ability to direct others and their opinions on themselves. This measurement can also be used to assess positive self-identity and job satisfaction and the tendency of turnover. Wei's (2008) scaling of teachers' professional identity has sparked huge repercussion. Many researches in China applied her six-dimensional measurement to assess teachers' professional identity. Researchers like Kang et al. (2015) and Qu et al. (2017) have also carried out studies on physicians' professional identity in hospitals of different tiers using six dimensions. Yuan and Wang (2015) set a scaling with 44 items for medical industry. They also used six dimensions. The subjects were chosen from the north part of the Shan Xi Province.

2.3.3 Influencing factors of professional identity

Regarding physicians' professional identity, scholars at home and abroad have done a lot of empirical analysis, like Chinese scholar Wang et al. (2016) believes that psychological flexibility, quality of life, social support, and expected income are the most important factors affecting physicians' professional identity.

Meeus's (1993) research result was that nurses' professional identity was greatly influenced by their career environment. The influence of supports from society or social groups and others individuals are greater than family support when nurses' professional identity is concerned. These supports can also increase nurses' professional identity. Crawford, Brown, and Majomi (2008) have conducted research on 34 nurses from different departments. They adopted semi-structured interviews and explore special topics. They found that nurses' professional identity was based a variety of aspects. In particular, the influence of surrounding individuals'

assessment to them was vital but this would negatively affect the possibility of getting nurses' professional status uplifted.

Wang et al.(2010) believed that influencing factors that affect nurse's professional identity included subjective support, nursing years, stress from interpersonal relationship, leadership management, job satisfaction and the support utilization. Yuan and Wang (2015) in related research areas found that factors that affect primary care physicians' career identity have differences for different genders. These differences are related to region, degree, work environment, job satisfaction and violence at workplace. By conducting research in 112 hospitals at Western Region in China, it was found that primary factors that influenced primary care physicians' professional identity included low income, insufficient back-up people, unreasonable distribution of hospitals and the low average quality of physicians (Xie et al., 2015). According to Zhang et al. (2013), demographic variables have influences on physicians' professional identity.

When an employee feels that the level of organizational commitment is reduced, the employee's level of professional commitment will decrease, and even the idea of resignation would appear. The decrease in professional identity is manifested in the decrease in the level of professional commitment and the thought of quitting, indicating that organizational commitment has an indirect impact on the level of professional identity (Zhu, 2020). Organizational commitment is significantly positively correlated with evaluation of professional identify, professional frustration, social support and social skills, and has less correlation with professional self-reflection. Organizational commitment is positively correlated with overall evaluation of professional identity; if the organizational commitment score is obviously low, effective organizational commitment measures need to be established as soon as possible so as to improve the professional identity of medical staff. The professional identity of medical staff needs to be improved. The analysis of possible influencing factors includes the emphasis on professional development, the practice atmosphere of medical staff, the social recognition of medical staff and the commitment of organizational support (Zheng, Xu, & Wang, 2014).

Chinese scholar Kang et al. (2015) has found that to some extent, salary and the medical level in the area influenced physicians' and other medical staff's professional identity. It was also stated that in a particular region, salary and professional identity showed an obvious positive correlation. It means that when the current medical level is higher in this region, primary care physicians feel a higher sense of professional identity. According to Si and Zhang (2017), the conclusion of their research on professional identity was similar to Yu et al., (2016).

Their conclusion was that although lower salary did not directly link to professional identity, lower salary made medical staff think that their efforts were not paid off because to some extent, salary is a way to show an employee's value. Therefore, with low identity, the turnover rate would increase. Due to the social environment, the relationship between physicians and patients becomes one of the important factors impacting professional identity; however, the seniority of job title also set a limit for physicians' correct judgement of their abilities. It was said that career behavior and career expectation were linked to social support. There is positive correlation between recognitions from surrounding environment and society and physicians' professional identity. The predicted influencing factors of professional identity include physicians' salary and the degree of recognition by the general public. One of the factors affecting physicians' judgement of their professional identity is the degree of satisfaction for their expected salary (Qu et al., 2017). According to researchers Fang et al. (2018) in related field, young physicians' professional identity was closely connected to the degree of social support and employment environment. Therefore, we should increase our support for physicians, bring more positive feelings and experiences to their career so that their professional identity can be enhanced.

2.3.4 The effect of professional identity

Physicians are at the core of serving patients. Their professional identity influences work performance, a sense of career exhaustion, work objectives, ability to adapt and feelings of self-experience. All these dimensions work together and have implications on the service quality of hospitals and hence consequently patients' experience. Significant positive professional identity ensures physicians' job stability (Qu et al., 2017). Bothma and Roodt (2012), there was positive correlation between professional identity and work engagement. At the same time, professional identity can also affect employees' work performance and job stability. Sun et al.(2013) study found that the professional identity of rural physicians was not just related to their serious attitude to the job but these two factors can also influence individual physician's idea of staying in/quitting his/her job. There is negative correlation between employees' professional identity and their exhaustion to work.

With self-concept of their own occupation, employees will generate a sense of professional identity. In the long-term engagement of a certain professional activity, with employees' understanding of the nature, content, social value and personal meaning of the occupational activity, they will naturally have such professional identity. Such a professional identity with psychological suggestion will easily help them to do a good job and finish tasks as required (Zhu, 2020). A strong professional identity will help invisibly blend professional identity and

self-identity with each other, so individual employees are more prone to devote themselves to work more proactively, via devoting more time, energy and resources, thus increasing work commitment. Medical staff with a low sense of professional identity are more likely to experience work pressure, and they may also experience job burnout or the idea of quitting.

Researchers Lin et al. (2015) found that there is a weak connection between employees' professional identity and the tendency of changing jobs. According to Sun et al. (2013), professional identity, the degree of work engagement and the tendency of individuals to change jobs are closely linked to each other. Professional identity plays an important role among factors that affect a physician to change his/her job. Most researches in China show that physicians' professional identity is associated with job stability but the degree of association varies. In the meantime, due to the limitation of sample size, the conclusions are biased. Therefore, the connection between the two factors deserved to be further explored. Researches at home and abroad showed that professional identity was closely linked to work performance, turnover tendency, mental health and quality of life (Wu, 2012).

2.4 Research on work engagement

2.4.1 Concept of work engagement

Work engagement refers to a state that an individual engages in work with a variety of aspects, from physical state, cognition to emotion. Positive psychology has gradually been developed and the research field has also been expanded. Positive and subjective experience, positive individual feature and positive organization receive more attention (Seligman & Csikszentmihalyi, 2000). As an important and positive feature, the concept of "engagement" proposed by Kahn since 1990 became popular among researchers and practitioners. The field they work in covers a wide range of areas, ranging from psychology, sociology, management, human resource management and health management (Shuck, 2011). Traditionally, researches on work engagement studied its role in the interplay of individuals and environment. However, these traditional researches did not form complete overview and theories (Jeung, 2011). Therefore, it is necessary to come up with a general and comprehensive definition for work engagement.

Kahn (1990), from University of Boston in the USA, was the first person to define work engagement. His definition was that individuals in an organization control themselves to integrate themselves into the work they did. Work engagement is a short-lived state that makes

a dynamic balance between work role and the self and the two will mutually feed into each (Kahn, 1992). Britt (1999) believes that work engagement is an individual's responsibility and commitment to a specific job. The more responsibility and commitment an individual feel in a specific job, the higher the level of commitment. Britt (2003) also believes that work engagement includes three dimensions, which are commitment, responsibility, and perception of performance impact. Well-known scholars Rich, Lepine, and Crawford (2010), based on Kahn's research, found that work engagement was a motivation concept with multiple dimensions and angles. It was also individuals' all-rounded investment to the whole feature of work and an integrated and connected concept for personal characteristics, organizational factors and employees' performance. According to Schaufeli et al. (2002), work engagement was a state that was influenced by multiple factors and it was also people's fully engaged state to career practice. This was a connection among the important influencing factors for individual feature, environment and work results. Therefore, Schaufeli and Bakker (2004) gave the definition of work engagement was high energy and strong identity to work. According to Jeung (2011), Schaufeli's concept was more multi-layered than the opposite direction of job burnout. Those individuals without job burnout cannot be said to have sound work engagement. These research results should be the established and commonly accepted results.

Statistical Information Centre of the former China Ministry of Health (SICMH, 2008) had a report "The Investigation and Research on the Relationship Between Physicians and Patients" pointing out that work engagement referred to a perfect physical and mental state of an individual. The state is featured by full energy, concentration on work and willingness to contribution, which are stable for a long time, and people with sound work engagement can affect others. Research on work engagement by Chinese researchers mostly is based on overseas research theories, for example, Cao et al. (2013) believe that work engagement and job burnout are two mutually independent constructs, but they have certain internal connections, and such scholars agree with the viewpoints of foreign scholars on the "two ends of the continuum" and believe in the behavior and psychology of most people in real life being at a certain point on the continuum. Hu and Wang (2014) believe that work engagement is a continuous behavioral psychological state that is generated during the work process, with earnest, and at the same time integrity and simultaneity from the workers. Wang and Zhang (2020) believes that work engagement is an individual's cognition of work status, which reflects the degree of importance of work to an individual. As the opposite end of job burnout, work engagement emphasizes the "optimal function" of the individual at work, which will have a positive impact on the organization. Individuals with high work engagement maintain a positive

work attitude and display positive work behaviors, which is bound to improve the organizational effectiveness.

In a research for work engagement of rural physicians, Zhang and Chen (2009) had found that work engagement played a vital role in rural medical field. The professional identity of rural physicians and their recognition by the public affect their work engagement. If they receive recognition mentally, they would be more engaged in work and vice versa. This state is an important manifestation of the game and balance for rural medical staff's self and profession.

2.4.2 Components of work engagement

The academic community generally see labor in three angles. According to Kahn's (1992) theory, work engagement was composed of physical engagement, cognitive engagement and emotional engagement. In Schaufeli et al. (2002) theory, work engagement was consisted of energy, the spirit of contribution and concentration. It featured long-term stability and influence. With regards to energy, it is believed that when people with work engagement do their jobs, the individuals would be full of energy, willing to make efforts and would not give up in the face of difficulties. As to contribution, it means that the profession is meaningful for the people in question. Individuals can gain a sense of satisfaction and pride and they are free from fear. Concentration refers to the state of full engagement to work. Under such circumstance, individual feels that time flies and is unwilling to stop his/her work because he/she feels happy.

2.4.3 Factors affecting work engagement

According to Kahn's definition of work engagement, there are three pre-conditions to it: a sense of meaning, security and availability. It is only with these three pre-conditions that an individual would have work engagement. There are other factors that can influence work engagement, such as environmental support, organizational identity, fair distribution and equal system (Saks, 2006).

Lin, Shi, and Xiao (2007) pointed out that the type and the characteristics of work had played a role in work engagement. The common variables of traditional subjects like age and gender are associated dimension of work engagement. There are fewer references on the research of gender now. And there was a saying that the degree of males' work engagement was superior than females' (Watkins Jr et al., 1991). However, Schaufeli (2006) disagreed. After collecting 31,916 samples from all over the world, he found that gender did not have much influence on work engagement; instead, work engagement was positively affected by age.

The importance of work, freedom and the diversity of skills have significant impacts on work engagement and they were a positive correlation (Brown, 1996).

According to Chinese scholar Huang et al.(2012), the degree of work autonomy, the complexity of skills and the degree of emotional expression have significant effect on physicians' work engagement. The degree of work autonomy has the most influence while there was negative correlation between the degree of emotional expression and work engagement. In other words, the more autonomy physicians have in their work, the higher level of work engagement they have. If they have to suppress their feelings, they will have lower level of work engagement. For nurses' work engagement, the importance of work has the most effect. Those who are highly responsible usually have more work autonomy and they are more engaged at work (Kovner et al., 2006).

The positive influence of psychological security to work involvement has been widely proved to be true. It was found that team psychological security was related to employees' work engagement (Nembhard & Edmondson, 2006). Chen et al. (2019) explored the influencing factors of work engagement of trainee nurses in practice. They selected more than 200 nurses as research subjects, used the work engagement scale to conduct a questionnaire survey, and retrieved 196 valid questionnaires for analysis. The analysis results show that own choice, parents' wishes, consent for department transfer have a significant impact on the work engagement of the trainee nurses.

2.4.4 Effects of the work engagement

Scholar Britt, Castro, and Alder (2005), after studying 176 American soldiers, found that those who have higher level of work engagement can release stress of working after long hours. However, if they were overloaded, the soldiers' physical and mental health would be negatively affected. There was positive influence between work engagement, job satisfaction and organizational commitment. However, Saks (2006) found in his research that there was negative correlation between the tendency of changing positions and work engagement. Xanthopoulou et al.(2009) found that those who are engaged more in work can earn more money. The job satisfaction is significantly positively correlated with such dimensions of remuneration and benefits, work environment, social recognition, organization management, leadership recognition and support, work engagement. Dong (2011) found that the concentration on work was an important factor to affect individual satisfaction and mental happiness. Contribution also has positive influence on individuals' satisfaction and mental happiness. According to Alarcon and Edwards (2011), there was significant relation between work engagement, strong

job satisfaction and weak tendency of quitting. It was said that work engagement and work ability were positively linked to each other. Researchers Airila et al. (2012) pointed out that there was positive correlation between work engagement and job capability. Bakker, Demerouti, and Ten Brummelhuis (2012) founded out that work engagement is positively related to tasks, extra work and active learning.

A large number of domestic and foreign studies have also confirmed that there is a significant positive correlation between sense of professional mission and work engagement. Xie, Xin, & Zhou (2016) used a sample of 832 Chinese employees to conduct an experiment, which confirmed the positive correlation between sense of professional mission, work engagement and career success. Dobrow (2011) used different professional mission scales to measure the positive correlation between professional mission and work engagement, and the correlation coefficient is between 0.58 and 0.68. Duffy, Allan, and Bott (2012) carried out cross-sectional studies that confirmed that there is a significant positive correlation between sense of professional mission and work engagement. This type of research also confirms that the sense of professional mission is an important variable that affects the degree of an individual's work engagement.

2.4.5 Measurement scales of work engagement

For various researches related to work engagement, there are different definitions, concepts and methods of measurement. Although different standards may bring academic results, the reliability could be compromised. Collecting and analyzing samples for precise work engagement studies are crucial to understand the relevant concepts. It is also a cornerstone of summarizing methods (Viljevac, Cooper-Thomas, & Saks, 2012). Schaufeli et al. (2002) created Utrecht Work Engagement Scale (UWES). Shirom (2003, 2007) created Shirom-Melamed Vigor Measure (SMVM). These two scales are now recognized and are commonly used standards in academic community (Wefald et al., 2012). In addition, while referencing Kahn's theory, Rich et al. (2010) developed a scale based on three concepts: cognition, emotion and physiology. This thesis makes a summary and compares the three scales.

(1) UWES. Schaufeli and Bakker (2003) designed the scale. The measurement standards were the model of work engagement that integrated energy, contribution and concentration. The dimension of energy, contribution and concentration have six, five and six indicators respectively to measure the degree of work engagement. The UWES is one the most commonly used scale in the field of work engagement.

(2) SMVM. Shirom (2003) created this scale. It was divided into three standards: physical strength, emotional energy and cognitive energy, using five, four, five indicators for measurement respectively. The internal and consistent coefficient within the three dimensions were 0.95, 0.88 and 0.72 respectively. The average of related coefficient was 0.444.

(3) Rich's scale (2010) of work engagement. Rich and others designed this scale. UWES is the most popular scale, but Rich believed there were unreasonable elements in it. Therefore, Rich decided to design a new sone that contains three dimensions: physical energy, emotion and cognition. Each dimension has six questions. Rich and others did factor analysis and generated an effective structure of first-order three-factor and second-order single-factor. However, they did not have cross-cultural and cross-organizational testing. This is consistent with Kahn's theory related to work engagement. Nevertheless, they improved and developed Kahn's theory and scale, which offers great reference.

(4) MBI scale. Maslach (2003) proposed the MBI scale. Maslach found that the reverse filling of the job burnout scale can reflect work engagement well, so the job burnout scale was reversely designed. In the measurement of work engagement, the work burnout scale MBI can be used for measurement, but reverse scoring should be used. The MBI scale consists of three subscales: EE (emotional exhaustion), DE (depersonalization), and PA (personal accomplishment). Wu (2017) used the MBI-HSS (5-point questionnaire) scale and the modified MBI scale to conduct a questionnaire survey on 400 nurses in a tertiary hospital in Shanghai, which took more than one year, and found that there was a negative correlation between work engagement and job burnout. It means that higher work engagement will reduce job burnout.

Chapter 3: Research Method

3.1 Profile of subjects for study

The object of formal study in this thesis are physicians working in a large public university affiliated hospital in Zhejiang Province. According to *the Regulations of the Measures for Hierarchical Management of Hospitals* (NHM, 1989) , hospitals in China are designated as primary, secondary or tertiary institutions according to their functions and tasks. Primary hospitals are county hospitals and health centers that directly provide disease prevention, medical treatment, health care and rehabilitation services to communities with a certain population. Secondary hospitals are regional hospitals that provide comprehensive medical and health services to many communities and undertake certain teaching and scientific research tasks. Grade-A tertiary hospitals are regional hospitals that provide high-level specialized medical and health services and carry out higher education and scientific research tasks in several areas. After evaluation, hospitals at all levels are determined as Grade-A, Grade-B and Grade-C according to the hierarchical management standards. A special grade is added to tertiary hospitals. In all, hospitals in China have three levels and ten grades. According to the China Healthcare Yearbook (NHC, 2019), by December 2018, there are around 2263 public Grade-A tertiary hospitals and over 2.8 million physicians in this country. The physicians' degrees are in a good mix as over 80% have bachelor degrees, and over 25% have postgraduate degrees (masters and PhD); The gender ratio has been stable, staying at 45% (F): 55(M)%; The professional titles of physicians are distributed as follows: senior title (including senior and deputy senior titles) takes 21%, intermediate title takes 33%, and junior titles and below take 46%.

3.2 Sample description

The interviews, preliminary tests and prediction samples in this thesis come from seven, nine, nine public Grade-A tertiary hospitals in Hangzhou, Zhejiang, China. The formal study sample comes from a large public university affiliated hospital with 4,342 beds in multiple campuses in Hangzhou, Zhejiang, China. It is also a national regional medical center in eastern China.

More than a thousand physicians were investigated in this thesis. Hangzhou is a city located in the more developed eastern coastal areas of China. In the city, there are many Grade-A tertiary hospitals with sound medical resources and good mixture of staff.

3.2.1 Samples interviewed

Based on the different categories, representative hospitals from the category of pure TCM, the category of hospital with integrated western medicine and TCM, and the category of pure hospitals of western medicine were chosen. Among the hospitals in Zhejiang Province, 7 hospitals in a ratio of 1:1:5 were identified following the aforementioned sequence. Interviewees were selected from the 7 hospitals, and each interview lasted 30 minutes. Though the samples were chosen from the 7 hospitals, the quantity distribution of interviewees were fixed at 1:1:3 based on the variables such as size of the hospitals, distribution of specialties, gender, age and position of physicians. Among them, 4 were from the First Affiliated Hospital of Zhejiang University, School of Medicine; 2 from the Second Affiliated Hospital of Zhejiang University, School of Medicine; 3 from Sir Run Run Shaw Hospital, Zhejiang University, School of Medicine; 2 from Zhejiang Provincial People's Hospital; 4 from Zhejiang Provincial Tongde Hospital; 4 from Zhejiang Provincial TCM Hospital and 1 from the First People's Hospital of Hangzhou.

3.2.2 Sample of open questionnaire

In the process of dispensing the open questionnaires, 2 more hospitals with specialty focuses were added in the pool of 7 original hospitals for better diversity of samples. The questionnaires were executed in a random way in the target hospitals with a certain upper limit in any hospital. In the processes, the ratio of questionnaires is 13:2 between comprehensive public hospitals and specialized public hospitals; and among the comprehensive hospitals, the ratio of distribution is 1:1:6 (the category of pure TCM, the category of hospital with integrated western medicine and TCM, and the category of pure hospitals of western medicine). Considering the variables such as hospital size, specialty distribution, demographics of sample etc., 150 first-line physicians were chosen. The questionnaires were dispensed in the 9 aforementioned hospitals randomly with a fixed quota for each hospital and were collected immediately after they are filled.

The samples information is as follows: The First Affiliated Hospital of Zhejiang University, School of Medical 30 persons; The Second Affiliated Hospital of Zhejiang University, School

of Medical 20 persons; Sir Runrun Shaw Hospital, Zhejiang University, School of Medicine 15 persons; Zhejiang Provincial People's Hospital 15 persons; Zhejiang Provincial Tongde Hospital 20 people; Zhejiang Provincial TCM Hospital 15 people; the First People's Hospital of Hangzhou 15 persons (these eight are state-owned, comprehensive hospital); The Children's Hospital Affiliated to Zhejiang University, School of Medical 10 persons; and Zhejiang Provincial Cancer Hospital 10 persons (these two are state-owned, specialized hospital).

3.2.3 Samples for pre-test

In this study, a pre-test was carried out in the 9 identified hospitals, and sample size were fixed on the basis of the size of the hospitals, distribution of specialties, demographic variables of the study subjects so as to establish the measuring scales to be used in the formal study. The samples in different hospitals were fixed with stratified ratio, and 9 hospitals were chosen for the test. Finally, 185 physicians from the First Affiliated Hospital of Zhejiang University, School of Medicine were selected as the sample for initial test. The demographic variables include gender, age and professional titles.

Via a questionnaire tool WJX, questionnaires were dispensed randomly at the fixed time. 185 filled questionnaires were collected, among which 182 were valid, with an effective collection ratio of 98.37%. The basic information of pre-test sample is shown in following: Among the 182 questionnaires, categorized by gender, there were 97 males' responders, accounting for 53%; there were 85 female respondents, accounting for 47%.

According to age, there were 3 people under 25 years old, accounting for 2%; 44 people were between 26-35, accounting for 24%; 63 people were between 36-45, accounting for 34%; 51 people were between 46-55, accounted for 28%; 21 people were 56 and above, accounting for 12%.

According to job title, there are 22 department directors and deputy directors, accounting for 12%; 70 attending physicians, accounting for 38%; 54 fellow physicians, accounting for 30%; 36 residents, accounting for 20%.

3.2.4 Sample of formal test

Stratified systematic sampling was carried out in the identified hospital. In other words, in 48 departments in the First Affiliated Hospital of Zhejiang University, School of Medicine, 300 physicians were chosen as samples. The sampling proportion was kept at around 10% fully considering the quantities of physicians in different departments. If the variance among the

different departments is small, the sampling proportion could be lowered by a small margin; if not, the proportion could be increased appropriately. If a certain department has very few physicians, the sampling could cover all physicians in that department. With an online survey platform WJX, 300 questionnaires were dispensed and collected, among which 300 were valid, and the effective collection rate is 100%. The sources of the samples include:

Based on gender: 171 males, accounting for 57%; 129females, accounting for 43%.

Based on age: <25, 1person, accounting for 0.33%; 26-35, 69 people, accounting for 23%; 36-45, 121 people, accounting for 40.33%; 46-55, 72 people, accounting for 24%; >56, 37 people, accounting for 12.33%.

Based on the job titles: department director/deputy director, 31 people, accounting for 10.33%; chief physicians/associate chief physician, 137 people, accounting for 45.67%; fellow physicians 58 people, accounting for 19.33%; resident physicians 74 people, accounting for 24.67%.

Based on post-tax monthly income: 3000Yuan and below, 4 people, accounting for 1.33%; 3001-5000Yuan, 12 people, accounting for 4%; 5001-7000Yuan, 28 people, accounting for 9.33%; 7001-9000Yuan, 74 people, accounting for 24.67%; 9001-11000Yuan, 121 people, accounting for 40.33%; >11001Yuan, 61 people, accounting for 20.33%.

Based on the category of education degree, bachelor and below, 29 people, accounting for 9.67%; master degree 124 people, accounting for 41.33%; doctoral degree 147 people, accounting for 49%.

Based on the category of discipline, there were 102 people in internal medicine, accounting for 34%; 73 people in surgery, accounting for 24.33%; 34 people in obstetrics and gynaecology, accounting for 11.33%; 31 people in paediatrics, accounting for 10.33%; there were 12 people in the ear-nose-throat (ENT), accounting for 4%; 19 people in the Traditional Chinese Medicine (TCM) department, accounting for 6.33%; 29 people in emergency medicine, accounting for 9.67%.

3.2.5 Sample of validation test

The validation test used samples from the First Affiliated Hospital of School of Medicine, Zhejiang University. Stratified systematic sampling was adopted while considering the factors such as size of departments in the hospital and demographic variables of physicians. Questionnaires were dispensed via a questionnaire tool WJX. 605 subjects were chosen at fixed time with a sampling proportion of 20%. In this process, 596 valid questionnaires were collected, 9 were invalid, and the effective collection rate is 99%. The sources of the samples

include:

Based on gender: 296 males taking 49.66%; 300 females taking 50.34%;

Based on age: <25, 10, accounting for 1.68%; 26-35, 246, accounting for 41.28%; 36-45, 213, accounting for 35.74%; 46-55, 103, accounting for 17.28%; >56, 24, accounting for 4.03%;

Based on the job titles: department director/deputy director, 81 people, accounting for 13.59%; chief physicians/associate chief physicians, 136 people, accounting for 22.82%; fellow physicians 224 people, accounting for 37.58%; resident physicians 155 people, accounting for 26.01%.

Based on the category of discipline, there were 280 people in internal medicine, accounting for 44.9%; 202 people in surgery, accounting for 33.89%; 38 people in obstetrics and gynaecology, accounting for 6.38%; 14 people in paediatrics, accounting for 2.35%; there were 15 people in the ear-nose-throat (ENT), accounting for 2.52%; 5 people in the Traditional Chinese Medicine (TCM) department, accounting for 0.84%; 42 people in emergency medicine, accounting for 7.05%.

Based on education degree, Bachelor degree and below: 183, accounting for 30.7%; Master degree: 253, accounting for 42.45%; Doctoral degree:160, accounting for 26.85%.

Based on post-tax monthly income: 3000Yuan and below, 12 people, accounting for 2.01%; 3001-5000Yuan, 57 people, accounting for 9.56%; 5001-7000Yuan, 134 people, accounting for 22.48%; 7001-9000Yuan, 120 people, accounting for 20.13%; 9001-11000Yuan, 122 people, accounting for 20.47%; >11001Yuan, 151 people, accounting for 25.34%.

3.3 Design of scale

3.3.1 (Initial) measurement of constructs

This thesis contains 4 major variables: Department culture in a hospital (an independent variable), physicians' job satisfaction (dependent variable), work engagement (intermediary variable) and professional identity (intermediary variable). The specific measurement methods are as follows:

(1) Department culture

Based on Positive Organizational Behaviour (POB) standard, this research, according to the Grounded Theory and induction, discusses the content of hospital department culture under the umbrella of Chinese culture. First, the research initially confirmed the content and dimension of hospital department culture after literature review, in-depth interviews and open

questionnaires to collect data. Second, this research carried out projects based on the related data and analyzed the credibility and validity in order to rationalize the project and test the credibility and efficiency of scale. Finally, the research proposed the idea of hospital department culture.

(2) Job satisfaction

The physicians' job satisfaction scale made by Li (2007) was referred to (after being used, the scale had a Cronbach a coefficient of 0.9386). First, based on literature review and the needs of this research, items that should not be categorized as related to job satisfaction were deleted. Then the author invited three hospital experts to correct and modify this scale. The researcher has collected suggestions for setting questionnaire, choosing indicators and wording of questions. The core structure of physicians' job satisfaction was initially divided into organizational management, job burnout, practicing environment and work reward.

(3) Work engagement

Work engagement is taken as an intermediary variable in this study. The author referred to modified Chinese version of Utrecht WES by Zhang and Gan (2005), which contained three subscales of "energy", "dedication" and "focus". The items of the scales conform to psychometric requirements so the scales can be adopted. They are being modified and validated.

(4) Professional identity

In order to expedite the implementation of intermediary effect test, this study put professional identity into professional awareness, professional behaviour, professional values and professional sense of belonging for analysis. The physician's professional identity scale, made with reference to studies by Zhang, et al. (2013), is being modified and validated.

Job satisfaction, work engagement and professional identity subscale are shown in Table 3.1.

Table 3.1 Physicians job satisfaction, work engagement and professional identity subscale

Dimension	Meaning of questions for measurement	Sources
Job satisfaction	I am satisfied with my salary level.	Zhao (2006)
	I am satisfied with my promotion opportunities.	Chang (2015)
	I get along with colleagues very well.	Zhao (2006)
	I am proud of my job.	Zeng (2007)
	My superior is very qualified for his/her job.	Chang (2015)
	My leader approves my job very much.	Chen (2008)
	I am very satisfied with a physician's social status.	Zhao (2006)
	I have a sense of identity and belonging in the hospital where I work.	Li (2007)
	There are many opportunities for physicians to receive professional training and further education.	Li (2007)
	I am very satisfied with the current practicing environment.	Wang (2018)
	I am optimistic about the career prospects of physicians.	Xu (2007)

Work engagement	I am very satisfied with the incentive policies on research and innovation and with the working environment.	Zeng (2007)
	After getting up, I happily go to work.	Zhang (2014)
	When I work, I feel I am fully of energy.	Schaufeli (2002)
	When I am working, I would forget everything around me.	Jing (2015)
	When I am working, I feel time flies.	Wang (2013)
	When I am devoted to my work, I feel very happy.	Jing (2015)
	I am full of passion for my job.	Wang (2013))
	The work I do can continuously motivate me.	Yang (2008)
	It is very difficult for me to drop the work at hand.	Wang (2007)
	A physician is a lofty and respectable job.	Chai (2012)
	The physician's job is related to life and death of people and it is of high responsibility and risk.	Zhang(2010)
	Approval from my leaders and colleagues makes me happy.	Chai (2012)
	If given a second change, I still want to be a physician.	Xia (2012)
	Being a physician can help me to achieve my value as a person.	Zhang (2010)
	Relieving patients of their pain and illness gives me a sense of achievement.	Qiao (2016)
	I give weight to communication with patients.	Qiao (2016)
	I am willing to participate in training and further my education to improve my practice.	Zhang (2010)

3.3.2 Grounded process and method

3.3.2.1 Description of the procedure

In conceptualizing, the author got to know that past studies used content analysis method which is widely used in social sciences. In order to reduce the interference from subjective factors, the literature was put into an order. Comparatively speaking, grounded theory is more applicable to the implementation of this study as it emphasizes building up a theory on the current experience, and the core concepts are mined by systematic and induction of materials. Professor Xu (2009) found that it is not a pre-specified concept, and it establishes connections among concepts, thus forming a theoretical structure. This study, taking POB as the benchmark, by relying on induction method and following grounded theory, explores into the composition and content of department cultures in hospitals against the backdrop of Chinese culture. Strauss and Corbin (1990) operating procedure were referred to, and this study includes steps such as theoretical sampling, material collection, coding concepts, comparing and forming theoretical concepts and establishing theory for evaluation.

3.3.2.2 Theoretical sampling

Glaster (1992) believes that theoretical sampling is an important feature of grounded theory which serves as a set of systematic methods. The researcher will use the theory generated from studying the materials as the basis for guiding collection and analysis of future materials. Glaser

(1998, 2001) proposed that "all can be data". This means all ideas, personal experience or historical information from current literature, researchers and research objects can be used to generate concepts for extracting the models, and they can be objects of comparison and source of data in grounded theory.

3.3.2.3 Data collection

Data are collected in three ways: literature review, interviews and open questionnaires.

(1) Literature review: By browsing Chinese journal database, CNKI, National Library of China and Wan Fang Database, the author reviewed literature on dimensions and scale development on department cultures in hospitals; After reading massive literature, the author got to know the concepts and structures of department cultures in hospitals.

(2) In-depth interviews: In-depth interview is a kind of free conversation between an interviewer and an interviewee on certain topics, and such interview intends to unveil potential motivation, attitude and emotions concerning a certain subject (Chen, 1999). With in-depth interview, the parties in conversation can creatively and proactively generate rich and vivid qualitative points from which a certain conclusion can be drawn. The in-depth interviews used in this research process were face to face interviews. And during such interviews, questions were posed to interviewees: Could you please list the cultural factors that influence physicians' job satisfaction in a department? Can these culture factors be controlled? Are these factors somehow related? Based on their experience and understanding, the interviewees discussed the connotations regarding these questions via brainstorming; in this way, dimensions about the department cultures in hospitals were collected; on the basis of the dimensions, open questionnaires regarding department cultures in hospitals were fixed.

(3) Open questionnaires: Open questionnaires are designed in a process in which a list of questions is listed based on the content and purpose of the research; the questionnaires are sent to the targets of the survey who can answer the questions relying on their own experience and reflections. The answering of the questions is free of external influence and the questions are open ones. This form of questionnaire has advantages in that it helps to collect massive materials on a larger scope. Questionnaires in such a form prove useful in identifying special questions on a deeper level so as to collect ideas and opinions from special population.

The study subjects of this thesis are physicians, and this thesis explores something in department culture that can improve physicians' job satisfaction, so it meets the research needs to collect physicians' statements on their perception of department cultures via open questionnaires.

Open questionnaires were dispensed to collect the dimensions regarding department cultures in hospitals. The questionnaires are dispensed and collected after physicians' filling on site. The topic in the open questionnaire included: Could you please list the cultural factors that influence physicians' job satisfaction in a department culture? Can these culture factors be controlled? Are these factors somehow related? In dispensing the questionnaires, the receivers of such questionnaires were asked to write 10-20 statements or descriptions that they deem to be in line with the department cultures in hospitals.

3.3.2.4 Coding and generating concepts

Through literature review, interviews and open questionnaires, the author collected text data nearing 10,000 Chinese characters. Based on these data, the author conducted research according to the three codes of Grounded Theory: Open Coding, Axial Coding and Selective Coding. The author carried on the study.

The open coding in the Grounded Theory (GT) can differentiate the different nature of the text data, and then divides the text data into groups. The open coding is to distinguish and explain the text data (Tu, 2010). To define all text data, the first thing is to conceptualize the data. The author textualized the concepts and events mentioned in the text data of nearly 10,000 Chinese words.

Chen (1999) proposed that the core of open coding is that the person who carried out the coding should not be biased with his or her own opinions. When distinguishing concepts, personal opinions should not exist. Only if we are just and fair can we disrupt all text data codes and then reorganize them.

Axial coding is to identify the interplay and relationship between materials and concepts, to code the background, conditions, strategies and results and to connect the secondary categories with the primary categories (Tu, 2010).

The first step of selective coding is to use the screening system to select the very core concept by carrying out all the concept categories involved in the text data. The second step is to analyze problems centered by the selected category of core concepts.

However, the Grounded Theory is still not complete, especially from Open Coding to Axial coding. Strauss and Corbin (1990) agreed with this method a lot. Only if the core categories continue to develop into a large theoretical framework can new theories come in being. In order to achieve this goal, selective coding is undoubtedly the best choice. In this research, the author applied the method of writing story lines in order to solve the problems in the core category.

3.3.2.5 Forming theoretical concepts

The grounded theory is used in this study. The inherent logical structure of department cultures in hospitals is sorted out first, and then the core categories are found, which further deepened the understanding of concepts and structures in department cultures in hospitals.

The author strictly checked the method of getting data, and sampled from the obtained data, and finally uses three-level coding. The process was strictly regulated and completely consistent with the Grounded Theory. The author then developed the framework into a complete theory step by step by extracting the text data within the core category. The results are not affected by artificial factors and meet requirements.

3.3.3 Questionnaire 1 (pre-test)

On the basis of fixing the content and dimensions of department cultures in hospitals, the author started compiling the pre-test questionnaire. Following the variables extracted, the author went through massive literature review and referenced some items in material scales; and other new questions are proposed by the author on the basis of interview materials and open questionnaire in line with grounded theory. In the meantime, to ensure the validity of the questionnaire, the author invited scholars and experts to discuss and review the questions in the pre-test questionnaire; after considering the wording, validity and other issues, some undesirable questions were removed.

There were 185 pre-test questionnaires sent through WJX and the answers of the questionnaire were evaluated by Likert five-point scale. The score of being 'very inconsistent', 'more inconsistent', 'general', 'more consistent' and 'very consistent' is 1,2,3,4 and 5 respectively. The order is 1, 2, 3, 4 and5, from low to high.

The questionnaire was dealt by three methods: CITC value, Cronbach α coefficient and exploratory factor analysis.

For the qualification of questions, CITC is a test method that checks whether the questions of the questionnaire meet the purpose of the survey. In general, CITC's definition line is 0.5 (Nunnally, 1978). If a question is lower than the definition line, then this question will be replaced or deleted.

Cronbach's α coefficient is to evaluate the consistency of the description of questions. This evaluation method has been highly recognized at home and abroad. It has become the first choice for the test scale's credibility. The measurement standard is basically set to 0.7 (Churchill, 1979; Devellis, 1991). The use of Cronbach α coefficient is generally conducted

with CITC value at the same time. The author can select a question and remove its CITC value. At this time, if Cronbach α coefficient increases significantly because the question load is very low, then this question should be replaced or deleted.

3.3.4 Questionnaire 2 (formal testing)

Formal questionnaire (Questionnaire 2) consists of 4 parts:

Part 1: Subscale for department culture in hospitals (questionnaire 1).

Part 2: Subscale for work engagement (to be modified).

Part 3: Subscale for professional identity (to be modified).

Part 4: Subscale for physicians' job satisfaction (to be modified).

The questionnaires are dispensed via WJX. The questionnaire adopted the Likert 5-point scale.

After collecting the questionnaires, the model setting and validation for the various contents of subscales were carried out (the specific methods are seen in 3.4.3); CITC value and Cronbach α coefficient were measure (the specific methods are seen in 3.3.3); AMOS software is used to analyze the confirmatory factors in subscales (the specific methods are seen in 3.4.2). Secondly, with CITC value, Cronbach α coefficient and main component analysis, the subscale for work engagement (to be modified), the subscale for professional identity (to be modified) and the subscale for physicians' job satisfaction (to be modified) were modified. Finally, the scale for physicians' job satisfaction measuring the influence of department cultures in hospitals is established.

3.3.5 Questionnaire3 (confirmatory test)

The questionnaire validating the assumptions consists of five parts:

Part I: Personal information. The purpose of this section is to collect information regarding gender, age, degree, department, job position and monthly income to have demographic analysis.

Part II: Subscale for department culture in hospitals.

Part III: Subscale for work engagement.

Part IV: Subscale for professional identity.

Part IV: Subscale for physicians' job satisfaction.

The questionnaires are dispensed via WJX. Likert 5-point scale was used in the whole questionnaire. The subjects were asked to select answers based on facts, and the answers range from "1 Strongly disagree", "2 Disagree", "3 Neutral", "4 Agree", to "5 Strongly Agree".

After collecting the questionnaires, the subscales were summed up with descriptive statistics (the specific methods are seen in 3.4.1), and CITC value and Cronbach α coefficient were calculated and exploratory factors analysis (main component analysis) were carried out for each subscale (the specific methods are seen in 3.3.3).

3.4 Statistical method

3.4.1 Descriptive statistics

SPSS is used to process the subscales of validating questionnaire (questionnaire 3) for descriptive statistics. The data from the subscales should be in normal distribution, which means that the absolute value of data skewness coefficient should be less than 3 and the absolute value of coefficient of kurtosis should be less than 10 (Kline, 2005). If they are in line with normal distribution, the average value of each dimension and question is reviewed for further analysis and discussion.

3.4.2 Exploratory factor analysis

The purpose of exploratory factors analysis is to streamline variables, turn multi-dimensional complex variables into low-dimensional simple variables, select a few core variables from many variables. And simplify complex issues (Hair et al., 2006). This method can accurately test whether the measurement scale has a unidimensional property. The standard in exploratory factors analysis (main component analysis) is a KMO value that is larger than 0.7, P value of Bartlett's sphericity test should be less than 0.001 (Nunnally, 1978). A characteristic value of 1 is used to intercept data, and via Varimax (variance maximizing orthogonal rotation), statistical analysis results were obtained. The intercept point of factor load is 0.5, and if any question's load on any factor is less than 0.5, or if any question's load on multiple factors is larger than 0.5, this question should be deleted to ensure unidimensional property.

3.4.3 Analysis of confirmatory factors

Analysis for confirmatory factors determine whether there is a causal and logical relationship between each factor and the tested question by statistical analysis of the text data obtained from

questionnaire (Bagozzi & Yi, 1988). In order to test the convergent validity of variables, this study selected the AMOS method.

The convergent validity is measuring the degree of relationship among different questions for the same dimension. And this is reflected in standardised factor loading value and average variance extraction. If the standardized factor loading value (SFL) is larger than 0.7, the average variance extraction (AVE) is larger than 0.5, the composition reliability (CR) is larger than 0.6, it means that the convergence validity is sound (Nunnally, 1978).

The calculating equation of average variance extraction is as follows:

$$\mathbf{AVE} = \frac{\sum \boldsymbol{\lambda\kappa^2}}{\sum \boldsymbol{\lambda\kappa^2} + \sum \mathbf{var}(\boldsymbol{\varepsilon\kappa})} \quad \textbf{.....(3.1)}$$

Notes: λk represents standardized factor loading, var(εk) represents value of error term. Source (Wu, 2010).

The equation used to calculate composition reliability is as follows:

$$\mathbf{CR} = \frac{(\sum \boldsymbol{\lambda\kappa})^2}{(\sum \boldsymbol{\lambda\kappa})^2 + \sum \mathbf{var}(\boldsymbol{\varepsilon\kappa})} \quad \textbf{.....(3.2)}$$

Notes: λk var (εk) represents value of error term. Source (Wu, 2010).

Furthermore, confirmatory factor analysis is also used to validate the discriminant validity. By comparison, if the root mean square of each concept's Average Variance Extraction (AVE) is larger than the absolute value of coefficient of correlation of that concept, it means that this concept has very good discriminant validity.

3.4.4 Structural equation model

As a tool for analyzing multi-factorial data, structural equation model is used to process relationships with multiple causes and consequences or variables that cannot be directly observed (Wu, 2010).

In this thesis, the author adopted Structural Equation Model (SEM) to test whether a theoretical model or assumption model is appropriate. Compared with traditional data analysis methods, SEM can easily process the relationships between variables and measure the measurement errors of indicators and calculate the measurement indicators and latent variables in the calculation model.

There are many indicators related to the model fit, but the majority of scholar's support calculating χ2, df, χ2/df, GFI, AGFI, TLI, CFI, RMR and RMSEA to look at the overall degree of fit in models. Among them, if χ2/df should be less than 5, GFI value, AGFI value, TLI value and CFI value should be larger 0.9, RMR value should be less than0.05, RMSEA value should

be less than 0.08 (Schumacker & Lomax, 2010; Tabachnick & Fidell, 2007), it is regarded that the model fit is sound.

3.4.5 Cross-over study

In this study, Questionnaire 3 has 6 demographic variables and the independent sample T validation and one-way analysis of variance (ANOVA) is used to find the heterogeneity of sampled data.

As ANOVA variance analysis matrix shows, if P value is above 0.05, there is no statistical significance; If P value is less than 0.05, there is statistical significance. If there is statistical significance, homogeneity of variance is validated. If the P value of homogeneity of variance validation is larger than 0. 05, it means there is equal variance, and Scheffé is used for post-hoc validation. if the P value of homogeneity of variance validation is less than 0.05, it means there is no equal variance, and Games-Howell will be used for post-hoc validation.

If there are only two choices in a demographic variable, there will be independent sample T validation rather than single factor variance analysis. If the samples in any group is less than 31, Shapiro-Wilk validation will be carried out to see whether the sampled data conform to normal distribution. In this test, if P value is less than 0.05, the assumption of normal distribution will be rejected; otherwise, it will be accepted. If it's the former, Kruskal-Wallis H validation will be carried out as this is a kind of non-parameter validation that requires no normal assumption.

Chapter 4: The Content Structure of Department Culture in Hospital

"Putting people first" has been well accepted among all walks of life, so human resources are increasingly known as an especially important kind of resource. One of the major means of developing this resource is through raising staff's satisfaction to ensure better efficiency in work. Among the factors influencing satisfaction, organizational culture in departments plays an ever-growing role. In line with Maslow's hierarchy of needs theory, when the material needs of hospital staff are basically met, the need for self-actualization becomes the dominant one; therefore, staff would attach more importance to organization culture of their departments. Different styles of organizational culture may spawn different preferences, generating different factors that would impact staff satisfaction (Xi, 2012). The 21st century is an era in which knowledge economy is the underlying background, so as to embody the advanced socialist culture and to ensure all-round development of people, and to bring about economic benefits and social benefits of a hospital, it is necessary to establish departmental organizational cultures with people orientation (Li & Liang, 2006; Tu, 2006).

4.1 Theoretical basis

4.1.1 Grounded theory

Grounded theory per se is a set of frequently used qualitative approaches with certain influence, but it is not really a series of solid "theories". This approach is composed of methods and principles in searching, collecting and analysing data; with this approach, core concepts and categories are extracted from raw data to establish a theoretical framework.

The study process of grounded theory consists of 6 steps: preparation, data collection, coding in three levels, writing memos, ranking, theoretical overview and drafting (Yu & Zhang, 2017). In the preparation, the research questions should be made clear, and the source of samples and way of sampling should be designed; data collection includes a series of methods, such as interviews, questionnaires, literature review, observation, reflections, all of which can be used as raw data under this study framework; coding on three levels are divided into open coding, axial coding and selective coding (Jia, 2015).

Open coding involves putting the raw data into abstract concepts; axial coding entails the comparison and sorting of concepts obtained through open coding in order to extract the "main categories"; finally, selective coding helps crystallize the "core category" that could cover all concepts. Memo writhing is carried out in the whole process of coding, and with this process, all ideas and fleeting thoughts are captured completely. Based on the steps in grounded theory, the sorting and restructuring is undertaken to form the draft (Wu, Wu, & Ma, 2016).

4.1.2 Theory of dominant culture, cultural traits and adaptive culture

Dominant culture refers to the dominant one in an organization and it would affect other cultures. This culture would become a standard, making members in the organization have shared goals. However, strong culture is always good, which means not all the strong culture can improve organizations' performance.

Culture traits refer to that those values and ways would not be influenced regardless of any changes of environment. This feature is usually positive and would influence performance. Therefore, the content of such a culture is vital. Only when the culture is positive and correct, can it play a positive role.

Adaptive culture refers to a culture that can change along with environment. In other words, with the change of the environment, this culture can change as well (Wang, 2017).

4.2 Remodeling of department culture

4.2.1 Theoretical sampling

It is found during literature retrieval that most of the current measurement tools for hospital departments are improved on the research results of others, and some of the tools do not even have a good reliability and validity test. Therefore, they are not scientific and effective to a certain extent. Measurement tools are not mature enough to meet the needs of this study.

The purpose of this study is to explore the content and dimensions of structure of department cultures in hospitals within the Chinese cultural background and to develop endogenous department culture scales of Chinese hospitals; to validate the impact of department culture on physicians' job satisfaction so as to provide theoretical basis for further promoting hospital development; to test whether career identity and job dedication regulate or mediate physicians' job satisfaction in order to support the policy makers and hospital administrators in making policies. Based on the feasibility, rationality and purpose of this

theoretical sampling, the author of this thesis mainly interviewed healthcare workers (physicians, nurses and medical technicians) in hospitals.

4.2.2 Collecting data

This thesis collects raw materials through literature reviews, interviews and open questionnaires.

4.2.2.1 Literature review

Influenced by company culture, the modern hospital culture has been gradually developed and it can date back to 1980s. According to the data available, the term Hospital Culture was mentioned at the Medicine and Cultural Academy Conference held in the city of Fuzhou in 1989. Department culture, as a part of hospital culture, cannot be ignored. It is the manifestation and extension of hospital culture, which is used to judge the degree of advance.

After reading literature, it is founded that the classification of hospital department culture can be divided into four parts: materialistic culture, system culture, behaviour culture and spiritual culture (Chen, 2005). To be more specific, First, materialistic culture at the surface level. It refers to materials, such as the name of hospitals, the logo of hospitals, the layout, facilities and equipment and website. All these things are the materialistic foundation of a hospital. Second, behaviour culture. It refers to the culture shown in medical process, such as attitudes to patients, medical skills and public relation. The behaviour culture is the window for the style and personalization of hospitals, and it is also a reflection of spiritual culture. Third, system culture at the middle level. This culture refers to various rules, regulations and management. By standardized various management and control and code of conduct, it can become a culture that acts in a united manner. The final one is the deeper spiritual culture. Different from the former three categories, spiritual culture belongs to ways of thinking and ideology, and is embodied in the thinking, views and behaviours of the staff. Compared with policy culture, spiritual culture is an inherent culture trait that needs to be fostered and developed gradually. It is the core culture of a hospital (Li, 2008).

As modern hospitals are being built to an advanced stage, the scope of hospital culture is expanding accordingly. Beside the four hierarchies, there are new elements proposed, such as the building up of technology culture, harmony culture, safety culture and innovation culture. Of these, innovation culture is widely accepted by scholars. In previous studies, innovation culture was not explicitly singled out, but it has been implicated in hospital culture scales. With innovation, progress can be made; entrepreneurship, innovation and teamwork, as part of the hospital culture, are expressed in innovation as well. Innovation culture is a kind of behavioural

culture if it is seen from the perspective of cultural composition. It is one side of social culture, it is carried out cultural practices and achievements in innovative activities, and it is the transformation and uplifting of ideas, viewpoints, cognitive methodology, values preferences, behavioural patterns, policy framework.

The hospital innovation culture consists of three levels: first, it is about values, which are expressed in concepts about sustainable development, risk awareness, respect for exploring the unknown; second, it is about policies and behaviours, such incentive mechanisms, innovation enthusiasm of physician; third, it is about material forms, such as environment and conditions for innovation, e.g., lab facilities, equipment. The dimension of values is the core of building up innovation culture; the policy and behavioural culture is the solid underlying foundation of innovation culture; the working environment and visual identify are the physical carriers of innovation culture.

4.2.2.2 In-depth interviews

The interviewees are asked to discuss the contents of culture through brainstorming sessions by drawing on their own experience and understanding in order to collect indicators of department cultures in hospitals. Based on the analysis of measurement scope and study indicators, open questionnaires that could capture department culture in full have been designed.

4.2.2.3 Open questionnaires

The designer of the questionnaire poses questions to the interviewees who can answer the questions in their own way; they can answer on the basis of their ideas and willingness. The questions are open questions with relevant answers. When the questionnaires are dispensed, 10-20 statements that interviewees deem to be appropriate descriptions of department cultures are written. Current literature focused more on hospital culture in general than on department cultures.

4.2.3 Raw material analysis

Based on literature review, interviews, open questionnaires, this thesis collected data of 10,000 Chinese characters. Following grounded theory, opening coding, axial coding and selective coding has been carried out.

4.2.3.1 Open coding

This study finally gets 33 concepts and 11 categories after literature review, in-depth data analysis and the concepts and definitions the author proposed. The author also exchanged ideas,

studied and discussed with experts and collected data, carried out coding and had analysis for many times (see Table 4.1).

Table 4.1 Open coding analysis of materials

Records of raw materials	Open coding	
	Conceptualization	Categorization
1. Upon entering the hospital, I could clearly see the signages (a1) about departments. Even if it is my first time to be here, I can find the department I am visiting. The process of seeing a physician in my hospital is very clear. Patients find it intuitive if they see the signages.	a1 Signage	A1 Cultural signs include: a1 Signages
2. When co-workers are tired, they may get better when they see the cultural slogans (a2) posted on the walls. They would adjust themselves and dedicated themselves to work.	a2 Slogan	a2 Slogans
3. The bulletin board (cultural bulletin) (a3) of the department showcases department profile, schedule, patient education themes, daily notices as well as Star of the Week, which is very good to incentivize the staff. It's for publicity and education.	a3 Cultural bulletin	a3 Cultural bulletin
4. The hospital public spaces (a4) have clear delineation. The outpatient buildings are in one dedicated area and departments are arranged in a rational way. Each floor is for a certain department.	a4 Public spaces	A2 Department environment include: a4 Public spaces
5. The hygiene (a5) in the departments is quite good, and there is clear accountability for maintaining hygiene. Signs of persons in charge of hygiene are posted; cleaning staff clean the department regularly every day; there are supervisors for hygiene.	a5 Hygiene	a5 Hygiene
6. Uniforms (a6) can show the morale of the healthcare workers who follow the dressing code. Staff exhibit professional images, further proving that the hospital is a professional one.	a6 Uniform	a6 Uniforms
7. The work atmosphere (a7) is nice. Co-workers are working in harmony. The efficiency is high.	a7 Work atmosphere	a7 Work atmosphere
8. Dedicated staff would inspect the equipment (a8) regularly to make sure the equipment is maintained and ready for use anytime.	a8 Equipment	a8 Equipment
9. The departments provide professional medical technology and the medical services are homogenous; there is respect and good care for patients who approve of our technology and services (a9).	a9 External image	A3 Public relations. include: a9 External image
10. The department I work in is famous in the region (a10), and ours is better than similar departments in other hospitals of the same level.	a10 Brand	a10 Brank

11. A relationship of mutual trust, support and cooperation is established within the department (a11); staff can report proactively leaders and there is effective communication; there is interaction and information and honors sharing (a12).	a11 Teamwork a12 Interaction and sharing	A4 Staff interpersonal relationship include: a11 Teamwork a12 Interaction and sharing
12.There is rational design (a13) in the management policies of departments in the hospital, and there is leader commitment (a14); the implementation is up to standard (a15); staff in the department regard the policies as fair and they proactively follow them.	a13 Rational design a14 Leader commitment a15 Implementation up to standard	A5 Management policies include: a13 Rational design a14 Leader. commitment a15 Implementation up to standard
13. Practicing medicine legally is the bottom line of any medical service. Physician are familiar with laws, by-laws, regulations (a16) and are willing to participate in training session regarding such laws and regulations (a17); they are able to obey such laws and regulations. Any illegal medical practice will be reported timely to safeguard public good (a18).	a16 Know laws and regulations a17 Learn about laws and regulations a18 Safeguard laws and regulation	A6 Policies and regulations include: a16 Know laws and regulations a17 Learn about laws and regulations a18 Safeguard laws and regulations
14. "Saving the dying and recue the wounded" is the mission of my department (a19).	a19 Sense of mission	A7 Hospital spirit include: a19 Sense of mission
15.The department is like a big family where we support and care for each other. The values (work values) physician pursue are consistent (a20).	a20 Value identification	a20 Value identification
16. I love my job, my department. I am proud of my department (a21).	a21 Sense of belonging	a21 Sense of belonging
17. The department attaches importance to sense of competition and achievement. I know the development goals of the department. I have my role models in the department (a22).	a22 Common goals	A8 Ideals and beliefs include: a22 Common goals
18.I have my career plan for the future (a23) and will take concrete actions (a24).	a23 Planning a24 Action	a23 Planning a24 Action
19.I pay close attention to the department development and I think personal growth is closed related to the department's future (a25).	a25 Community of shared future	A9 Cohesion includes: a25 Community of shared future
20. I often recommend my department to friends and relatives (a26).	a26 Degree of approval	a26 Degree of approval
21. I am satisfied with the operations and management of my department (a 27)	a27 Satisfaction	a27 Satisfaction
22. I think my department needs to improve the culture, which I have doubts now (a28).	a28 Ideation	A10 Innovation awareness includes: a28 Ideation
23. I closely follow the cutting-edge development of this discipline; my department is willing to find new resources, adopt new technology and provide new programs (a29).	a29 Following cutting edge development	a29 Following cutting edge development
24. When I have a new idea, I will put it into my practice quickly (a30).	a30 Innovate and explore	a30 Innovation and exploration

25. The department leaders stress innovation in the discipline; there are frequent training and mentoring on reform and innovation (a31).	a31 Human support	A11Innovative environment includes: a31 Human support
26. With the support of my department, I can timely access the knowledge about advances in my specialty (a32).	a32 Information-driven	a32 Information-driven
27.The department provides innovative policies and financial support in a timely manner, and the department encourages and incentivizes innovative behavior; the department is willing to take risks (a33).	a33 Financial support	a33 Financial support

4.2.3.2 Axial coding

Based on the grounded theory, the author analyzed the 33 concepts and 11 categories in the open coding process. By incorporating the scenarios in a hospital and considering the daily operations of a department, the author has obtained the primary category and 5 secondary categories of department culture after consulting several experts in hospital human resources, they are material culture, behavior culture, policy culture, spiritual culture and innovation culture.

Material culture is divided into two types: cultural signages and department environment. Cultural signages include three parts: first, signs that give directions, such as the flowchart in seeing a physician, the name of different departments; second, the signs for bathroom, signs for saving water, "Do not litter" signs; third, cultural bulletin, which normally refers to bulletin boards for notices and profile of medical experts. The department environment includes five parts: first, public space--whether the departments layout is rational; second, hygiene--how neat and tidy the department environment is; third, uniforms--the clothing of physician in workplace; fourth, the working environment--the general atmosphere, not referring to interpersonal relationships only; fifth, medical equipment—various medical devices in a department.

Behavioral culture consists of public relations and inter-personal relations. Public relations include: first, external images, which is about the patients' perception of medical technology and services provided by the department. Specifically, this is about the patients' approval of the medical technology and services, respect and care received during the medical processes; second, brand. This refers to the reputation of this department in the healthcare industry in general and whether the medical service outdo that of other hospitals. Inter-personal relations are about teamwork and this is composed of relationships on different levels: mutual trust, mutual support and help, the relationship between this department and other departments, the way to communicate with leaders.

Policy culture includes management policies, laws and regulations. Management policies are the internal ones regulating the behavior of the staff from the department; laws and regulations are those for the whole industry at large. Both are policies and they are different in scope and jurisdiction.

Spiritual culture includes the hospital spiritual makeup, ideals and beliefs, and cohesion. The hospital spiritual makeup is shown in values of department staff—whether they love and have pride in their department; whether they feel the warmth, whether they love their jobs and whether they regard saving the dying and rescuing the wounded as their sacred mission. Ideals and beliefs refer to the common goals, role models in the department as well as whether staff know the department goals well and whether they have clear career plans. Cohesion refers to personal loyalty to the department, whether staff pay close attention to the department development, whether the staff recommend the department to friends and relatives, whether they combine personal growth with the future of the department and whether they know the culture and core concepts of the department.

Innovation culture includes innovation awareness and an enabling environment for innovation. The innovation awareness refers to insights and action for department reform, the knowledge of cutting-edge development of the discipline, and putting new ideas into real practice; innovation environment is about the mechanism's innovation, such as hospital's attitude towards the innovation of departments and physicians, incentive polices or lack of such, and whether there are courses to imbue capabilities for innovation.

The composition of department culture can be seen in the following Figure 4.1.

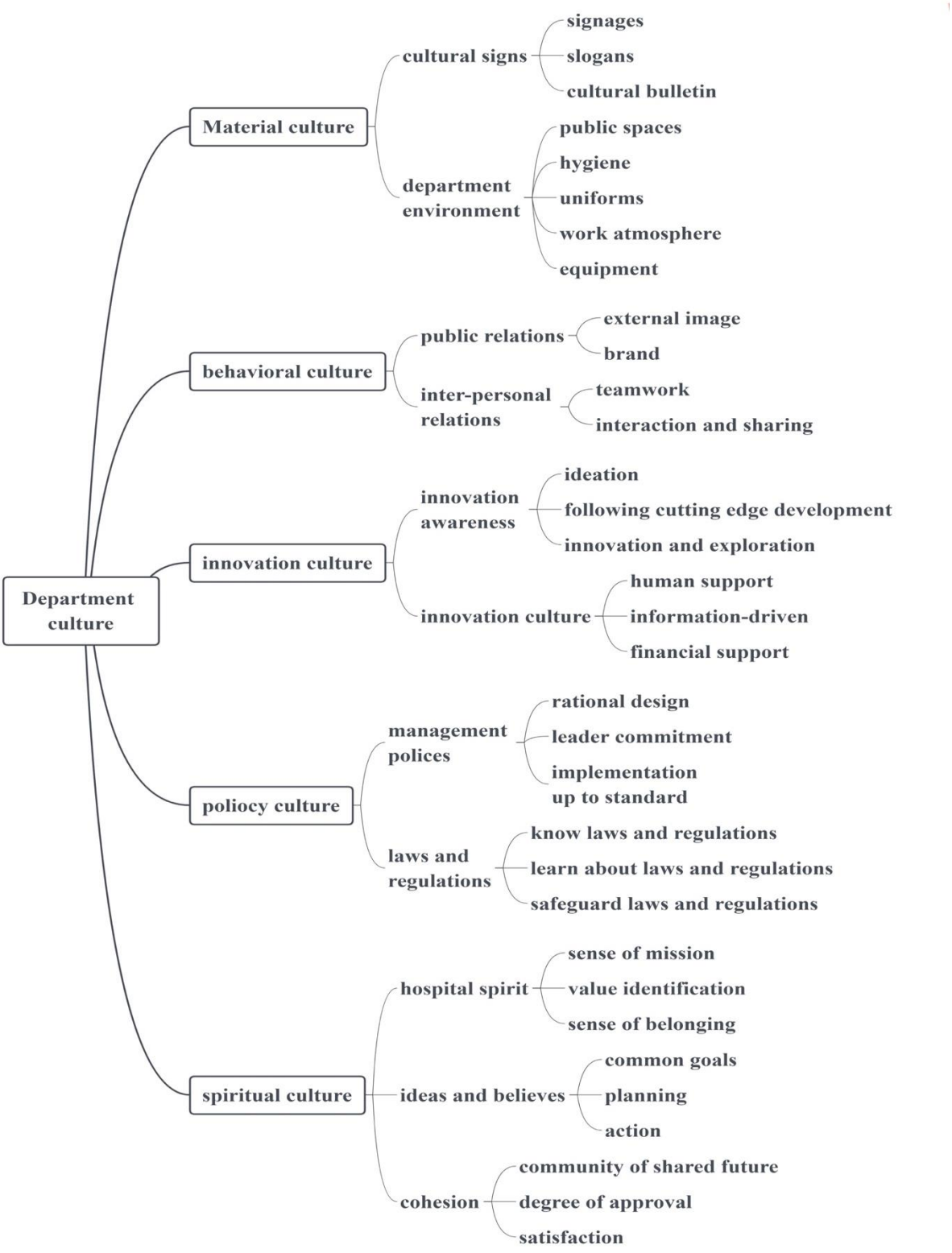


Figure 4.1 Composition of hospital department culture

4.2.4 Forming theoretical concepts, establishing theories and evaluation

4.2.4.1 Concepts and structures of department culture

The great rejuvenation of the Chinese nation needs a high degree of confidence in culture as support and guarantee. Therefore, the development of culture plays a crucial role in a country's development. As an important part of medical development, medical managers in each tier should place emphasize to hospital culture. However, everyone knows that departments are not only the basic component of a hospital but also a vital platform of hospital culture. Therefore, the development of department culture should be established and standardized throughout the whole work (Sha, 2016).

Department culture is the real embodiment of hospital culture in general and it is accepted and followed by department staff. Department culture is the summation of values, management policies, code of conduct, human-oriented environment, medical brand perceived by staff and service targets and contribution to the hospital culture at large. Positive department culture serves as the guideline and driver for sustainable development of the department and it is pervasive in all activities carried out in the department; it is where the core values lie and is the wellspring of department development. This kind of culture solidifies staff of various levels with core values so staff voluntarily contribute their part in developing the department (Qiang et al., 2017; Xing, 2016).

4.2.4.2 Characteristics of endogenous department cultures

On the one hand, hospital culture is part of social culture, so like cultures in any other industry, it has all the characteristics of culturology; on the other hand, hospital cultures take shape in hospitals, so this is an industry culture with features inherent to hospitals. Accordingly, department cultures in hospitals have their own characteristics as follows:

(1) Social aspect of hospital department culture in a hospital. Department culture is one accumulated among healthcare workers in a hospital, and it is a natural tendency that would ensue when society comes to a certain stage. On the one hand, department culture is constructed by a duality of departments as the host and patients and family members as the guests; the structure of such a culture and its degree of development is influenced by receivers of medical service. The forming process of such a culture is embedded in the social environment where the hospital is located and this culture is grown on such environment; on the other hand, the department cultures rely on the human society, and the starting place and ultimate aim of such cultures is about seeking physical and psychological health and improving quality of life. The

purpose of such cultures is to obtain acceptance and approval from society; any department cultures departing from the social environment will not be viable. The department culture must be consistently integrated with the economy, politics, local environment, and the culture matrix; by persistently seeking harmony, department culture will bring about more space for developing the hospital.

(2) Human factor of hospital department cultures. The activities of a department are centered on humans, so to have a better understanding, people can boil the department culture down to culture about humans. To implement such a concept, the department should focus on economic profits and seek maximization of benefits while paying attention to human needs, which include needs of the givers—the staff of the department and of the receivers--the patients and family members, generating economic benefit and social benefit (Xiao, 2004).

(3) The contemporaneity of hospital department cultures. Department cultures are developed under a framework of certain time period, science, technology and ideology, so they reflect the ethos in a certain era. As the society, economy, politics and culture evolve continuously, reform in the healthcare system and the development of medical technology by leaps and bounds will bring new content to the hospital culture. Embedded in the epoch, the department cultures should follow the trend of the times and adjust accordingly, which is about adapting and developing as well as improving. A hospital which does not know its position in time will lose its dynamism and support from the masses.

(4) Practicality of hospital department cultures. Medical practice and social practice are the foundation and wellspring for establishing, inheriting and developing hospital cultures. As an entity with medical processes, medical structures, SOPs, discipline development, code of conduct, specific work ethics, hospitals are undertaking the tasks of providing healthcare services, saving the dying and rescue the wounded and serving the people, which are their inherent missions, so they have to follow the social norms and develop themselves with their unique features.

4.2.4.3 Evaluation of the study results

This study has been carried out following the principles and requirements of grounded theory and is in line with the theory. In implementing this study, the author strictly followed the research methods from grounded theory to study the structure of department cultures in hospitals. By in-depth analysis of interviews, open questionnaires and raw data alike, the author developed a series of concepts, such as material culture, behavioral culture, policy culture, spiritual culture and innovation culture. Each concept has subcategories under it; for example,

material culture includes cultural signages and department environment; and further each subcategory may contain elements, for example, cultural signages include placards, statements and cultural bulletins.

In addition, with sorting and coding the raw data, the study proposed 33 concepts, which serve as the foundation of developing the categories. After comparing these concepts, the author obtained 11 subcategories, which were further analysed for their structural relations, similarities, attributes and dimensions to come up with the major categories. In building up the theoretical structure, all core categories were studied, and they are named collectively as department culture in hospitals. This conclusion of this theory proved to have sound explanatory power. The proposition of structures in department cultures in hospitals will be the theoretic and practical basis for strengthening culture building, improving satisfaction of physician. Therefore, based on the analysis, the author believes that the conclusion conforms to the criteria of evaluation from grounded theory for empirical conclusions.

4.3 Validation of department culture in hospitals

4.3.1 Compilation of pre-test questionnaires

Proceeding from the aforementioned research, the author started compiling the pre-test questionnaires. In selecting the questions, the author made reference to matures scales while leveraging the definitions of the five dimensions in department cultures in hospitals proposed by following the grounded theory so as to ensure confidence and power of this questionnaire. However, the majority of the questions were compiled by the author based on the raw data collected through interviews. There are 56 questions (See Table 4.2).

Table 4.2 The primary items in Questionnaire for DC in Hospitals and their sources

Questions	Sources
1. I feel that the processes of getting medical treatment are clear	Du (2015)
2.I feel that the signages and directions are clear in the department	Zhou (2012)
3.I am aware of the functions of the bulletin board (cultural bulletin)	The author
4.I feel that the cultural slogans are functional in encouraging people	The author
5.I feel that the layout of the department is rational	Liu and Wu (2019)
6.I feel that the hygiene is well kept in the department	The author
7.I feel that the physicians are properly dressed during work	Zhou (2012)
8.The medical equipment are always kept ready for use	Du (2015)
9.I feel that the work atmosphere is good in the department	Du (2015)
10.I feel that the patients approve of the technology and service which my department provides	Xu (2008)
11.I feel that the department is known in this industry	Xu (2008)
12.I feel that the medical technology provided in the department is	The author

professional	
13.In this department, the medical services are provided with respect and care for patients	The author
14.The department provides homogenous services to all patients	The author
15.I feel that the colleagues have mutual trust, mutual support and help each other.	Gao (2010)
16.I feel that the I should often ask for permission and report to leaders of the department	The author
17.I feel that the communication with leaders/administrators are effective	The author
18.I feel that the we can work harmoniously with the department leaders	The author
19.I feel that the different departments in the hospital can proactively coordinate their work	Xi (2012)
20.I am aware of the policy making in the department	Chang (2009)
21.I feel that the management policies of the department are reasonable and practical	Chang (2009)
22.I feel that the department leaders attach importance to policy making and its implementation	The author
23.I feel that there are some people who do not follow the policies	The author
24.I feel that the department management is following regulations and standards	Chang (2009)
25.I feel that there is fairness in the department	Xi (2012)
26.I am aware of laws, by-laws, industrial regulations related to work	The author
27."Practicing medicine legally" is the bottom line of any medical services	The author
28.With respect to illegal medical practice, I can point it out and report it to relevant government agencies	The author
29.I would actively participate in training and coaching regarding reform and innovation in the department	The author
30.I feel that the physicians in the department follow the policies and regulations in the department	Zhou (2012)
31.I love the department I work in	The author
32.The department is like a big family where we care for and support each other	Chang (2009)
33.I love my specialty and/or job	Chang (2009)
34.I feel that "saving the dying and rescuing the wounded" is the natural mission of the department	The author
35.I feel that the physicians seek the common values and philosophies (work values)	Chang (2009)
36.I have pride in working my department	Zhou (2012)
37.I have role models in the department	Gao (2010)
38.I know the development goals of the department very well	Zhou (2012)
39.I have clear career plans of my own and I am willing to take action	Zhou (2012)
40.My department stresses a sense of competition to raise the bar and dominance in competition	The author
41.I care about the future development of the department	Gao (2010)
42.I recommend this department to my friends and family	The author
43.I feel that my personal future is closely related to that of the department	Chang (2009)
44.I am satisfied with the operation and management of the department	The author
45.I am aware of the unique culture of the department	The author
46.I can systematically elaborate the core concepts in my department	The author
47.I feel that it is appropriate to reform the department now	The author
48. My department stress finding new resources, developing new techniques and new programs	He (2009)
49.For the current work, I often have doubts	The author

50.If I have a new idea, I will put it into practice immediately	He (2009)
51.I closely pay attention to the cutting-edge development of the specialty	The author
52.I feel that the I can access the latest advances and knowledge of this discipline	The author
53.I have received training and coaching regarding reform and innovation in the department	He (2009)
54.I feel that the department leaders are keen in innovation in the department	Wei (2013)
55.My department can timely provide policy and financial support for innovation	Wei (2013)
56.The department encourages and incentivizes the physician's innovative behavior and risk taking	Gong (2014)

In order to optimize the scale to ensure validity, the author invited five experts in hospital management and human resources (three professors, one associate professor and one PhD) to discuss and winnow the questions that have been selected on the basis of the different dimensions of grounded theory; in considering the wording, validity of the content and difficulties in understanding the questions in the process of filling the questionnaires, the author deleted some questions so as to avoid any ambiguities. In the end, 49 questions were kept, among which 9 are used to measure material culture, 10 to behavioral culture, 10 to policy culture, 12 to spiritual culture and 8 to innovation culture.

4.3.2 Pretest and simplification of the questions for measurement

To ensure better statistical analysis and to get better confidence and validity in the scale related to department culture, the author have had a pre-test of the questionnaires in the compilation process of the questionnaire itself. By doing so, data obtained through pre-test and the subsequent analysis of such data can help the author to correct the questionnaires if necessary. Unwarranted questions can be eliminated so as to ensure robustness and accuracy of questions.

To achieve the targets of the pre-test and improve the robustness and accuracy of the scales related to department cultures, this thesis uses CITC, Cronbach α factor and exploratory factors to process the data obtained in pre-tests. First, SPSS 22.0 was used to have Cronbach α factor calculation for the dimensions of five concepts called material culture, behavioral culture, policy culture, spiritual culture and innovation culture, and the questions related to the dimensions were calculated for CITC values, and relevant calculation structures are shown in Table 4.3.

Table 4.3 Confidence analysis of scale for hospital department cultures

Questions for measurement	CITC value	Alpha if Item Delete	Cronbach α value
P1	0.747	0.816	
P2	0.733	0.822	0.868
P3	0.729	0.826	
P4	0.664	0.852	
P5	0.690	0.818	
P6	0.659	0.823	
P7	0.718	0.810	0.855
P8	0.615	0.834	
P9	0.661	0.823	
P10	0.724	0.799	
P11	0.663	0.814	
P12	0.688	0.806	0.847
P13	0.574	0.835	
P14	0.637	0.819	
P15	0.646	0.847	
P16	0.741	0.823	
P17	0.738	0.825	0.867
P18	0.735	0.828	
P19	0.597	0.859	
P20	0.664	0.846	
P21	0.703	0.836	
P22	0.704	0.836	0.867
P24	0.762	0.822	
P25	0.619	0.856	
P26	0.552	0.825	
P27	0.581	0.818	
P28	0.636	0.807	0.838
P29	0.733	0.775	
P30	0.706	0.784	
P31	0.833	0.826	
P32	0.719	0.870	0.888
P33	0.816	0.832	
P34	0.658	0.890	
P37	0.710	0.882	
P38	0.796	0.863	
P39	0.711	0.882	0.898
P40	0.819	0.857	
P41	0.708	0.885	
P42	0.710	0.749	
P43	0.677	0.785	0.833
P44	0.695	0.763	
P50	0.527	0.871	
P51	0.714	0.662	0.811
P52	0.724	0.651	
P48	0.656	0.883	
P53	0.667	0.883	
P54	0.780	0.857	0.893
P55	0.793	0.852	
P56	0.794	0.852	

From the data in Table 4.3, the Cronbach α factors of material culture are 0.868 and 0.855, the Cronbach α factors of behavioral culture are 0.847 and 0.867, the Cronbach α factors of policy culture are 0.867 and 0.838, the Cronbach α factors of spiritual culture are 0.888, 0.898 and 0.833, the Cronbach α factors of innovation culture are 0.811 and 0.893, which are all above 0.7, the criteria for statistical analysis. Therefore, it can be said that by analysing the department cultures of hospitals from the five dimensions of material culture, behavioural culture, policy culture, spiritual culture and innovation culture, the study has high accuracy and reliability.

4.3.3 Analysis of exploratory factors

In order to purify the questions to make the scale sound and reliable, in this thesis, exploratory factor analysis (main component analysis) for all questions regarding material culture, behavioral culture, policy culture, spiritual culture and innovation culture were conducted and this is to judge whether the scales for these dimensions have a single dimension.

In conducting exploratory factor analysis, a similar method is adopted. By calculating the data obtained in pre-test, the KMO value of questions regarding material culture is 0.891, the KMO value of questions regarding behavioral culture is 0.855, the KMO value of questions regarding policy culture is 0.871, the KMO value of questions regarding spiritual culture is 0.933, the KMO value of questions regarding innovation culture is 0.856, and all of them passing Bartlett' s sphericity test ($P<0.001$). From the calculations and analysis, it can be found that the pre-test data can be used for exploratory factors analysis (main component analysis).

The material culture in departments of hospitals is composed of MC1 (cultural signages) and MC2 (department environment), and the rest of the questions converged at two factors MC1and MC2, among which P1, P2, P3and P4 converged at the factor MC1 (cultural signages), and P5, P6, P7, P8and P9 converged at factor MC2 (Department environment).

The behavioral culture in departments of hospitals is composed of BC1(public relations) and BC2 (Inter-personal relations), the rest of the questions converged at factor BC1and BC2, among which P10, P11, P12, P13and P14 converged at factor BC1 (public relations), and P15, P16, P17, P18 and P19converged at factor BC2 (Inter-personal relations).

The policy culture of departments in hospitals are composed of PC1 (management policies) and PC2 (policies and regulations), the rest of the questions converged at factor PC1 and PC2, among which P20, P21, P22, P24 and P25 converged at PC1 (management policies), and P26, P27, P28, P29, and P30 converged at factor PC2 (policies and regulations).

The Spiritual culture of departments in hospitals is composed of SC1 (Hospital spirit) SC2 (Ideals and beliefs) and SC3 (Cohesion), the rest of the questions converged at factors SC1,

SC2 and SC3, among which P31, P32, P33, P34 converged at factor SC1 (hospital spirit), and P37, P38, P39, P40 and P41converged at factor SC2 (ideals and beliefs), and P42, P43 and P44 converged at factor SC3 (cohesion).

The innovation culture of departments in hospitals is composed of IC1 (innovation awareness) and IC2 (Innovation environment), the rest of the questions converged at factors IC1and IC2, among which P50, P51, P52 converged at factor IC1 (Innovation awareness), and P48, P53, P54, P55 and P56 converged at factor IC2 (innovation environment).

The Latent root of variance component and cumulative variance ratio and of exploratory factors (main component) analysis for hospital department cultures can be seen in Table 4.4, 4.5.

Table 4.4 Latent root of variance component and cumulative variance ratio of DC

	Factor	Latent root	Variance interpretation ratio	Cumulative variance interpretation ratio
material culture	1	4.909	54.541	54.541
	2	1.169	12.993	67.534
behavioral culture	1	4.394	43.934	43.934
	2	2.024	20.235	64.173
policy culture	1	4.888	48.882	48.882
	2	1.472	14.723	63.604
spiritual culture	1	7.314	60.950	60.950
	2	1.009	8.411	69.361
	3	0.672	5.600	74.961
innovation culture	1	4.395	54.931	54.931
	2	1.327	16.593	71.524

Table 4.5 Analysis of exploratory factors for hospital DC

Questions for measurement	Main components		
	1	2	3
P1	0.770		
P2	0.799		
P3	0.841		
P4	0.785		
P5		0.704	
P6		0.792	
P7		0.834	
P8		0.696	
P9		0.707	
P10	0.817		
P11	0.810		
P12	0.801		
P13	0.708		
P14	0.722		
P15		0.748	
P16		0.841	
P17		0.848	
P18		0.811	
P19		0.717	
P20	0.726		

P21	0.815		
P22	0.809		
P24	0.818		
P25	0.703		
P26		0.629	
P27		0.741	
P28		0.740	
P29		0.837	
P30		0.775	
P31	0.804		
P32	0.732		
P33	0.811		
P34	0.580		
P37		0.748	
P38		0.713	
P39		0.565	
P40		0.737	
P41		0.854	
P42			0.757
P43			0.799
P44			0.686
P50	0.681		
P51	0.897		
P52	0.879		
P48		0.784	
P53		0.733	
P54		0.859	
P55		0.830	
P56		0.817	

Based on the data collected through pretest and analysis, questions were making cleaner for the dimensions of material culture, behavioral culture, policy culture, spiritual culture and innovation culture. In the end, 9 question for material culture, 10 questions for behavioral culture, 10 questions for policy culture, 12questions for spiritual culture and 8 questions for innovation culture were finalized, which are seen in Table 4.6. The finalized questionnaire is shown in the attachments.

Table 4.6 Final questions for hospital department cultures

Primary indicator	Secondary indicator	Questions for measurement
Material culture MC	Cultural signages MC1	P1. I think that the processes of getting medical treatment are clear.
		P2. I think that the signs and directions in the department are clear
		P3. I think the publicity bulletin (cultural bulletin) plays a positive role in publicizing the culture of the department.
		P4. I think the cultural signs and slogans are very encouraging.
	Department environment MC2	P5. I think the layout of the department is rational.
		P6. I think that the hygiene is well kept in the department.
		P7. I think that the physicians are properly dressed during work.
		P8. The medical equipment is available and ready to be used.
		P9. I think that the work atmosphere is good in the department.
Behavioral culture	Public relations	P10. I think that the patients approve of the technology and service which my department provides.

BC	BC1	P11. I think that the department is known in this industry. P12. I think the medical technology provided in the department is professional. P13. In this department, I think the medical services are provided with respect and care for patients. P14. I think the department provides homogenous services to all patients. P15. The colleagues in my department have mutual trust, mutual support and help each other.
Policy culture PC	Interpersonal relations BC2	P16. I may often ask for permission and report to leaders of the department. P17. I can communication with leaders/administrators effectively. P18. I can work harmoniously with the department leaders. P19. I think in terms of work, there is coordination among the different departments in the hospital.
	Management policies PC1	P20. I am aware of the policy making in the department. P21. I think that the management policies of the department are reasonable and practical. P22. I think that the department leaders attach importance to policy making and its implementation. P24. I think that the department management is following regulations and standards. P25. I think that there is fairness in the department.
	Policies and regulations PC2	P26. I think I am aware of laws, by-laws, industrial regulations related to work. P27. I think "Practicing medicine legally" is the bottom line of any medical services. P28. With respect to illegal medical practice, I can point it out and report it to relevant government agencies. P29. I would actively participate in training and coaching regarding reform and innovation in the department. P30. I think that the physicians in the department follow the policies and regulations in the department.
Spiritual culture SC	Hospital spirit SC1	P31. I love the department I work in. P32. The department is like a big family where we care for and support each other. P33. I love my specialty and/or job. P34. I think that "saving the dying and rescuing the wounded" is the natural mission of the department.
	Ideals and beliefs SC2	P37. I think I have role models in the department. P38. I know the development goals of the department very well. P39. I have clear career plans and I am willing to take action. P40. My department stresses a sense of competition and achievement, to raise the bar and seek dominance in competition. P41. I can systematically elaborate the core concepts in my department.
	Cohesion SC3	P42. I care about the future development of the department. P43. I recommend this department to my friends and family. P44. I think that my personal future is closely related to that of the department.
Innovation Culture IC	Innovation awareness IC1	P50. If I have a new idea, I will put it into practice immediately. P51. I closely pay attention to the cutting-edge development of the specialty. P52. I think that the I can access the latest advances and knowledge

	of this discipline.
Innovation environment IC2	P48. My department stresses finding new resources, developing new techniques and new programs. P53. I have received training and coaching regarding reform and innovation in the department. P54. I think that the department leaders are keen in innovation in the department. P55. I think department can timely provide policy and financial support for innovation. P56. The department encourages and incentivizes the physicians' innovative behavior and risk taking.

4.3.4 Analysis of confirmatory factors

4.3.4.1 Model setting and validation

In the process of validating component structure of material culture in hospitals, the research set up two models for use: (1) Single factor model. It is assumed that 9 questions (from question 1to question 9) share the common latent variable--material culture. (2) Double factor model. It is assumed that MC1 (cultural signages) and MC2 (department environment) each individually work as a latent variable.

In the process of validating component structure of behavioral culture in hospitals, the research set up two models for use: (1) Single factor model. It is assumed that 10 questions (from question 1 to question 10) share the common latent variable--behavioral culture. (2) Double factor model. It is assumed that BC1 (public relations) and BC2 (Inter-personal relations) are individually latent variables.

In the process of validating component structure of policy culture in hospitals, the research set up two models for use: (1) Single factor model. It is assumed that 10 questions (from question 1to question 10) share the common latent variable--policy culture. (2) Double factor model. It is assumed that PC1 (management polices) and PC2 (Laws and regulations) are individually latent variables.

In the process of validating component structure of spiritual culture in hospitals, the research set up two models for use: (1) Single factor model. It is assumed that 16 questions (from question 1 to question 12) share the common latent variable--spiritual culture. (2) Double factor model A. It is assumed that SC3 (cohesion) is a latent variable, andSC1 (hospital spirit) and SC2 (Policies and regulations) serve as a common latent variable. (3) Double factor model B. It is assumed that SC1 (hospital spirit) is a latent variable, and SC2 (policies and regulations) and SC3 (cohesion) serve as a common latent variable. (4) Double factor model C. It is assumed that SC2 (policy regulations) work as a latent variable, and SC1 (hospital spirit) and SC3

(cohesion) work as a common latent variable. (5) Triple factor model. It is assumed that SC1 (hospital spirit), SC2 (policy regulations) and SC3 (cohesion) of policy culture are individual latent variables respectively.

In the process of validating component structure of innovation culture in hospitals, the research set up two models for use: (1) Single factor model. It is assumed that 8 questions (from question 1to question 8) share the common latent variable -- innovation culture. (2) Double factor model. It is assumed that IC1 (Innovation awareness) and IC2 (innovation environment) in innovation culture are individual latent variables.

By using AMOS 20.0 software to validate the model, and the results are seen in Table 4.7, the GFI, AGFI, TLI and CFI of the single factor model and double factor model are lower than 0.9, but the RMSEA values are above 0.08, indicating that the fitting effect of single factor model is not as desirable as that of double factor model (see Table 4.7).

Table 4.7 Fitting index of analyzing confirmatory factors in models

	Model	$\chi 2$	df	$\chi 2$ / df	GFI	AGFI	TLI	CFI	RMSEA
Material culture	Single factor	144.380	27	5.347	0.820	0.700	0.805	0.854	0.155
	Double factor	58.429	26	2.247	0.931	0.880	0.944	0.960	0.083
Behavioral culture	Single factor	318.322	35	9.095	0.656	0.459	0.545	0.646	0.211
	Double factor	61.480	34	1.808	0.936	0.897	0.955	0.966	0.067
Policy culture	Single factor	227.751	35	6.507	0.749	0.606	0.702	0.769	0.174
	Double factor	71.653	34	2.107	0.932	0.891	0.940	0.955	0.078
Spiritual culture	Single factor	239.421	54	4.434	0.792	0.700	0.854	0.880	0.138
	Double factor A	208.539	53	3.935	0.814	0.726	0.875	0.899	0.127
	Double factor B	172.466	53	3.254	0.845	0.771	0.904	0.923	0.112
	Double factor C	140.006	53	2.642	0.884	0.829	0.930	0.944	0.095
	Triple factor	104.237	51	2.044	0.915	0.870	0.955	0.966	0.076
Innovation culture	Single factor	177.457	20	8.873	0.813	0.663	0.721	0.801	0.206
	Double factor	36.747	19	1.934	0.952	0.910	0.967	0.978	0.072

4.3.4.2 Content validity

Content Validity refers to the fitting and logical conformity between the content or indicators for measurement and the subject matter to be measured. In other words, this is about whether

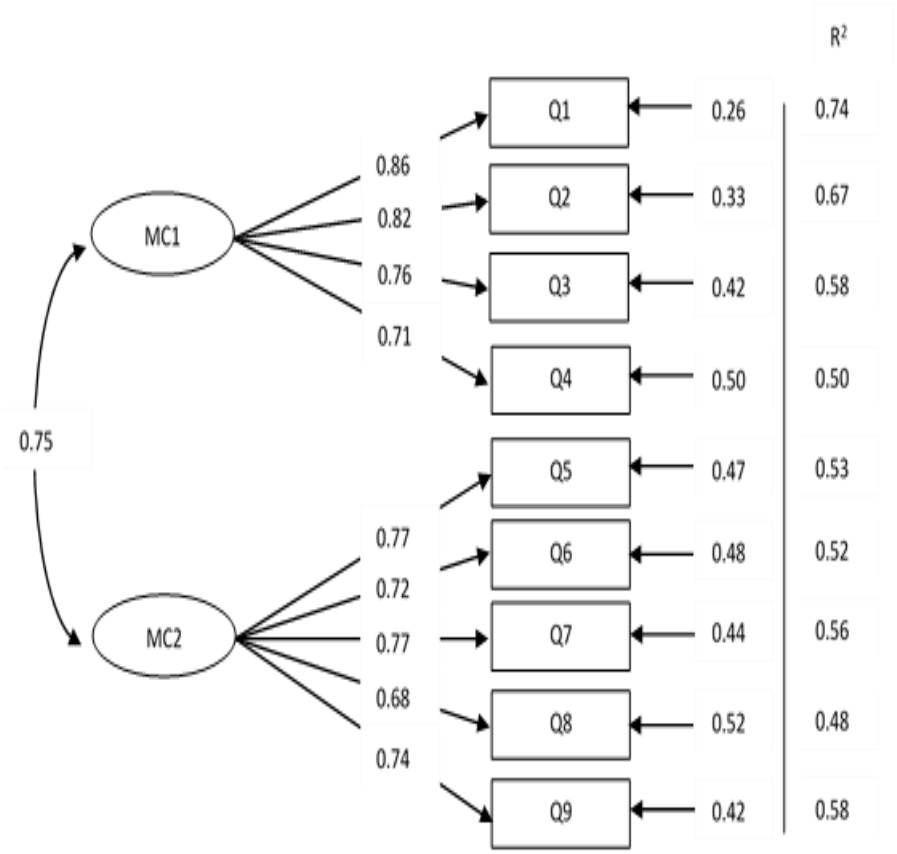
the questions chosen conform to the purposes and requirements of measurement (Feng, 2001).

In the research process, the content of department culture has been firstly defined, and based on the definition, the questions in the questionnaire have been verified to make sure there is relevance between the questions and concepts in department culture. In the survey process, ideas and suggestions from professors and post-graduates of management science, experts and scholars in the field of hospital management were collected. These experts were invited for reviewing the questions and after three rounds of discussion, a consensus was reached. The subjects of this study are physician working in Triple A hospitals in Hangzhou China. There has been pre-test and data analysis; from there, the formal questionnaire was compiled for measurement. The results show that contents of the questionnaire could reflect the components of department culture. Therefore, the content validity is regarded as sound.

4.3.4.3 Construct validity

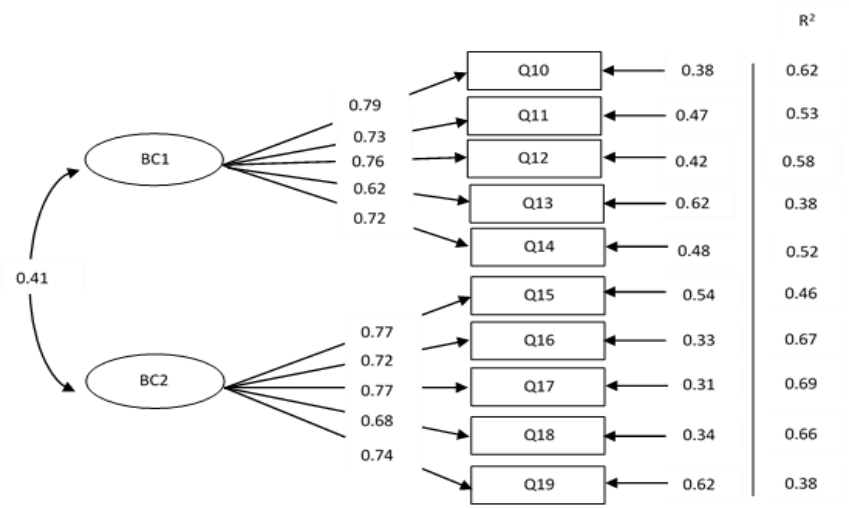
The Construct Validity is composed of convergent validity and discriminant validity. The convergent validity is about whether different variables can be used to measure the same latent variable; the discriminant validity is about whether different latent variables have significant differences. In this study, the convergent validity will be verified.

In order to verify the convergent validity of the scale for measuring the five components of department culture, this thesis firstly conducted a confirmatory factors analysis with the data collected. In the process of analysing confirmatory factors, AMOS 20.0 software was used. The results are shown in Figure 4.2, 4.3 and Table 4.8.

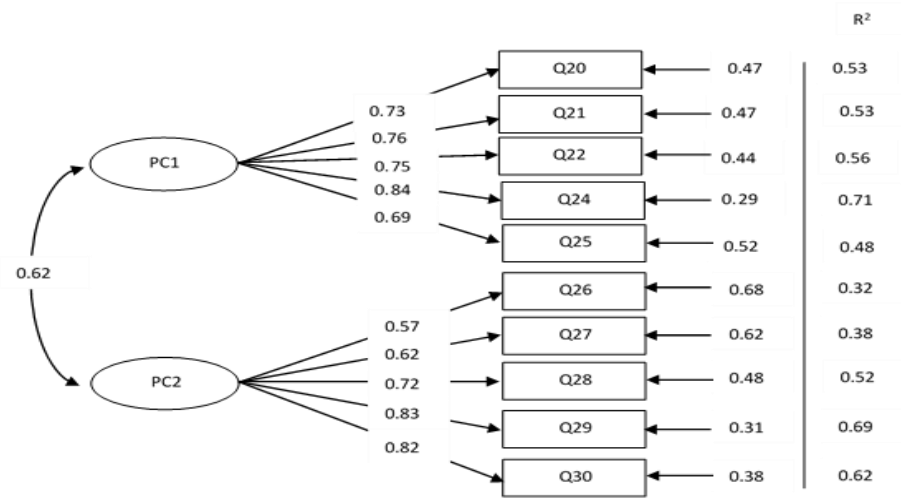


χ^2=54.639，df=26，P-value=0.001，RMSEA=0.078

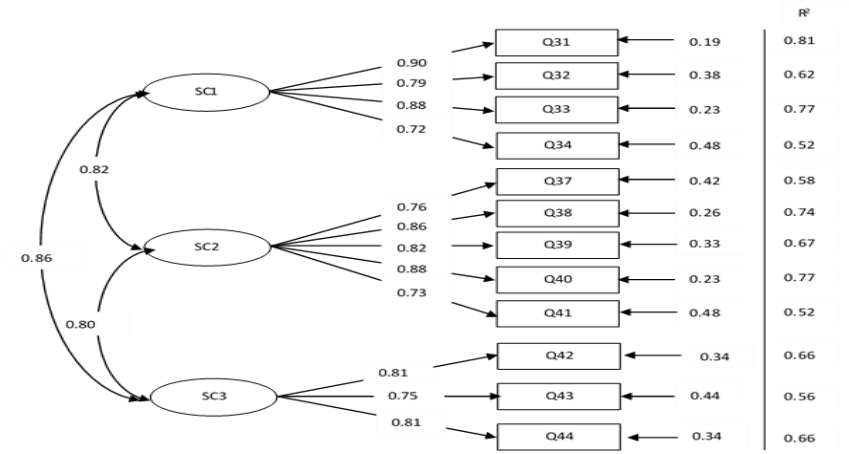
Figure 4.2 Analysis of confirmatory factors for MC



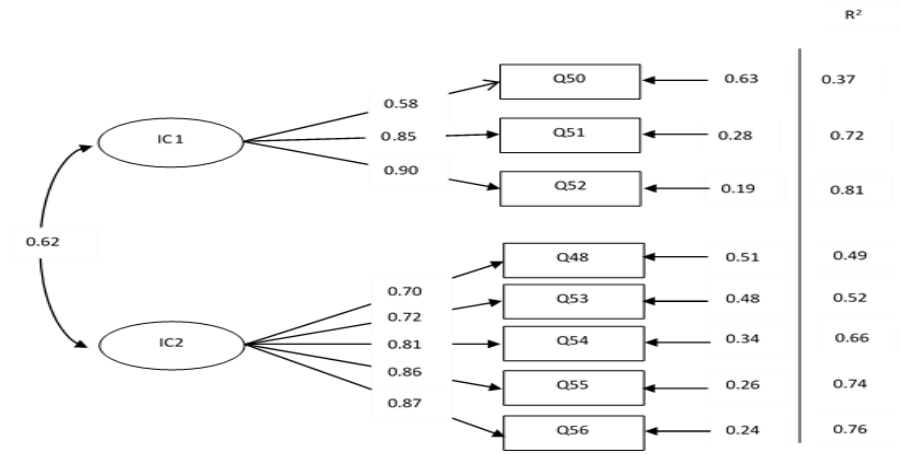
χ^2=61.480, df=34, P-value=0.003, RMSEA=0.067



χ^2=71.653, df=34, P-value=0.000, RMSEA=0.078



χ^2=107.019, df=51, P-value=0.000, RMSEA=0.078



χ^2=36.747, df=19, P-value=0.009, RMSEA=0.072

Figure 4.3 Analysis of confirmatory factors for BC, PC, SC & IC

Table 4.8 Fitting index of five components in DC in hospitals

Dimension components	χ2	df	χ2/df	GFI	AGFI	TLI	CFI	RMSEA	RMR
MC	54.639	26	2.102	0.935	0.888	0.951	0.965	0.078	0.028
BC	61.480	34	1.808	0.936	0.897	0.955	0.966	0.067	0.025
PC	71.653	34	2.107	0.932	0.891	0.940	0.955	0.078	0.023
SC	104.237	51	2.044	0.915	0.870	0.955	0.966	0.076	0.018
IC	36.747	19	1.934	0.952	0.910	0.967	0.978	0.072	0.036

From the table above, it can be found that the χ2/df of the dive components is between 1.8-2.1, and the values of GFI, AGFI, TLI and CFI are around 0.9 or greater than 0.9, RMSEA values are less than0.08, and RMR values are less than 0.05. The results show that the model for analyzing confirmatory factors fits well with the data collected.

In this study, confirmatory factors analysis (CAF) was used to verify the convergent validity of 5 tables for material culture, behavioral culture, policy culture, spiritual culture and innovation culture in hospitals.

The analysis for convergent validity of department cultures is seen in Table 4.9.

Table 4.9 Analysis for convergent validity of department cultures

Name of latent variable	Code of latent variable	Standard factor loading	Error item	AVE	CR
MC1	Q1	0.86	0.26	0.623	0.868
	Q2	0.82	0.33		
	Q3	0.76	0.42		
	Q4	0.71	0.50		
	Q5	0.77	0.41		
MC2	Q6	0.72	0.48	0.542	0.855
	Q7	0.77	0.41		
	Q8	0.68	0.54		
	Q9	0.74	0.45		
BC1	Q10	0.79	0.38	0.526	0.847
	Q11	0.73	0.47		
	Q12	0.76	0.42		
	Q13	0.62	0.62		
	Q14	0.72	0.48		
BC2	Q15	0.68	0.54	0.572	0.869
	Q16	0.82	0.33		
	Q17	0.83	0.31		
	Q18	0.81	0.34		
	Q19	0.62	0.62		
PC1	Q20	0.73	0.47	0.570	0.869
	Q21	0.76	0.42		
	Q22	0.75	0.44		
	Q24	0.84	0.29		
	Q25	0.69	0.52		
PC2	Q26	0.55	0.70	0.506	0.837
	Q27	0.61	0.63		
	Q28	0.74	0.45		
	Q29	0.85	0.28		

	Q30	0.77	0.41		
	Q31	0.90	0.19		
SC1	Q32	0.79	0.38	0.680	0.894
	Q33	0.88	0.23		
	Q34	0.72	0.48		
	Q37	0.76	0.42		
	Q38	0.86	0.26		
SC2	Q39	0.82	0.33	0.659	0.905
	Q40	0.88	0.23		
	Q41	0.73	0.48		
	Q42	0.81	0.34		
SC3	Q43	0.75	0.44	0.625	0.834
	Q44	0.81	0.34		
	Q50	0.58	0.63		
IC1	Q51	0.85	0.28	0.633	0.832
	Q52	0.90	0.19		
	Q48	0.70	0.51		
	Q53	0.72	0.48		
IC2	Q54	0.81	0.34	0.634	0.895
	Q55	0.86	0.26		
	Q56	0.87	0.24		

From the table above, it can be found that:

(1) The standardized factor load of each measurement variable of material culture is between 0.68 and 0.86, which are all above the recommended minimum value of 0.7 in statistical research; If confidence is analysed comprehensively, the composition reliability of the two latent variables for material culture are 0.868 and 0.855 respectively, which are greater than the recommended minimum value of 0.6, and the average variance extraction of the two latent variables are 0.625 and 0.542, which are greater than the recommended minimum value of 0.5. This means that the measurement model for material culture in hospital departments has good convergent validity.

(2) The standardized factor load of each measurement variable of behavioral culture is between 0.62 to 0.83, which are all above the recommended minimum value of 0.7 in statistical research; If confidence is analyzed comprehensively, the composition reliability of the two latent variables for behavioural culture are 0.847 and 0.869 respectively, which are greater than the recommended minimum value of 0.6, and the average variance extraction of the two latent variables are 0.526 and 0.572, which are greater than the recommended minimum value of 0.5. This means that the measurement model for behavioral culture in hospital departments has good convergent validity.

(3) The standardized factor load of each measurement variable of policy culture is between 0.55 to 0.85, which are all above the recommended minimum value of 0.7 of statistical research; If confidence is analyzed comprehensively, the composition reliability of the two latent variables for behavioral culture and policy culture are 0.869 and 0.837 respectively, which are

greater than the recommended minimum value of 0.6, and the average variance extraction of the two latent variables are 0.570 and 0.506, which are greater than the recommended minimum value of 0.5. This means that the measurement model for policy culture in hospital departments has good convergent validity.

(4) The standardized factor load of each measurement variable of spiritual culture is between 0.72 to 0.90, which are all above the recommended minimum value of 0.7 of statistical research; If confidence is analyzed comprehensively, the composition reliability of the three latent variables for spiritual culture are 0.894, 0.905 and 0.834 respectively, which are greater than the recommended minimum value of 0.6, and the average variance extraction of the three latent variables are 0.680, 0.656 and 0.625, which are greater than the recommended minimum value of 0.5.This means that the measurement model for spiritual culture in hospital departments has good convergent validity.

(5) The standardized factor load of each measurement variable of innovation culture is between 0.58 to 0.90, which are all above the recommended minimum value of 0.7 of statistical research; If confidence is analyzed comprehensively, the composition reliability of the two latent variables for innovation culture are 0.832 and 0.895 respectively, which are greater than the recommended minimum value of 0.6, and the average variance extraction of the four latent variables are 0.633 and 0.634, which are greater than the recommended minimum value of 0.5. This means that the measurement model for innovation culture in hospital departments has good convergent validity.

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Chapter 5: Building the Model

5.1 Definition of the relevant concepts

Before deducting the hypothesis and establishing study framework, the author has to define employee engagement, professional identity and job satisfaction to lay the groundwork for further studies.

5.1.1 Work engagement

Kahn (1990) from Boston University is the first to propose definition of work engagement as "members of an organization control themselves so that they and their roles are fully integrated". Kahn (1992) regards work engagement as something temporary, and the job roles and individuals are kept in a dynamic equilibrium. The two transform and coordinate each other. On the basis of Kahn research, Rich et al. (2010) summed up work engagement as a multi-dimensional concept which is comprehensive and all-round investment of a person in his or her job. This is a complete concept that connects personal traits, organizational elements and work performance. Schaufeli and Bakker (2004) proposed that work engagement is a positive, full, more lasting and universal emotion-cognition status. The work engagement is a perfect status full of lasting and positive emotions and motivations. It is a status with positivity and satisfaction. The status is characterized with dynamism, dedication, focus, persistence and diffusivity (SICMH, 2008). Zhang and Chen (2009), when researching into work status of physicians in rural areas in China, proposed that work engagement referred to personal identification of the job which physicians felt that they are doing something extremely important; it is a psychological status where physicians subjectively would like to proactively dedicate themselves to; it is a comprehensive manifestation of the status in which physicians with intentional self-control would like to align themselves, their job roles and responsibilities consistently.

From viewpoints above, one can see that overseas scholars have not reached a consensus regarding work engagement. Their concepts to varying extent have some grounds, and they complement each in their thinking.

Based on the research results of previous scholars and the conditions of this study, the author proposed that physicians' work engagement is a kind of work status in which individual physicians align with the roles and contribute positively to the work, the manifestation being that a fulfilling process.

5.1.2 Professional identity

Holland (1980) contended that professional identity is clear and stable perception of an individual on his career goals, interests, gifts, this is a stable status. Erikson proposed that as an individual grows up and matures, there is a possibility and capacity to strengthen and develop professional identity regardless of whether it is in adolescent stage or adulthood (Sudak, 1983). Coldron and Smith (1999) wrote that professional identify is a way to clearly see the relationship between oneself and others or environment. McGowen and Hart (1990) put it that professional identity includes understanding of the professional practice, the perception of developing one's talents and professional values. Specifically, it includes the common attitude, values, knowledge, beliefs and skills of professionals.

Wei (2008) from China proposed that professional identity is an integral body of individual's perception of his job, experience and behavioral tendency, which is connected to specific professional features. It is a dynamic identity built by one and it is composed of a series of sub-identities. Zhang (2008) thought of professional identity as one's positive approval of one profession, and this is a process as well as a status. Yuan and Wang (2015) regarded professional identity as physicians' viewpoints on social values of their jobs, goals, responsibilities, and it is the psychological foundation for physicians to do a good job and reach their goals of treating patients.

To sum it up, there is no consensus on the definition of professional identify in the academic field, but one can find the commonality about professional identity, which is positive assessment of one's own profession and is a cognitive process about one's own capacity building and professional values.

Drawing on the materials collected in the field and on the basis of the research, physicians' professional identify is defined as: It is a cognitive process in which there is psychological yearning and positive assessment of medical work, expectation for effective integration of personal development and professional values, and the professional practice is always reinforced.

5.1.3 Job satisfaction

Hoppock (1935) proposed the concept of job satisfaction: Workers' fulfilling psychological and physiological perception of environment factors, i.e., the subjective response of workers towards work scenarios. Porter (1968) proposed that job satisfaction is determined by the difference between real wage and his expected wage from a particular job. Smith et al. (1969) raised that job satisfaction is a result of worker's interpretation of work features by using a reference framework composed of different work values, culture backgrounds and personal expectations. Cavanagh (1989, 1992) defined job satisfaction as: the degree of one's liking of one's job that is manifested. It is emotional response to the assessment of one's work or work experience.

Xu (1977) pointed out that job satisfaction referred to personal feelings or emotional response to one's work, and the degree is determined by the difference between the expected value and the real value obtained by the worker. Huang and Xing (2002) regarded job satisfaction as a satisfaction for employees as a "professional", and it is a general assessment after one has compared wages, the job itself, promotion opportunities and his own personal expectation. Xu (1977) from Taiwan, China maintained that job satisfaction is an attitude or a viewpoint of workers on the job and working environment and is an overall emotional response to one's job roles.

Currently, with different perspectives and theories, scholars have different definitions for job satisfaction. With respect to Job satisfaction of physician, most scholars would cite the definition by Cavanagh (1989, 1992).

Considering the content of this research, the author defined job satisfaction as: it is an assessment of an individual physician on a specific psychology level and an attitude full of emotional factors; it is an attitude and emotional experience on the job itself and various parts of a job after one has check the difference between real value and expected value of one's job. The scale used about job satisfaction used in this thesis treats job satisfaction as a whole concept and there is no more analysis on multi-dimensions.

5.2 Research hypotheses

5.2.1 Relationship between variables and dimension components

5.2.1.1 Relationship between material culture and its dimension components

Based on the results of exploratory factors analysis (main component analysis), the latent root of two components in material culture (MC) are greater than 1, and the cumulative variance interpretation ratio is 67.534%, which well explains that the quantity of components in material culture is in line with the presupposed quantity of such components at the beginning. The two components are MC1 cultural signages and MC2 department environment. Therefore, this thesis proposed the following hypothesis:

Hypothesis 001: MC1 and MC2 can be explained by latent variable MC.

5.2.1.2 Relationship between behavioral culture and its dimension components

Based on the results of exploratory factors analysis (main component analysis), the latent root of two components in behavioral culture (BC) are greater than 1, and the cumulative variance interpretation ratio is 64.173%, which well explains that the quantity of components in behavioral culture is in line with the presupposed quantity of such components at the beginning. The two components are BC1 public relations BC2 inter-personal relationship. Therefore, this thesis proposed the following hypothesis:

Hypothesis 002: BC1 and BC2 can be explained by latent variable BC.

5.2.1.3 Relationship between policy culture and its dimension components

Based on the results of exploratory factors analysis (main component analysis), the latent root of two components in policy culture (PC) are greater than 1, and the cumulative variance interpretation ratio is 63.604%, which well explains that the quantity of components in policy culture is in line with the presupposed quantity of such components at the beginning. The two components are PC1 management policies and PC2 policies and regulations. Therefore, this thesis proposed the following hypothesis:

Hypothesis 003: PC1 and PC2 can be explained by latent variable PC.

5.2.1.4 Relationship between spiritual culture and its dimension components

Based on the results of exploratory factors analysis (main component analysis), the latent root of three components in spiritual culture (SC) are greater than 1, and the cumulative variance

interpretation ratio is 74.961%, which well explains that the quantity of components in spiritual culture is in line with the presupposed quantity of such components at the beginning. The three components are SC1 hospital spirit, SC2 ideals and beliefs SC3 cohesion. Therefore, this thesis proposed the following hypothesis:

Hypothesis 004: SC1, SC2 and SC3 can be explained by latent variable SC.

5.2.1.5 Relationship between innovation culture and its dimension components

Based on the results of exploratory factors analysis (main component analysis), the latent root of two components in innovation culture (IC) are greater than 1, and the cumulative variance interpretation ratio is 71.524%, which well explains that the quantity of components in innovation culture is in line with the presupposed quantity of such components at the beginning. The two components are IC1 innovation awareness and IC2 innovation environment. Therefore, this thesis proposed the following hypothesis:

Hypothesis 005: IC1 and IC2 can be explained by latent variable IC.

5.2.2. Relationship between department culture and its dimension components

The modern hospital culture is generated and developed with reference to corporate culture. "Hospital culture" was proposed in the late 1980s in China. To be precise, this term was proposed in the Seminar on Medicine and Culture held in 1989 in Fuzhou, capital of the coastal province Fujian. Department cultures are indispensable parts of a hospital's culture; departments are carriers of hospital culture and department cultures could be important indicators gauging a hospital's culture in general.

After literature review, it is found that scholars agree that the department culture can be put into four kinds: Material culture, policy culture, behavioral culture and spiritual culture (Chen, 2005). Specifically: (1) Material culture on a superficial level. This is expressed in explicit forms, such as the name, logo, layout, structures, facilities and web portal. of the hospital. These forms are integrated to serve as the base for providing healthcare services to the masses. (2) Behavioral culture on a shallow level. This is embodied in various culture phenomena exhibited by healthcare workers engaged in medical activities. It includes attitude towards patients, medical technology, public relations. It showcases the general style and individual traits of a hospital, and it is part of the spiritual culture of a hospital. (3) Policy culture on an intermediate level. This is reflected in the hospital policies, by-laws, regulation, code of conduct. A hospital is a technology-intensive organization with high requirements for mental and physical capacity on the part of healthcare workers who need to be well managed. Consequently, a unified culture

that is commonly accepted and followed is of necessity. (4) Spiritual culture on a deep level. Different from the former three categories, spiritual culture belongs to ways of thinking and ideology, and is embodied in the thinking, views and behaviors of the staff. Compared with policy culture, spiritual culture is an inherent culture trait that needs to be fostered and developed gradually. It is the core culture of a hospital. The four hierarchies form an integral whole for the material culture is the underlying base of policy culture, behavioral culture and spiritual culture; the policy culture is the embodiment of the spiritual culture and it influences the behavioral culture which further reflects the morale in a hospital; the spiritual culture is at the core position in a hospital culture system.

As modern hospitals are being built to an advanced stage, the scope of hospital culture is expanding accordingly. Beside the four hierarchies, there are new elements proposed, such as the building up of technology culture, harmony culture, safety culture and innovation culture. Of these, innovation culture is widely accepted by scholars. In previous studies, innovation culture was not explicitly singled out, but it has been implicated in hospital culture scales. With innovation, progress can be made; entrepreneurship, innovation and teamwork, as part of the hospital culture, are expressed in innovation as well. Innovation culture is a kind of behavioral culture if it is seen from the perspective of cultural composition. It is one side of social culture, it is carried out cultural practices and achievements in innovative activities, and it is the transformation and uplifting of ideas, viewpoints, cognitive methodology, values preferences, behavioral patterns, policy framework. The hospital innovation culture consists of three levels. first, it is about values, which are expressed in concepts about sustainable development, risk awareness, respect for exploring the unknown; second, it is about policies and behaviors, such incentive mechanisms, innovation enthusiasm of physician; third, it is about material forms, such as environment and conditions for innovation, lab facilities, equipment. The dimension of values is the core of building up innovation culture; the policy and behavioral culture is the solid underlying foundation of innovation culture; the working environment and visual identify are the physical carriers of innovation culture. Therefore, on the basis of the original three dimensions of material culture, behavioral culture and policy culture, innovation culture is added. Based on the analysis above, this thesis proposed the following hypothesis:

Hypothesis 06: MC, BC, PC, SC and IC can be explained by latent variable DC.

5.2.3 Relationship between department culture and work engagement

There are different definitions for the term work engagement. Kahn (1990) in theory regarded engagement as the relationship between an employee and the role he plays; in practice,

engagement is defined as a temporal variable behavior that employees exhibit when they are undertaking a specific role. Rich et al. (2010) defined engagement as a stable and continuous dynamic mechanism with which employees put the three-dimensional effort of cognition, emotion and physical body into work entailed by their roles.

First, the role of department culture is motivating the staff in a department with positive beliefs and code of conduct to dedicate themselves into the jobs and make due contributions to the department. The dimension of emotion, staff exhibit work engagement. Second, Department cultures are somewhat mandatory, and equal to certain code of conduct and moral ethics (2012). Subconsciously, the common values in the department are taking shape, making staff to work diligently on a consciously level (Xing, 2016). Therefore, this thesis proposed the following hypothesis:

Hypothesis 07: Department cultures have a positive impact on work engagement.

5.2.4 Relationship between department culture and professional identity

Professional identity, as a psychological concept, denotes an individual's positive approval for the profession he or she is in. There are multiple factors impacting professional identity as it not only includes experience summed up in past work but also includes current work experience, values and expectations for the future work. Department cultures may exert a big impact on current work experience, values and expectation for the future work. High-quality department cultures can align the staff in a department well and build up strong cohesion and sense of belonging; in the meantime, inter-personal relationships will be harmonious as staff care and support each other because they work hard for the common good with dedication. Under such atmosphere, staff could have nice experience; what's indispensable is that successful department cultures encourage staff well and there are benchmarks to emulate in work; there are clear rules for promotion; there are human-oriented and rational incentives and penalties (Qu et al., 2017).

Therefore, the staff's work experience and expectations for the future work will be positive, and consequently professional identity will be of high level. Based on the above, the following hypothesis is proposed:

Hypothesis 08: Department cultures have positive impact on professional identity.

5.2.5 Relationship between professional identity and work engagement

The professional identity for a certain job can be manifested in various ways. For example, profession perception: the staff are proud for have this job; feeling be respected because of this job; For example, professional behavior, the staff could complete their work carefully and active in building harmonious relations with colleagues; For example, professional values: the staff deem it helpful to work in these roles for the general masses and the industry; For example, professional sense of belonging: the staff care about what others say of their profession and feel disappointed when there are groundless accusations.

It can be found that if professional identity is of high level, it could impact work engagement cognitively, emotionally and physically. If the staff have professional pride, they will work harder involuntarily as they take pride in their jobs and will dedicate time and efforts into work without considering costs; physically, staff will be motivated from head to toe so that they dedicate themselves to their work, ensuring good performance (Feng et al., 2017). Therefore, this thesis proposed the following hypothesis:

Hypothesis 09: Professional identity has a positive impact on work engagement.

5.2.6 Relationship between department culture and job satisfaction

The American organizational scientist Locke (1976) defined job satisfaction as "a pleasant feeling when people feel that a job itself could meet or is conducive to meet one's own work value needs," and Berry regarded job satisfaction as "a psychological response of an individual on his work experience". To put it bluntly, job satisfaction is whether one feels happy about his job or not or whether there is a positive experience (Wang et al., 2014). Coincidentally, good department cultures could bring pleasant working experience for staff in an all-round way. Good department cultures entails the implementation of human-centered philosophies, and decisions are not only the responsibility of leaders; instead, all departments and staff of all levels are involved in the decision-making process; a family-like culture is established and there is a sense of belonging among the staff members; Good department cultures only strengthen staff's professional beliefs, and ethics, service oriented principles will be internalized as part of their values; happiness in work and life will be uplift wholly (Zhang et al., 2014). Therefore, this thesis proposed the following hypothesis:

Hypothesis 10: Department cultures have a positive impact on job satisfaction.

5.2.7 Relationship between work engagement and job satisfaction

Based on Kahn's definition of work engagement--work engagement refers to the fact that staff can control themselves so that they can align themselves with the job roles well. From Kahn's perspective, there is a dynamic process where staff themselves and job roles could rely on each other and could dynamically convert to each other. When the work engagement is too high, individuals can put his heart and mind into work and exhibit himself in such work; When the work engagement is too low, the individuals would push themselves away from the job to avoid performing as the organization requires; furthermore, the individual could plan to resign. In terms of structure of work engagement, Schaufeli put it into three elements: vigor, dedication and absorption (Schaufeli et al., 2002).

From this concept and structure, one can deduce that the more dedication there is, the more passionate the staff could be; if there is more dedication and absorption, the staff could contribute more without considering too much about reward. Based on the above, the following hypothesis is proposed:

Hypothesis 11: Work engagement has a positive impact on job satisfaction.

5.2.8 Relationship between professional identity and job satisfaction

A big role of professional identity is to reduce negative emotions and job fatigue, and accordingly will promote job satisfaction. Zhao and Wang (2015), in their study for professional identity of workers in service sector and emotional consumption, had reached conclusion after analyzing variance of questionnaires: professional identify and emotional consumption is negatively correlated. When professional identity is high, the emotional consumption will be low, and vice versa. Positive professional identity on the part of physicians will help deal with frustration in clinical work, discontent towards working environment, relieve job fatigue and improve job satisfaction.

In the meantime, professional identity brings about solemnness, pride, sacredness of the job, and when individuals are in such a job, they feel pleasant in heart and mind; Wang et al. (2010), in her study about nurses' professional identity and the influencing factors, found that the more the nurse felt about external support, the more they felt pride in their jobs; under such a scenario, Maslow's needs (1954) of self-achievement is met, thus the job satisfaction is raised. Therefore, this thesis proposed the following hypothesis:

Hypothesis 12: Professional identity has a positive impact on job satisfaction.

5.3 Building the model

On the basis of theoretical analysis, this study proposed 12 hypotheses to be verified (See Table 5.1). These hypotheses are divided into verifiable and exploratory ones, and the former are those that have been studied and proved by previous scholars; the latter are those that have not be proposed by other scholars, and though there are theoretical research about such, there has never been verified.

Table 5.1 Summary of study hypotheses

SN of hypotheses	Content of hypothesis	Nature of hypotheses
H01	MC1 and MC2 can be explained by latent variable MC	Verifiable
H02	BC1 and BC2 can be explained by latent variable BC	Exploratory
H03	PC1 and PC2 can be explained by latent variable PC	Verifiable
H04	SC1, SC2 and SC3 can be explained by latent variable SC	Exploratory
H05	IC1 and IC2 can be explained by latent variable IC	Exploratory
H06	MC, BC, PC, SC and IC can be explained by latent variable DC	Exploratory
H07	DC has a positive impact on WE	Verifiable
H08	DC has a positive impact on PI	Verifiable
H09	PI has a positive impact on WE	Verifiable
H10	DC has a positive impact on JS	Verifiable
H11	WE has a positive impact on JS	Verifiable
H12	PI has a positive impact on JS	Verifiable

As to the relationship between the material culture of a department in hospitals and its dimension components, there are theoretical and experimental studies by Du (2015), and Zhou (2012) found in literature review, so H01 is regarded as a verifiable hypothesis.

As to the relationship between behavioral culture and its dimension components, there are no theoretical and experimental studies about it, so H02 is regarded as an exploratory hypothesis.

As to the relationship between the policy culture of a department in hospitals and its dimension components, there are theoretical and experimental studies by Chang (2009) and Zhou (2012) found in literature review, so H03 is regarded as a verifiable hypothesis.

As to the relationship between spiritual culture and its dimension components, there are theoretical and experimental studies by Gao (2010), Zhou (2012), and Sun (2015), found in literature review, but in literature it was not found to have subdivision of spiritual culture in department culture and few empirical studies were found. Therefore, it is assumed that H04 is an exploratory hypothesis.

As to the relationship between innovation culture and its dimension components, there are no theoretical and experimental studies about it, so H05 is regarded as an exploratory hypothesis.

As to the relationship between department cultures in hospitals and its dimension components, it is found through literature review that scholar divided department cultures into: Material culture, policy culture, behavioral culture and spiritual culture. However, as modern hospitals are being developed, the scope of hospital culture is expanded; apart from the conventional four layers, innovation culture is proposed, which is well accepted by scholars. Therefore, on the basis of the original four dimensions of material culture, policy culture, behavioral culture and spiritual culture, innovation culture is added. Therefore, it is assumed that H06 is an exploratory hypothesis.

As to the relationship between department cultures in hospitals (DC) and work engagement (WE), it is found through literature review that Kahn (1990), Sun (2012), and Xing (2017) published relevant theoretical and empirical studies. Therefore, it is assumed that H07 is a verifiable hypothesis.

As to the relationship between department cultures in hospitals (DC) and professional identity (PI), it is found through literature review that Sun (2012) published relevant theoretical and empirical studies. Therefore, it is assumed that H08 is a verifiable hypothesis.

As to the relationship between professional identity (PI) and work engagement (WE), it is found through literature review that Feng et al. (2017) published relevant theoretical and empirical studies. Therefore, it is assumed that H09 is a verifiable hypothesis.

As to the relationship between department cultures and job satisfaction, it is found through literature review that Wang (2014) and Zhang (2014) published relevant theoretical and empirical studies. Therefore, it is assumed that H10 is a verifiable hypothesis.

As to the relationship between work engagement (WE) and job satisfaction (JS), it is found through literature review that Sun (2012) published relevant theoretical and empirical studies. Therefore, it is assumed that H11 is a verifiable hypothesis.

As to the relationship between professional identity (PI) and job satisfaction (JS), it is found through literature review that Yuan (2015) published relevant theoretical and empirical studies. Therefore, it is assumed that H12 is a verifiable hypothesis.

This research sorted the relationship between core variables and proposed a series of study hypothesis. Following the logic of "Department cultures in hospitals-Professional identity/work engagement--Job satisfaction", this thesis explored into the inherent relationship between department culture impacting job satisfaction. Ultimately, the initial theoretical model is built. See Figure 5.1.

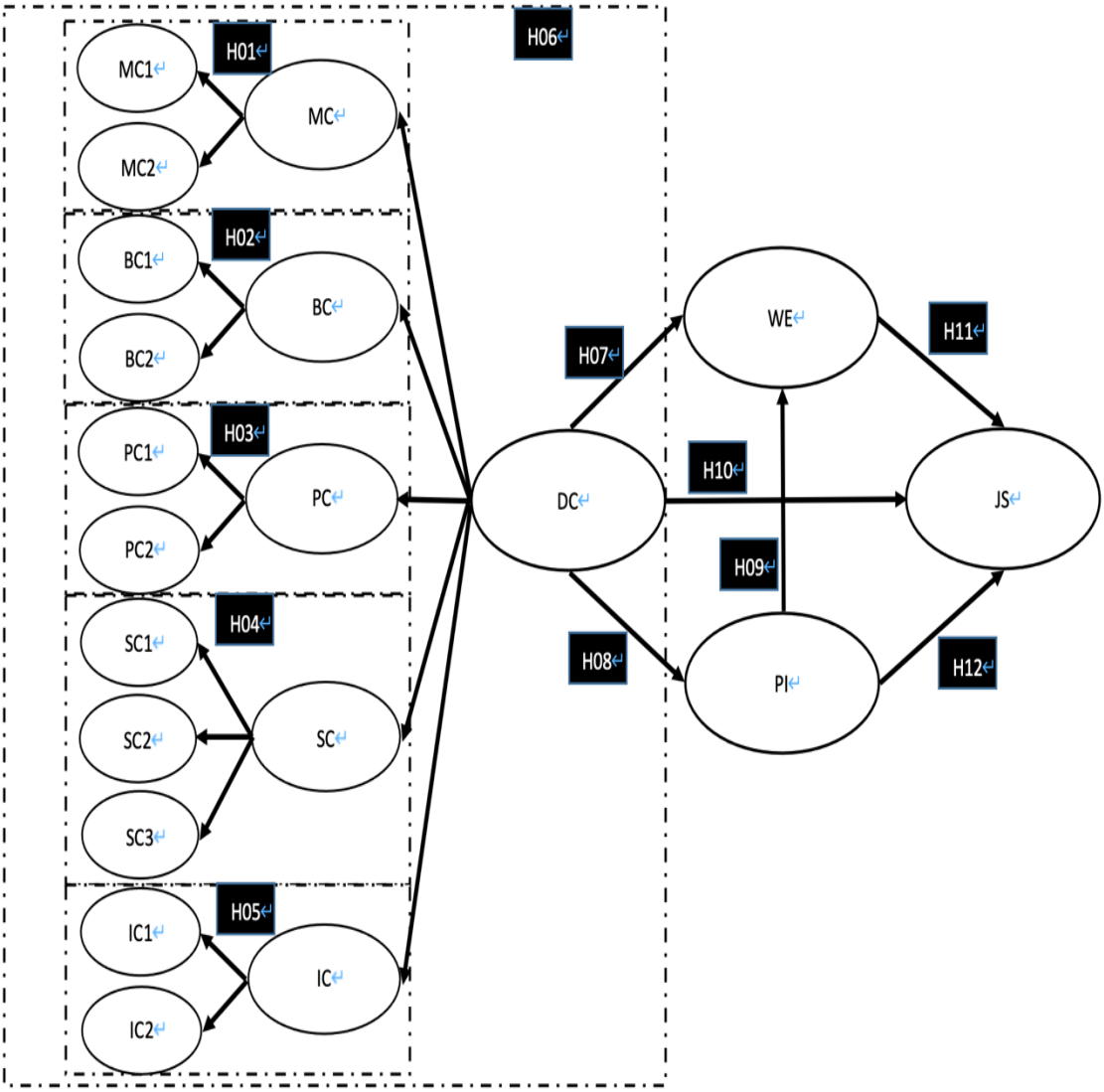


Figure 5.1 Initial theoretical model

Chapter 6: Discussion and Results Analysis

6.1 Study design

6.1.1 Design of relevant subscales

Subscale (to be verified) for work engagement, professional identity and job satisfaction can be seen in the following Table 6.1.

Table 6.1 Subscale for work engagement, professional identity and job satisfaction

Dimension	Meaning of questions for measurement	Sources
Work Engagement	After getting up, I happily go to work.	Zhang (2014)
	When I work, I feel I am fully of energy.	Schaufeli (2002)
	When I am working, I would forget everything around me.	Jing (2015)
	When I am working, I feel time flies.	Wang (2013)
	When I am devoted to my work, I feel very happy.	Jing (2015)
	I am full of passion for my job.	Wang (2013)
	The work I do can continuously motivate me.	Yang (2008)
	It is very difficult for me to drop the work at hand.	Wang (2007)
Professional Identity	A physician is a lofty and respectable job.	Chai (2012)
	The physician's job is related to life and death of people and it is of high responsibility and risk.	Zhang (2010)
	Approval from my leaders and colleagues makes me happy.	Chai (2012)
	If given a second chance, I still want to be a physician.	Xia (2012)
	Being a physician can help me achieve my personal value in life.	Zhang (2010)
	Relieving patients of their pain and illness gives me a sense of achievement.	Qiao (2016)
	I give weight to communication with patients.	Qiao (2016)
	I am willing to participate in training and further my education to improve my practice.	Zhang (2010)
Job satisfaction	I am satisfied with my salary level.	Zhao (2006)
	I am satisfied with my promotion opportunities.	Chang (2015)
	I get along with colleagues very well.	Zhao (2006)
	I am proud of my job.	Zeng (2007)
	My superior is very qualified for his/her job.	Chang (2015)
	My leader approves my job very much.	Chen (2008)
	I am very satisfied with a physician's social status.	Zhao (2006)
	I have a sense of identity and belonging in the hospital where I work.	Li (2007)
	There are many opportunities for physicians to receive professional training and further education.	Li (2007)
	I am very satisfied with the current practicing	Wang (2018)

	environment.	
	I am optimistic about the career prospects of physicians.	Xu (2007)
	I am very satisfied with the incentive policies on research and innovation and with the working environment.	Zeng (2007)

6.1.2 Scales validation and modification

In the formal survey (the second survey) in this study, the questions in subscale for work engagement (to be calibrated), the subscale for professional identity (to be calibrated), the subscale for job satisfaction (to be calibrated) were put together with those about department culture, so the data for validation regarding the subscales were from the formal survey (the second survey). The material culture, behavioral culture, policy culture, spiritual culture, innovation culture has been validated in Chapter IV, so the following is to validate the subscales for work engagement, professional identity and job satisfaction for reliability and validity.

6.1.2.1 Validation of internal consistency

By using the data collected in the formal survey (the second survey), the following is going to analyze the CITC value and Cronbach α value for work engagement, professional identity and job satisfaction. The specifics are shown in Table 6.2.

Table 6.2 Reliability analysis of the subscale for WE, PI and JS

Dimension	Questions	CITC Value	Alpha if Item Delete	Overall Cronbach α value of the scale
Work Engagement WE	WE1	0.714	0.917	0.924
	WE 2	0.710	0.917	
	WE 3	0.795	0.910	
	WE 4	0.638	0.922	
	WE 5	0.803	0.910	
	WE 6	0.806	0.909	
	WE 7	0.803	0.910	
	WE 8	0.681	0.919	
Professional Identity PI	PI 1	0.561	0.855	0.865
	PI 2	0.607	0.849	
	PI 3	0.648	0.845	
	PI 4	0.515	0.859	
	PI 5	0.607	0.849	
	PI 6	0.673	0.842	
	PI 7	0.675	0.842	
	PI 8	0.636	0.846	
Job Satisfaction JS	JS 1	0.622	0.905	0.911
	JS 2	0.647	0.904	
	JS 3	0.644	0.904	
	JS 4	0.659	0.903	
	JS 5	0.561	0.907	
	JS 6	0.593	0.906	

JS 7	0.657	0.903
JS 8	0.668	0.903
JS9	0.677	0.902
JS10	0.658	0.903
JS11	0.685	0.902
JS12	0.670	0.903

From Table 6.2, it can be found that CITC values of the subscales are all larger than 0.5, and the overall Cronbach α values of subscales are larger than 0.7, which indicates that all subscales have sound internal consistency.

6.1.2.2 Exploratory factor analysis

Table 6.3 Subscale for work engagement, professional identity and job satisfaction

Indicators	Meaning of questions for measurement
WE	After getting up, I happily go to work. When I work, I feel I am fully of energy. When I am working, I would forget everything around me. When I am working, I feel time flies. When I am devoted to my work, I feel very happy. I am full of passion for my job. The work I do can continuously motivate me. It is very difficult for me to drop the work at hand.
PI	A physician is a lofty and respectable job. The physician's job is related to life and death of people and it is of high responsibility and risk. Approval from my leaders and colleagues makes me happy. If given a second chance, I still want to be a physician. Being a physician can help me achieve my personal value in life. Relieving patients of their pain and illness gives me a sense of achievement. I give weight to communication with patients. I am willing to participate in training and further my education to improve my practice.
JS	I am satisfied with my salary level. I am satisfied with my promotion opportunities. I get along with colleagues very well. I am proud of my job. My superior is very qualified for his/her job. My leader approves my job very much. I am very satisfied with a physician's social status. I have a sense of identity and belonging in the hospital where I work. There are many opportunities for physicians to receive professional training and further education. I am very satisfied with the current practicing environment. I am optimistic about the career prospects of physicians. I am very satisfied with the incentive policies on research and innovation and with the working environment.

As the subscales for work engagement, professional identity and job satisfaction use uni-dimensional questions, no exploratory factor analysis would be pursued here. Subscales for

work engagement, professional identity and job satisfaction were generated, which are shown in Table 6.3.

With the validation in reliability and validity above, and with the questions for material culture, behavioral culture, policy culture, spiritual culture and innovation culture studied in Chapter IV, this thesis established the final questionnaire used for validation, which is shown in Annex C Table c1.

6.2 Data analysis

6.2.1 Descriptive statistics

(1) Descriptive statistics of material culture in hospital departments. As Annex A Table a.1 indicates, the average score of material culture (MC1 and MC2) is 2.044, which is lower than the mean value (3) in the 5-point scale. This study adopted the Likert 5-point scale (1 Strongly agree, 2 Agree, 3 Neutral, 4 Disagree and 5 Strongly disagree), so even lower values signify that material culture plays a more important role. Among the questions, question 3 "I am aware of the functions of the bulletin board (cultural bulletin)" has an average value of 1.77, which is the question with the lowest average value, indicating that to some extent physicians know the functions of bulletin board (cultural bulletin) very well. Questions5 "I feel that the layout of the department is rational" has an average value of 2.50, which is the question with the highest average value, indicating that generally physicians do not regard the layout of the department as rational. In addition, the standard deviation of all questions is less than 1, which indicates that interviewees' viewpoints are more converging than polarizing. If kurtosis and measure of skewness is considered, it can be found that the data is in normal distribution.

(2) Descriptive statistics of behavioral culture in hospital departments. The average score of behavioral culture is 1.779, which is lower than the mean value (3) in the 5-point scale. This study adopted the Likert 5-point scale (1 Strongly agree, 2 Agree, 3 Neutral, 4 Disagree and 5 Strongly disagree), so even lower values signify that behavioral culture plays a more important role. Questions 12 "I feel that the medical technology provided in the department is professional" has an average value of 1.57, which is the lowest value in the dimension of behavioral culture, indicating that to some extent physicians approve of the medical technology provided in the department. The average score of the rest of the questions range between 1 and 2, which indicates that physicians have high approval of the public relations and Inter-personal relationship in behavioral culture. In addition, the standard deviation of all questions is less than

1, which indicates that interviewees' viewpoints are more converging than polarizing. If kurtosis and measure of skewness is considered, it can be found that the data is in normal distribution.

(3) Descriptive statistics of policy culture in hospital departments. The average score of policy culture is 1.821, which is lower than the mean value (3) in the 5-point scale. This study adopted the Likert 5-point scale (1 Strongly agree, 2 Agree, 3 Neutral, 4 Disagree and 5 Strongly disagree), so even lower values signify that policy culture plays a more important role. Questions 27 "I think 'Practicing medicine legally' is the bottom line of any medical services" has an average value of 1.46, which is the lowest value in the dimension of policy culture, indicating that to some extent all physicians believe " practicing medicine legally" is the bottom line of the industry. The value of the rest of the questions range between 1 and 2, which suggests that physicians approve of the management policies in the department and are willing to follow the rules and regulations that they know well. In addition, the standard deviation of all questions is less than 1, which indicates that interviewees' viewpoints are more converging than polarizing. If kurtosis and measure of skewness is considered, it can be found that the data is in normal distribution.

(4) Descriptive statistics of spiritual culture in hospital departments. The average score of spiritual culture is 1.686, which is lower than the mean value (3) in the 5-point scale. This study adopted the Likert 5-point scale (1 Strongly agree, 2 Agree, 3 Neutral, 4 Disagree and 5 Strongly disagree), so even lower values signify that spiritual culture plays a more important role. Question 34 "I feel that 'saving the dying and rescuing the wounded" is the natural mission of the department" and question 44 "I feel that my personal future is closely related to that of the department all have an average value less than 1.48, which is the question with the lowest mean value in spiritual culture, indicating that to some extent physicians fully agree with the idea of "saving the dying and rescuing the wounded" and personal prospects is closely related to the future of the department. Question 41 "I can systematically elaborate the core concepts in my department" has an average value of 2.06, which is the question with the highest value in the dimension of spiritual culture. Though it is between 2 and 3, it is more proximal to 2, so to some extent the core concepts in Department culture in hospitals are well accepted by physicians. In addition, the standard deviation of all questions is less than 1, which indicates that interviewees' viewpoints are more converging than polarizing. If kurtosis and measure of skewness is considered, it can be found that the data is in normal distribution.

(5) Descriptive statistics of innovation culture in hospital departments. The average score of innovation culture is 1.92, which is lower than the mean value (3) in the 5-point scale. This study adopted the Likert 5-point scale (1 Strongly agree, 2 Agree, 3 Neutral, 4 Disagree and 5

Strongly disagree), so even lower values signify that innovation culture plays a more important role. Question 52 "I feel that the I can access the latest advances and knowledge of this discipline" has an average value of 1.67, which is the lowest in the dimension of innovation culture, indicating that to some extent physicians have more opportunities and pathways to have access to the latest advances and knowledge in their disciplines. Questions 56 "The department encourages and incentivizes the physician's innovative behavior and risk taking" has an average value of 2.10, which is the highest value in the dimension of innovation culture, indicating that physicians have relatively lower awareness of incentives risk-taking encouragement from hospitals. In addition, the standard deviation of all questions is less than 1, which indicates that interviewees' viewpoints are more converging than polarizing. If kurtosis and measure of skewness is considered, it can be found that the data is in normal distribution.

(6) Descriptive statistics of work engagement. The physicians' work engagement has an average value of 1.906, which is lower than the mean value (3) in the 5-point scale. This study adopted the Likert 5-point scale (1 Strongly agree, 2 Agree, 3 Neutral, 4 Disagree and 5 Strongly disagree), so even lower values signify that work engagement plays a more important role. Question 4 "When I am working, I feel time flies" has an average value of 1.74, which is the lowest in the dimension of work engagement, indicating that physicians agree that they should be focused and devoted in the work. Questions 8 "It is very difficult for me to drop the work at hand" has an average value of 2.05, which is the highest in all questions about work engagement. It is still more proximal to 2, which suggests that physicians have strong attachment to their work. In addition, the standard deviation of all questions is less than 1, which indicates that interviewees' viewpoints are more converging than polarizing. If kurtosis and measure of skewness is considered, it can be found that the data is in normal distribution.

(7) Descriptive statistics of professional identity. The physicians' professional identity has an average value of 1.825, which is lower than the mean value (3) in the 5-point scale. This study adopted the Likert 5-point scale (1 Strongly agree, 2 Agree, 3 Neutral, 4 Disagree and 5 Strongly disagree), so even lower values signify that material culture plays a more important role. Questions 2 " The physician's job is related to life and death of people and it is of high responsibility and risk" has an average value of 1.59, which is a question with the lowest value in the dimension of professional identity, indicating that to some extent physicians all clearly know their professions, regarding physicians' work as something that is related to life and death of people and that is of high responsibility and risk. Questions 4 "If given a second chance, I still want to be a physician" has an average value of 2.17, which is the highest in the questions in the dimension of professional identity, indicating under the current circumstances, some

physicians are bewildered about the future of this profession and hesitate to choose this industry again if given a second chance. In addition, the standard deviation of all questions is less than 1, which indicates that interviewees' viewpoints are more converging than polarizing. If kurtosis and measure of skewness is considered, it can be found that the data is in normal distribution.

(8) Descriptive statistics of job satisfaction. The average value of job satisfaction is 2.043, which is lower than the mean value (3) in the 5-point scale. This study adopted the Likert 5-point scale (1 Strongly agree, 2 Agree, 3 Neutral, 4 Disagree and 5 Strongly disagree), so even lower values signify that job satisfaction is very high. Question 3 "I get along with colleagues very well" has an average value of 1.80, which is the lowest in the questions in the dimension of job satisfaction, indicating that to some extent physicians agree that harmonious relations between colleagues are important. Question 1 "I am satisfied with my salary level" has an average value of 2.24, which is the highest in the questions in the dimension of job satisfaction, indicating that physicians generally accept that the salaries are not well set and are not in proportion to the work they undertake. In addition, the standard deviation of all questions is less than 1, which indicates that interviewees' viewpoints are more converging than polarizing. If kurtosis and measure of skewness is considered, it can be found that the data is in normal distribution

All of the above descriptive statistics data are shown in Annex A Table a.1.

6.2.2 Test for reliability and validity of the questionnaires

Due to cleaning of some questions for subscales in the formal survey (the second survey), it is necessary to further test the scales for reliability and validity in the validation process.

6.2.2.1 Validation of internal consistency

The methods used for validating internal consistency is the same as that used earlier in this study，item-Total (CITC) and Cronbach α coefficient are used, the result is shown in Table 6.4 and Table 6.5.

Table 6.4 Reliability analysis for the scale of department culture

Dimension components		Questions	CITC value	Alpha if item delete	Cronbach α value	Overall Cronbach α value
MC	MC1	mc1	0.714	0.814	0.859	0.907
		mc2	0.702	0.819		
		mc3	0.728	0.809		
		mc4	0.670	0.835		
	MC2	mc5	0.647	0.816	0.850	
		mc6	0.709	0.796		

BC	BC1	mc7	0.670	0.810	0.894	0.935	
		mc8	0.614	0.823			
		mc9	0.646	0.813			
		bc10	0.734	0.867			
		bc11	0.703	0.876			
		bc12	0.776	0.859			
		bc13	0.766	0.860			
		bc14	0.707	0.873			
		bc15	0.743	0.869			
		bc16	0.744	0.869			
	BC2	bc17	0.806	0.855	0.896		
		bc18	0.794	0.858			
		bc19	0.624	0.898			
PC	PC1	pc20	0.697	0.909	0.913	0.937	
		pc21	0.803	0.888			
		pc22	0.806	0.888			
		pc23	0.837	0.881			
		pc24	0.754	0.899			
		pc25	0.770	0.853			
		pc26	0.627	0.884			
	PC2	pc27	0.706	0.871	0.890		
		pc28	0.769	0.853			
		pc29	0.784	0.851			
SC	SC1	sc30	0.841	0.831	0.892	0.951	
		sc31	0.767	0.860			
		sc32	0.789	0.851			
		sc33	0.658	0.897			
		sc34	0.757	0.900			
	SC2	sc35	0.835	0.883	0.915		
		sc36	0.732	0.905			
		sc37	0.822	0.886			
		sc38	0.770	0.899			
	SC3	sc39	0.749	0.814	0.868		
		sc40	0.764	0.799			
		sc41	0.734	0.828			
IC	IC1	ic42	0.741	0.795	0.863	0.931	
		ic43	0.695	0.849			
		ic44	0.776	0.763			
		ic45	0.786	0.916			
		ic46	0.792	0.916			
	IC2	ic47	0.824	0.909	0.929		
		ic48	0.857	0.902			
		ic49	0.800	0.913			

Table 6.5 Reliability analysis for the scales for WE, PI and JS

Dimension components	Questions	CITC value	Alpha if Item delete	Overall Cronbach α value of the scale
WE	we1	0.714	0.917	0.924
	we2	0.710	0.917	
	we3	0.795	0.910	
	we4	0.638	0.922	
	we5	0.803	0.910	
	we6	0.806	0.909	
	we7	0.803	0.910	
	we8	0.681	0.919	

PI	pi1	0.561	0.855	0.865
	pi2	0.607	0.849	
	pi3	0.648	0.845	
	pi4	0.515	0.859	
	pi5	0.607	0.849	
	pi6	0.673	0.842	
	pi7	0.675	0.842	
	pi 8	0.636	0.846	
JS	JS1	0.622	0.905	0.911
	JS 2	0.647	0.904	
	JS 3	0.644	0.904	
	JS 4	0.659	0.903	
	JS 5	0.561	0.907	
	JS 6	0.593	0.906	
	JS 7	0.657	0.903	
	JS 8	0.668	0.903	
	JS 9	0.677	0.902	
	JS 10	0.658	0.903	
	JS 11	0.685	0.902	
	JS 12	0.670	0.903	

6.2.2.2 Exploratory factor analysis (Principal component analysis)

To ensure the unidimentionality of each variable and discriminant validity among different variables, the thesis has conducted principal component analysis (PCA) for eight items of MC, BC, PC, SC (spirits), IC, WE, PI and JS (Job satisfaction). Data in Table 6.6 shows the number of principal components extracted from each group of items, explained variance ratio, KMO value from Bartlett spherical test and p value. The ratio of explained variance is acceptable, as it varies between 0.66 and 0.78. KMO values are larger than 0.8, the P value of Bartlett test is less than 0.01, showing that data all basically meet the requirements.

Table 6.6 The dimension validation of hospital DC

Variable	Number of factors	Percentage of relevancy (%)	KMO value	P value
MC	2	66.303	0.902	＜0.001
BC	2	70.997	0.939	＜0.001
PC	2	72.508	0.939	＜0.001
SC	3	77.263	0.951	＜0.001
IC	2	78.730	0.913	＜0.001

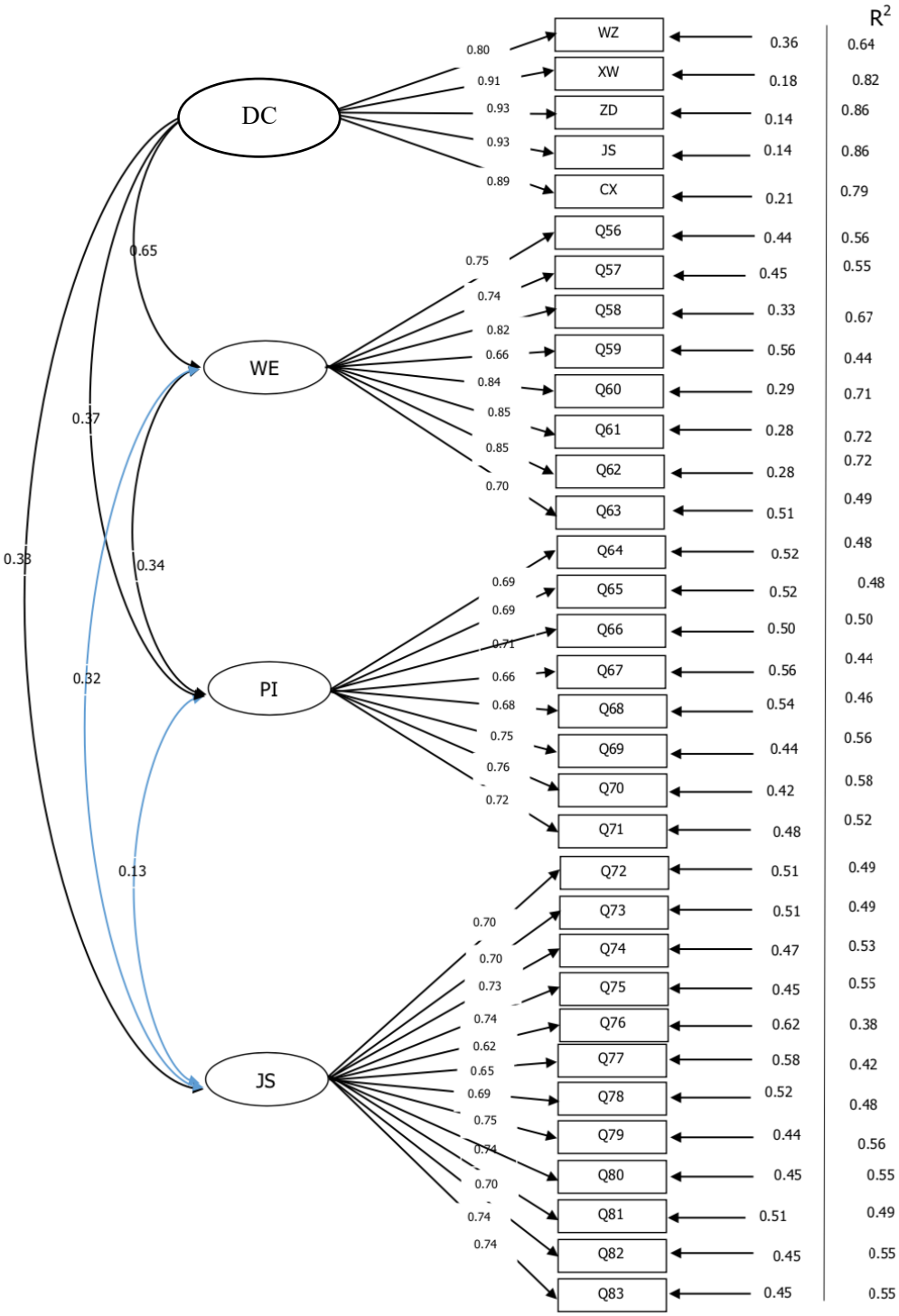
Varimax rotation methods are applied to ensure the explanation of principal component is clearer and more concise. After Varimax rotation, the load is shown in Table 6.7.

Table 6.7 Results of Exploratory factor analysis of hospital department culture

Item	Principal component		
	Factor1	Factor2	Factor3
MC1	0.691		
MC2	0.703		
MC3	0.839		
MC4	0.802		
MC5		0.650	
MC6		0.800	
MC7		0.717	
MC8		0.733	
MC9		0.688	
BC1	0.700		
BC2	0.828		
BC3	0.814		
BC4	0.686		
BC5	0.645		
BC6		0.677	
BC7		0.791	
BC8		0.827	
BC9		0.807	
BC10		0.665	
PC1	0.668		
PC2	0.815		
PC3	0.799		
PC4	0.842		
PC5	0.803		
PC6		0.699	
PC7		0.810	
PC8		0.679	
PC9		0.778	
PC10		0.705	
SC1	0.754		
SC2	0.710		
SC3	0.783		
SC4	0.602		
SC5		0.606	
SC6		0.792	
SC7		0.622	
SC8		0.801	
SC9		0.822	
SC10			0.692
SC11			0.692
SC12			0.838
IC1	0.861		
IC2	0.700		
IC3	0.875		
IC4		0.713	
IC5		0.787	
IC6		0.811	
IC7		0.874	
IC8		0.858	

As the subscales for work engagement, professional identity and job satisfaction use uni-dimensional questions, no exploratory factor analysis would be pursued here.

6.2.2.3 Analysis of confirmatory factors



χ^2=1114.597, df=489, P-value=0.000, RMSEA=0.048

Figure 6.1 Results of confirmatory factor analysis

In order to validate the convergent validity of subscales of various variables, analysis of confirmatory factors is firstly carried out. Software AMOS 20.0 is used for analyzing the confirmatory factors, and the results are shown in Figure 6.1.

The results of confirmatory factor analysis can be seen in the figure, and the chi-square to degree of freedom of the test model is 2.279, which indicates a good fitting. The GFI value is 0.885, the AGFI value is 0.869, the TLI value is 0.944, the CFI value is 0.948, the RMR value is 0.021, and the RMSEA value is 0.048. These indicators suggest that the analysis model of the confirmatory factors fits well with data collected.

The convergent validity of each subscale is measured with their standard factor load (SFL) and average variance extraction (AVE). As is shown in Table 6.8, the SFL of each observable variable is between 0.62 and 0.93, and 2/3 of the observable variables are larger than statistically minimally acceptable 0.7, and 1/3 of the observable variables are less than 0.7, but all are larger than 0.5. In addition, the composition reliability of 4 latent variables is 0.814, 0.915, 0.889 and 0.924, which are larger than or around 0.7, the statistically minimally acceptable value. Their AVE values are 0.756, 0.579, 0.516 and 0.503, which are all larger than the statistically minimally acceptable value of 0.5. The data suggests that each concept in the theoretical model has its satisfactory convergent validity.

Table 6.8 Convergent validity analysis of model variables

Latent variable	Observable variable	Standard factor load SFL	Error item	Average variance extraction	Composition reliability
DC	MC	0.80	0.36	0.756	0.814
	BC	0.91	0.17		
	PC	0.93	0.14		
	SC	0.93	0.14		
	IC	0.89	0.21		
WE	Going to work happily everyday	0.75	0.44	0.579	0.915
	Being energetic in work	0.74	0.55		
	Fully devoted to work	0.82	0.67		
	Time flies quickly in work	0.66	0.56		
	Fully focused	0.84	0.29		
	Passionate about work	0.85	0.28		
	Work motivates me	0.85	0.28		
PI	Hard to drop my work	0.70	0.51	0.516	0.889
	Noble profession	0.69	0.524		
	Job importance	0.69	0.524		
	Work brings me happiness	0.71	0.496		
	Steadfast career goals	0.66	0.564		
	Public approval of the job	0.68	0.538		
	Sense of achievement in this industry	0.75	0.438		
	Physician and patient	0.76	0.422		

	communication				
	Further education	0.72	0.482		
	Satisfaction with salary	0.70	0.51		
	Satisfaction with promotion	0.70	0.51		
	Harmonious relations with colleagues	0.73	0.467		
	Pride of being a physician	0.74	0.452		
	Approval of leaders	0.62	0.616		
	Leaders' approval	0.65	0.578		
	Satisfaction with job position	0.69	0.524		
JS	Sense of belonging in the hospital	0.75	0.438	0.503	0.924
	More opportunities for on-the-job training	0.74	0.452		
	Satisfaction with practicing environment	0.70	0.51		
	Satisfaction with career prospects	0.74	0.452		
	Satisfaction with research environment	0.74	0.452		

6.3 Cross-over Analysis

6.3.1 Comparison of physicians of different genders

The independent sample T tests conducted using SPSS produced the following results: there are no gender differences in the Q56-Q63 of work engagement in physicians. There are gender differences in Q66 (recognized by colleagues) (t=2.686, P=0.007)； and also, in Q67 (unswervingly selected occupation) (t=2.539, P=0.011)，only Q66 and Q67 shows difference in Q64-Q71 of professional identity dimension. There are no gender differences in Q72-Q83 of job satisfaction, seeing the following Table 6.9 for details.

Table 6.9 Variance Analysis of the influence of gender to WE, PI and JS

Main Component	Gender	M	SD	*t*	*df*	*P*-Value
Q56	M	2.01	.666	-0.579	565	0.563
	F	2.04	.728			
Q57	M	1.85	.663	0.906	565	0.365
	F	1.80	.671			
Q58	M	1.95	.712	0.247	565	0.805
	F	1.93	.694			
Q59	M	1.74	.613	-0.124	565	0.902
	F	1.75	.652			
Q60	M	1.93	.690	0.670	565	0.503
	F	1.90	.656			
Q61	M	1.84	.669	-0.270	565	0.788
	F	1.86	.664			
Q62	M	1.89	.687	0.026	565	0.980

	F	1.89	.669			
Q63	M	2.02	.692	-0.960	565	0.337
	F	2.08	.727			
Q64	M	1.87	.673	1.128	565	.260
	F	1.81	.640			
Q65	M	1.60	.655	-.311	565	.756
	F	1.62	.656			
Q66	M	1.87	.645	2.686	565	.007
	F	1.73	.637			
Q67	M	2.13	.625	2.539	565	.011
	F	2.00	.566			
Q68	M	2.02	.666	.969	565	.333
	F	1.97	.629			
Q69	M	1.77	.675	-.030	565	.976
	F	1.77	.620			
Q70	M	1.72	.641	.253	565	.800
	F	1.71	.610			
Q71	M	1.71	.636	.764	565	.445
	F	1.67	.606			
Q72	M	2.21	.662	-0.847	565	0.397
	F	2.26	.670			
Q73	M	2.19	.693	-0.073	565	0.942
	F	2.19	.619			
Q74	M	1.85	.620	0.119	565	0.906
	F	1.84	.565			
Q75	M	1.93	.684	1.114	565	0.266
	F	1.87	.632			
Q76	M	2.11	.574	0.118	565	0.906
	F	2.10	.554			
Q77	M	2.14	.562	0.726	565	0.468
	F	2.10	.572			
Q78	M	2.16	.678	1.333	565	0.183
	F	2.08	.633			
Q79	M	1.93	.681	0.686	565	0.493
	F	1.89	.626			
Q80	M	1.96	.651	1.378	565	0.169
	F	1.89	.619			
Q81	M	2.19	.657	0.915	565	0.361
	F	2.14	.673			
Q82	M	2.09	.673	0.582	565	0.561
	F	2.06	.643			
Q83	M	2.08	.661	1.134	565	0.257
	F	2.02	.651			

6.3.2 Comparison of physicians of different ages

The mean values of all dimensions of physicians with different ages were analyzed by means of one-way variance analysis (One-way ANOVA). The results were from SPSS as follows:

There is no significant difference between physicians of different ages in Q58, Q59, Q62 of work engagement (p >0.05). There is significant difference in Q56 (willing to work) (F= 3.084, P=0.016), Q57 (energetic in work) (F=3.222, P=0.012), Q60 (feel happy in work) (F=2.672, P=0.031), Q61 (passion for my job) (F=2.426, P=0.047), and Q63 (difficult to drop the work) (F=2.439, P=0.046).

On the items of professional identity questionnaire, statistics shows that there is no significant difference in Q64 (respectable job), Q65 (responsibility and risk), Q66 (colleague approval), Q67 (firm to vocation), Q68 (life value), Q69 (achievement in professional), Q70 (communication), Q71 (participate training) (p >0.05) of physicians of different ages (p >0.05).

The mean values of all dimensions of physicians' job satisfaction with different ages were analyzed by one-way variance analysis (One-way ANOVA). The results were from SPSS as follows: There are no significant differences in promotion opportunities (Q73) and attribution (Q79) between different ages in terms of job satisfaction (p >0.05). There are significant differences in salary level (Q72) (F=4.100, P=0.003)， get along with colleagues (Q74) (F=2.320, P=0.056), proud of my job (Q75) F=3.066, P=0.016), superior's qualification (Q76) (F=1.645, P=0.161), leader approves job (Q77) (F=3.057, P=0.016)， social status (Q78) (F=3.013, P=0.018), opportunity of professional training (Q80) (F=2.670, P=0.031), practicing environment (Q81) (F=2.694, P=0.030), career prospects (Q82) (F=3.052, P=0.01), policies on research and innovation (Q83) (F=6.799, P=0.000). The cross-analysis results are shown in Annex B Table b.1.

6.3.3 Comparison of physicians of different monthly income after tax

SPSS calculation shows that there is no significant difference in work engagement items to physicians in monthly income after tax by using One-way ANOVA (p >0.05). Items are "willing to work" (Q56), energy to work (Q57), involve to work (Q58), feel time flying(Q59), enjoy work (Q60), passion to work (Q61), motivation (Q62), difficult to drop from work (Q63).

SPSS calculation shows that there is no significant difference in professional identity items to physicians in monthly income after tax by using One-way ANOVA (p >0.05). Items are: respectable job (Q64), risk and responsibility (Q65), Approval from colleagues (Q66), Q67 (firm to vocation), Q68 (life value), Q69 (achievement in professional), Q70 (communication).

SPSS calculation shows that there is no significant difference in job satisfaction to income after tax by using One-way ANOVA (p >0.05). Items of job satisfaction are: salary level (Q72), promotion opportunity (Q73), get along with colleagues (Q74), pride of job (Q75), superior's qualification (Q76), leader approves job (Q77), social status (Q78), belonging in the hospital (Q79), opportunity of professional training (Q80), practicing environment (Q81), career prospects (Q82), (Q83) policies on research and innovation. The cross-analysis results are shown in Annex B Table b.2.

6.3.4 Comparison of physicians of different job positions

SPSS calculation shows that there is no significant difference in work engagement item enjoy work (Q60) to job positions by using One-way ANOVA (p >0.05), and there are significant difference in work engagement items "willing to work" (Q56) (F= 3.617, P=0.013), energy to work (Q57) (F=6.100, P=0.000), involve to work (Q58) (F= 3.096, P=0.026), feel time flying (Q59) (F=4.717, P=0.003), enjoy work (Q60), passion to work (Q61) (F=5.243, P=0.001), motivation (Q62) (F= 4.912, P=0.002), difficult to drop from work (Q63) (F=4.341, P=0.005).

SPSS calculation shows that there is no significant difference in professional identity to job positions in items: (Q66) approval from colleagues, (Q69) achievement in professional, (Q70) communication, and (Q71) willing to training by using one-way ANOVA (p >0.05). And there is significant difference in professional identity items: respectable job (Q64) (F=4.112, P=0.007), risk and responsibility (Q65) (F=2.894, P=0.035), approval from colleagues (Q66), (Q67) (firm to vocation) (F=2.866, P=0.036), Q68 (life value) (F=3.109, P=0.026).

SPSS calculation shows that there is no significant difference in job satisfaction of physicians in job position by using One-way ANOVA (p >0.05), items include: salary level (Q72), promotion opportunity (Q73), get along with colleagues (Q74), pride of job (Q75), superior's qualification (Q76), leader approves job (Q77), social status (Q78), belonging in the hospital (Q79), opportunity of professional training (Q80), practicing environment (Q81), career prospects (Q82), (Q83)policies on research and innovation. The cross-analysis results are shown in Annex B Table b.3.

6.3.5 Comparison of physicians of different specialties

SPSS calculation shows that there is no difference in the work engagement of physicians in different specialties by using One-way ANOVA (p >0.05), these items are: (Q56) willing to work, (Q57) energy to work, (Q63) difficult to drop from work. And the following items show

significant difference in different specialties, (Q58) involve to work (F= 1.933, *P*=0.016), (Q59) feel time flying (F=1.825, *P*=0.025), (Q60) enjoy work (F=1.923, *P*=0.016), (Q61) passion to work (F=2.277, *P*=0.003), (Q62) motivation (F= 2.235, *P*=0.004).

SPSS calculation shows that items (Q66) approval from colleagues, Q68 life value, Q69 achievement in professional, (Q70) communication, and (Q71) willing to training have no significant difference in different specialties (p>0.05); and items (Q64) respectable job (F=1.800, *P*=0.028), (Q65) risk and responsibility (F=2.554, *P*=0.001), (Q66) approval from colleagues (Q67) firm to vocation, (F=1.713, *P*=0.041) have significant difference.

SPSS calculation shows that there is no significant difference in job satisfaction of physicians in different specialties by using One-way ANOVA. Items are : (Q72) salary level, (Q73) promotion opportunity, (Q74) get along with colleagues, (Q75) pride of job, (Q76) superior's qualification, (Q77) leader approves job, (Q78) social status (Q79) belonging in the hospital, (Q80) opportunity of professional training, (Q81) practicing environment, (Q82) career prospects，(Q83) policies on research and innovation. The cross-analysis results are shown in Annex B Table b.4.

6.3.6 Comparison of physicians of different education degrees

SPSS calculation shows that items (Q56) willing to work, (Q57) energy to work, (Q58) involve to work, (Q59) feel time flying enjoy work (Q60) enjoy work has no significant difference in physicians in different education degree to work engagement of by using One-way ANOVA (p >0.05); and items (Q61) passion to work, (Q62) self-motivation has significant difference as listed in following table:

SPSS calculation shows that there is no significant difference in items (Q64) respectable job, (Q66) approval from colleagues, (Q68) life value, (Q69) achievement in professional, (Q71) willing to training of professional identity of physicians in education degree by using One-way ANOVA (p >0.05), and there is significant difference in items (Q65) risk and responsibility (F=3.479, *P*=0.032), (Q67) firm to vocation (F=7.028, *P*=0.001), (Q70) communication (F=3.712, *P*=0.025).

SPSS calculation shows that there is no significant difference in items (Q72) salary level, (Q73) promotion opportunity, (Q74) get along with colleagues, (Q75) pride of job, (Q76) superior's qualification, (Q78) social status, (Q80) opportunity of professional training, (Q81) practicing environment, (Q82) career prospects, (Q83) policies on research and innovation (p >0.05); and there is significant difference in items (Q77) leader approves job (F=4.730,

P=0.009)，(Q79) belonging in the hospital (F=3.904, *P*=0.021). The cross-analysis results are shown in Annex B Table b.5.

6.4 Hypotheses and model validation

In line with the calculation requirements of structural equation model analysis method, the theoretical model proposed in this study is converted to the expression of structural equation model, which is shown in Figure 6. 2. The theoretical model proposed in this study consists of 4 variables, which are department culture (DC), work engagement (WE), professional identity (PI) and job satisfaction (JS). The department culture in hospitals is a hypothetical independent variable, and others are hypothetical dependent variables.

Figure 6.2 lists the theoretical model and 12 hypotheses to be tested, which are expressed in cause-effect relations. The hypothesis is:

H01: MC1 and MC2 can be explained by latent variable MC

H02: BC1 and BC2 can be explained by latent variable BC

H03:PC1 and PC2 can be explained by latent variable PC

H04:SC1, SC2 and SC3 can be explained by latent variable SC

H05:IC1 and IC2 can be explained by latent variable IC

H06: MC, BC, PC, SC and IC can be explained by latent variable DC.

H07: Department cultures have a positive impact on work engagement.

H08: Department cultures have positive impact on professional identity.

H09: Professional identity has a positive impact on work engagement.

H10: Department cultures have a positive impact on job satisfaction.

H11: Work engagement has a positive impact on job satisfaction.

H12: Professional identity has a positive impact on job satisfaction.

6.4.1 Model estimation

In this study, AMOS20.0 was used to analyze structural relations of model 1, and the results of such analysis is shown in Figure 6.2 and Table 6.10.

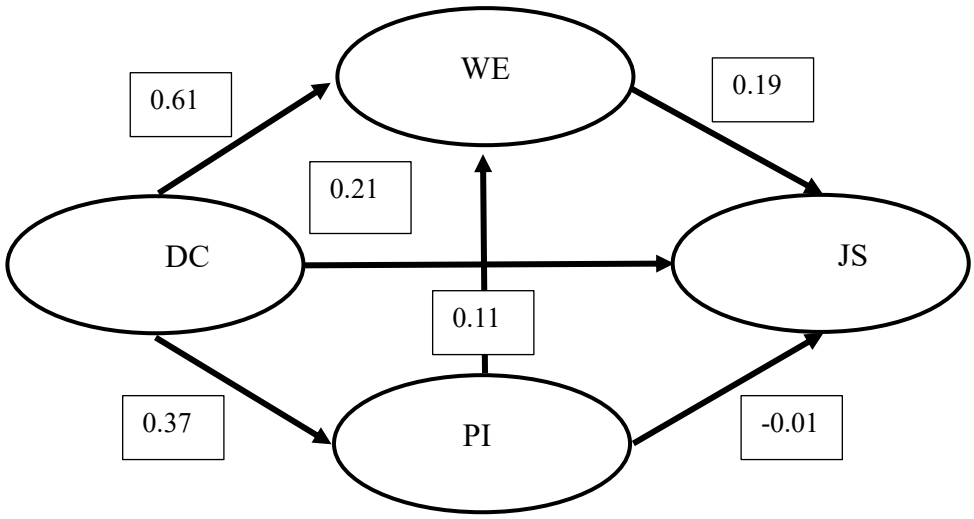


Figure 6.2 Analysis results of model structural equation

Table 6.10 Model fitting index

Fitting index	Model
χ^2	1114.597
df	489
χ/df	2.279
P-value	0.000
RMR	0.021
GFI	0.885
AGFI	0.869
TLI	0.944
CFI	0.948
RMSEA	0.048

It can be seen that the fitting index of the model reaches the required criterion, which indicates that theoretical model of study hypothesis proposed in this thesis have good degree of fitting and stability.

6.4.2 Testing the study hypotheses

The Material culture (MC), Behavioral culture (BC), Policy culture (PC), Spiritual culture (SC) and Innovation Culture (IC) in the model and their relationship with composition dimensions are firstly tested.

The material culture (MC) load factors on MC1 and MC2 are 0.82 and 0.90, where MC's Cronbach α value is 0.907, the average variance extraction (AVE) is larger than 0.74, composition reliability (CR) is 0.851, which indicates that MC1 and MC2 can be explained by latent variable MC. Consequently, hypothesis 1 is supported.

The behavioral culture (BC) load factors on BC1 and BC2 are 0.87 and 0.91, where BC's Cronbach α value is 0.935, the average variance extraction (AVE) is larger than 0.795,

composition reliability (CR) is 0.885, which indicates that BC1 and BC2 can be explained by latent variable BC. Consequently, hypothesis 2 is supported.

The policy culture (PC) load factors on pc1 and pc2 are 0.92 and 0.84, where PC's Cronbach α value is 0.937, the average variance extraction (AVE) is larger than 0.78, composition reliability (CR) is 0.876, which indicates that pc1 and pc2 can be explained by latent variable PC. Consequently, hypothesis 3 is supported.

The spiritual culture (SC) load factors on SC1, SC2 and SC3 are 0.86, 0.93 and 0.83, where SC's Cronbach α value is 0.951, the average variance extraction (AVE) is larger than 0.763, composition reliability (CR) is 0.906, which indicates that SC1, SC2 and SC3 can be explained by latent variable SC. Consequently, hypothesis 4 is supported.

The innovation culture (IC) load factors on ic1 and ic2 are 0.83 and 0.86, where IC's Cronbach α value is 0.931, the average variance extraction (AVE) is larger than 0.715, composition reliability (CR) is 0.826, which indicates that ic1 and ic2 can be explained by latent variable IC. Consequently, hypothesis 5 is supported.

The department culture's load factors on material culture, behavioral culture, policy culture, spiritual culture and innovation culture are respectively 0.80, 0.91, 0.93, 0.93 and 0.89, the average variance extraction (AVE) is larger than 0.756, composition reliability (CR) is 0.814, which suggest that material culture, behavioral culture, policy culture, spiritual culture and innovation culture can be explained by latent variable Department culture in hospitals (DC). Consequently, hypothesis 6 (H06) is supported.

The path coefficient from hospital department culture. (DC) to work engagement (WE) is 0.61, *P v*alue is significant, hypothesis H07 is supported.

The path coefficient from hospital department culture (DC) to professional identity (PI) is 0.37, *P* value is significant, hypothesis H08 is supported.

The path coefficient from professional identity (PI)to work engagement (WE) is 0.11, *P* value is significant, hypothesis H09 is supported.

The path coefficient from hospital department culture (DC) to job satisfaction (JS) is 0.21, *P* value is significant, hypothesis H10 is supported.

The path coefficient from work engagement (WE) to job satisfaction (JS) is 0.19, *P* value is significant, hypothesis H11 is supported.

The path coefficient from professional identity (PI) to job satisfaction (JS) is -0.01, *P* value is non-significant, hypothesis H12 is not supported.

The relationship and validation statistics of two model variables are shown in Table 6.11.

Table 6.11 Relationship and validation statistics of model variables

Hypothesis	Relationship	Path coefficient	*P* value	Validation results of hypothesis
H07	DC→WE	0.61	Significant	Supportive
H08	DC→PI	0.37	Significant	Supportive
H09	PI→WE	0.11	Significant	Supportive
H10	DC→JS	0.21	Significant	Supportive
H11	WE→JS	0.19	Significant	Supportive
H12	PI→JS	-0.01	Non-Significant	Non-Supportive

Final theoretical model of this study is shown in Figure 6.3.

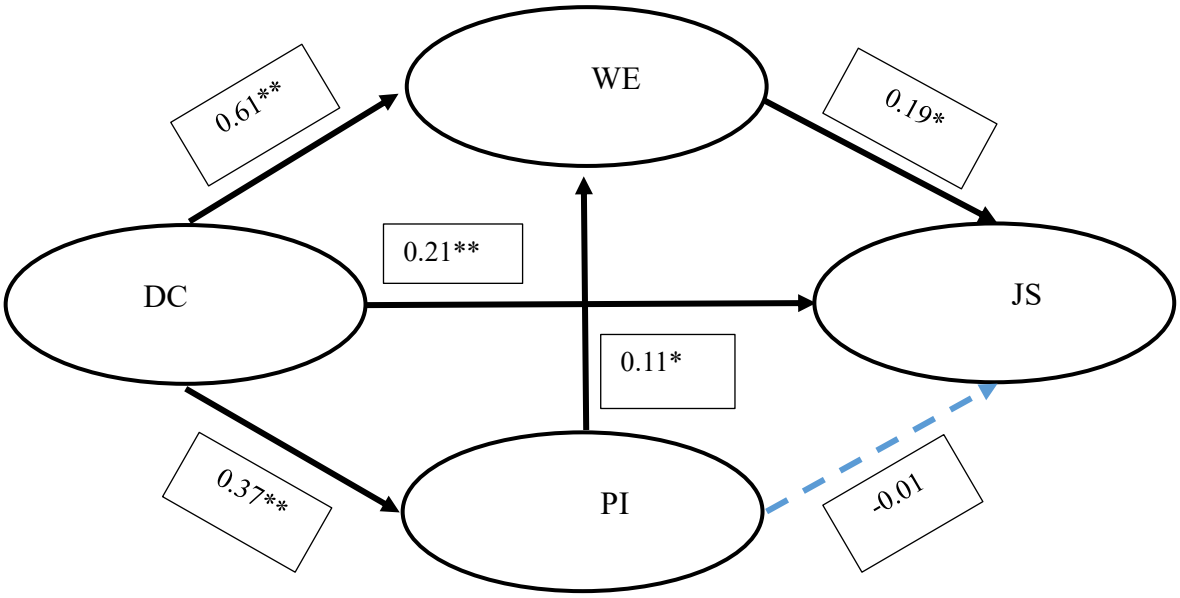


Figure 6.3 Final theoretical model

Note: ** is 0.01, being significant. * is 0.05, being significant. The dotted line suggests non-significant effect.

6.5 Results and analysis

In this thesis, a final survey was carried out in No.1 Hospital Affiliated to Medical School, Zhejiang University, which is a Tier 1 Grade-A tertiary hospital in Hangzhou, Zhejiang Province, China. The theoretical model in which it is assumed that department culture affects job satisfaction has been validated. The results are as follows:

1. Department culture significantly affect job satisfaction.

The department culture in hospitals consists of five dimension of Material culture, Behavioral culture, Policy culture, Spiritual culture and Innovation Culture. Each dimension has significant and positive impact on Job satisfaction (Path coefficient is 0.22). This shows that if growing department culture is given high priority, the physicians' job satisfaction can be

significantly enhanced. If the staff are satisfied, the patients will be ultimately happy. In the end, the hospital builds a sound customer base with good reputation and brand, which bring operating benefits to the hospital.

2. Department culture affects WE significantly and positively.

The department culture significantly affects physicians' work engagement, with a path coefficient of 0.61. If the department culture guides, coheres, restrains and incentivizes the staff, work engagement will be promoted. If it is hoped to improve physician's work engagement, it is essential to build a sound department culture.

3. Department culture affects PI significantly and positively.

The department culture in hospitals affects the physicians' professional identity significantly and positively, with a path coefficient of 0.37.A positive department culture can help improve physician's professional identity and job satisfaction, which can enhance performance.

4. Work engagement plays a mediating role between department culture and job satisfaction.

From work engagement to job satisfaction, the path coefficient is 0.19, which suggests that the cause of job satisfaction is about motivation, while the five dimensions of department culture indirectly affect job satisfaction via work engagement. It is obvious that the hospital administrators must build positive department cultures so as to promote the subjective willingness and full engagement of physicians, ultimately to ensure physicians' job satisfaction.

5. Professional identity does not play a mediating role between department culture and job satisfaction.

We can see from the data that the path coefficient is -0.01 that in the relationship between hospital department culture and job satisfaction, professional identity does not play a mediating role, having less impact on physicians' job satisfaction. However, the conclusion is consistent with that of Shu et al. that job satisfaction really affects professional identity to a certain extent. Family physicians' dissatisfaction with their salary directly affects professional identity (Shu et al., 2015). Job satisfaction is an important indicator of physicians' professional identity. The higher the individual's job satisfaction is, the higher the perception of their own value and organizational value is, and the degree of their professional identity will be improved accordingly (Yuan, 2015). To improve the professional identity of community physicians, we need to start with improving their job satisfaction, so as to stabilize the community hospital team and improve the level of primary health care services (Huang, 2019).

Chapter 7: Conclusions and Outlook

7.1 Summary

This study sampled physician subjects from The First Affiliated Hospital of Zhejiang University, School of Medicine, a tertiary hospital in Hangzhou, Zhejiang Province, China. And the study includes:

1. Based on literature review and fundamental theoretic methods, this thesis established theoretic models for department cultures in hospitals;

2. Through qualitative methods (in-depth interviews and open questionnaires), relevant scales were designed to identify and measure the different dimensions of department cultures in hospitals;

3. Professional identity and work engagement were used as mediating variables, and a theoretical model in which department cultures in hospitals affect physician's job satisfaction was constructed.

4. Questionnaires were dispensed to 596 physicians from The First Affiliated Hospital of Zhejiang University, School of Medicine. With the data, the reliability and validity of the measurement model were tested. In such tests, the dimensions of department cultures in hospitals were used as independent variable, professional identity and work engagement were used as mediating variable, and job satisfaction was used as a dependent variable.

The goals of the study were achieved.

7.1.1 Theoretical contribution

Contribution 1: The building of Hospital Department Culture Scale (5 dimensions and 11 sub-dimensions) with the new dimension of innovation culture.

This study took department culture in The First Affiliated Hospital of Zhejiang University, School of Medicine as the object of research; through methods like literature review, in-depth interviews, open questionnaires, pre-test survey with questionnaires, formal survey with questionnaires and validating questionnaires , this study defined the concepts of department cultures in hospitals in China by using exploratory factor analysis and confirmatory factors analysis and proposed the five dimension components of department cultures in hospitals in

China: Material Culture (with 2 sub-dimensions of cultural signages and department environment), Behavioral Culture (with 2 sub-dimension of public relations and inter-personal relationship), Policy Culture (with 2 sub-dimension of management policies and policies and regulations), Spiritual Culture (with 3 sub-dimensions of hospital spirit, ideals and beliefs and cohesion) and Innovation Culture (with 2 sub-dimensions of innovation awareness and innovation environment).

Contribution 2: An exploration of how hospital department culture affects physicians' job satisfaction and the test of the affecting mechanism.

The measurement model has eight subscales: subscales for material culture, behavioral culture, policy culture, spiritual culture, innovation culture, work engagement, professional identity and job satisfaction. There are 9 questions in the subscale for material culture, and the overall Cronbach α value is 0.907, and the Cronbach α values of the two sub-dimensions are 0.859 and 0.850. There are 10 questions in the subscale for behavioral culture, and the overall Cronbach α value is 0.935, and the Cronbach α values of the two sub-dimensions are 0.894 and 0.896. There are 10 questions in the subscale for policy culture, and the overall Cronbach α value is 0.937, and the Cronbach α values of the two sub-dimensions are 0.913 and 0.890. There are 12 questions in the subscale for spiritual culture, and the overall Cronbach α value is 0.951, and the Cronbach α values of the three sub-dimensions are 0.892, 0.915 and 0.868. There are 8 questions in the subscale for innovation culture, and the overall Cronbach α value is 0.931, and the Cronbach α values of the two sub-dimensions are 0.863 and 0.929. There are 8 questions in the subscale for work engagement, and the Cronbach α value is 0.924. There are 8 questions in the subscale for professional identity, and the Cronbach α value is 0.865. There are 12 questions in the subscale for job satisfaction, and the Cronbach α value is 0.911. All the Cronbach α values of the subscales above are larger than 0.70, indicating that there is very sound internal consistency.

In terms of convergence in the subscales, the SFL each observable variable is between 0.62 and 0.93, and 2/3 of the observable variables are larger than statistically minimally acceptable 0.7, and 1/3 of the observable variables are less than 0.7, but all are larger than 0.5. In addition, the composition reliability of 4 latent variables is 0.814, 0.915, 0.889 and 0.924, which are larger than or around 0.7, the statistically minimally acceptable value. Their AVE value is 0.756, 0.597, 0.516 and 0.503, which are all larger than the statistically minimally acceptable value of 0.5. The data suggests that each concept in the theoretical model has its satisfactory convergent validity.

Contribution 3: The confirmation of a significant positive influence from hospital department on work engagement.

According to study results, department cultures have a positive impact on work engagement, but they don't exert a positive impact on professional identity; department cultures have a positive impact on job satisfaction.

Contribution 4: The discovery of spiritual culture as the most recognized department culture by medical practitioners.

After studying the physicians, it is found that among the five dimensions of material culture, behavioral culture, policy culture, spiritual culture and innovation culture, physicians mostly identify with spiritual culture. This means that physicians all agree with the idea that it is their responsibility to save the dying and rescue the wounded, personal prospects are closely related to that of the department. It also means that the core concepts of department cultures are deeply embedded in the mind of the physicians. The survey results on material culture show that physicians know well about the functions of cultural bulletin (cultural board) in the department and regard the layout of the department as suboptimal. The survey results on behavioral culture show that to some extent physicians mostly approve of the medical technology of the department. The survey results on policy culture show that to some extent physicians regard "Practicing medicine legally" as the bottom line and they approve of the management policies in their departments. The survey results on innovation culture show that to some extent physicians have more opportunities and routes to access the latest advances in their disciplines, but they have low awareness in incentives and risk-taking tolerance for innovation instituted by the hospital.

7.1.2 Lessons for hospital management

Empirical research shows that physicians in China have low job satisfaction in general, which could probably negatively impact the quality of medical services. The hospital administrators need to pay much more attention to this. This research proves that there is a positive correlation between the department cultures in hospitals and job satisfaction, which provides new reminders to hospital administrators and policy makers so that they may explore new paths to improve Job satisfaction. In the meantime, it is found that work engagement plays mediating role. Therefore, improving work engagement would further strengthen the positive impact of hospital department culture on job satisfaction.

Department culture is the soul of department development, and it encompasses the

spiritual outlook, values, ethics, and codes of conduct of the department. It is an effective carrier for improving the quality of department professionals and medical technology as well. Based on the fact that the hospital department culture can promote the job satisfaction of medical staff to a certain extent, this article proposes several suggestions to strengthen the hospital department culture from the following five aspects.

7.1.2.1 The overall planning of organizational culture should coordinate and harmonize the hospital culture and department culture so as to achieve the synergy between the two.

The construction of department culture is a systematic, theoretical, and scientific project, and it cannot be established overnight. The hospital should give the department directions in planning, guidance and overall planning as much as it attaches importance to the hospital cultural construction. First, the department culture should be integrated into the hospital culture system, and the approach on a hospital and department level should be consistent; secondly, the cultural connotation of the department should be comprehensively and correctly interpreted, and the department should be supported in the cultural denotation can be diversified; third, the hospital can build the department culture like other business indicators, such as the planning, content, effectiveness, etc., which are included in the year-end department assessment to promote the development of department culture. If the department culture and the hospital's cultural construction goals are unified, the content and spirit of the hospital culture will be truly implemented, the hospital culture will take root, and the department culture construction will be spiritually supporting the building of the department's brand and promotion of the hospital's sustainability.

The development of a hospital is like sailing against the current. If one does not advance, one will retreat. In the face of the rapid development of foreign-funded hospitals, private hospitals, and public and private partnership hospitals, how should public hospitals deal with it? Presumably this is a question that all hospital managers often think about.

It should be said that each hospital pays much attention to brand building, but after a brand is formed, whether it can maintain its long-term vitality is very the key question. It is easy to build a brand, but it is difficult to maintain a brand. If the brand fails to take root, it will be a waste of all previous efforts. In order to maintain the vitality of the brand, we

need to add new highlights and new measures on the basis of retaining the advantages of the original brand, and continue to introduce new ones, so that the hospital brand always maintains its characteristics, meets the needs of the masses for medical treatment, and at the same time closely the brand is promoted to a higher level. In the end, the brand perception on the part of the general public will be elevated and hospital culture is made viable and sustainable.

7.1.2.2 Hospital department culture with unique feature should be nurtured and inherited so as to become the guidance and source of motivation for doctors to provide quality service to patients.

The process of effective implementation of the hospital's cultural concept is to make the hospital's concepts such as the spirit of the hospital, the purpose of running the hospital, and the interpretation of the hospital emblem penetrate into the hearts of the employees, so that the staff consciously practice them in the daily work; consequently, the culture will become the norms that staff consciously abide by, and the hospital cultural concepts are highly understood and strongly recognized, and this in turn has a positive guiding and standardizing effect on the work behavior of the staff. Through some research and practice activities, the hospital can fully mobilize the enthusiasm of medical staff, so that everyone has a deeper understanding of the hospital culture and the meaning of their work, thus they are more willing to play an active role in their daily practice. The cultural concepts must be embodied through work practice. However, in actual work, a considerable number of departments may not fully involve employees in the process of concept refinement and sublimation, and ignore the enthusiasm and initiative of staff in the establishment of the culture system, which led to the emergence of aloofness. In the end, lip service will become the norm; cultural practice takes a second place in work; and when staff are busy, culture is the thing they often ignore. On the contrary, it is urgent to make sure medical staff participate more in the construction of the hospital, and strengthen the sense of ownership in actual work, so that their own ideas and the hospital's cultural ideas are gradually integrated, so as to achieve the ideal state of cultural ideas rooted in the minds and souls of employees, and then cultural ideas can be fully implemented.

The department culture is an extension of the hospital culture and a subculture of the hospital culture, which is in the same line as the hospital culture. Although the culture presented by each department is different, in the final analysis department cultures are

closely related to the hospital culture. Whether the hospital culture can survive and prosper or not depends on the department culture, so it is necessary to vigorously support the department cultures. This requires not only the strong support of the hospital, but also the high attention of the director of the department, and the concerted efforts of the staff in the department. To develop department culture, it is necessary to expand and strengthen the department culture construction so that department culture becomes a compass leading the function of departments, a driving force for the development of hospital culture. Finally, the hospital culture takes root in every corner of the hospital.

7.1.2.3 Investment in hospital department culture should be intensified which will translate into greater work engagement, higher work efficiency and better operation performance.

Whether it is in building up spiritual assets or cultural activities, all employees must be mobilized to participate. Specially, it is necessary to guide medical staff to actively participate in cultural activities such as lectures, skills training, cultural and sports competitions, performances, popular science education, games and entertainment. This is to ensure the right orientation of cultural activities. Pertinence should be managed when organizing cultural activities, and in so doing so, the hospitals should change from a general perspective to a targeted one, so as to achieve full participation and active engagement.

Hospital culture needs continuous innovation, and cultural theme activities need to continuously launch new programs in order to catch everyone's attention, stimulate the enthusiasm of employees to participate, and then they could practice the culture. The hospital and department need to continue to innovate and explore new themes. Starting from the actual situation of the two main bodies of the hospital—medical staff and patients, one hospital can organically integrate the personal demands of medical staff and patients with the hospital culture to ensure better synchronization. In that way, the most advanced culture concepts can be well accepted. Through theme activities of different perspectives, channels, and forms, cultural events can be implemented so extend the content of culture activities.

Dr. Trudeau's epitaph "To cure sometimes, to relieve often, to comfort always" summarizes everything a physician can do in his life. The humanistic spirit of medicine is the soul of medicine. It is the first cultural form touched by human life since one's birth. It is the spiritual scene that needs to be cared most during the weakest and most painful

period of life. Therefore, the construction of department culture is conducive to maintaining the fine cultural traditions of the department and building the brand image of the department. At the same time, it encourages generations of department members to work hard, contribute to the development of the department, and inherit the medical traditions for the public good. Excellent culture and good reputation will be spread in society through various channels. At the end of the day, departments could learn from each other and improve accordingly, word of mouth is passed on among patients, professional talents try to get employed in the hospital, and the medical brands of the hospital stand out, which finally form a virtuous cycle. Ultimately, an innovative, coordinated, green, open, shared health industry can be pushed forward.

7.2 Principal innovative points

The study explored into the dimension components of department cultures in hospitals and by looking at professional identity and work engagement's influence on job satisfaction, had compared results in this research with previous studies. The innovation points of this study include the following:

Innovation point 1: This study constructed the components and structure of department cultures in hospitals in China.

As of now, empirical studies and theoretical analysis concerning department cultures in hospitals in China are limited. This thesis used the standard grounded theory to code the data collected on three levels; after analysis and comparison, the model for department culture in hospitals with five-dimension components were established, and the dimension components are: material culture, behavioral culture, policy culture, spiritual culture and innovation culture. With exploratory factors analysis and confirmatory factors analysis, this study had an in-depth validation for the dimension components of department cultures in hospitals.

Innovation point 2: This thesis also established scales for department cultures in hospitals in China.

Measurement tools are lacking for the department cultures in hospitals. In this thesis, grounded theory was strictly followed. Data were collected, coded, analyzed and compared. A scale measuring department cultures in hospitals was designed, and the reliability and validity test was carried out for it. The scale needs further modification and promotion. The scale measuring department cultures in hospitals is based on local studies of hospitals in China, so it

can reflect the facts in department cultures in Chinese hospitals, thus serving as a reference and indicator for Chinese hospital administrators.

Innovation point 3: Mechanisms and models with which department cultures in hospitals affect job satisfaction were designed and tested.

There are few studies concerning the relationship between department cultures in hospitals and job satisfaction in other countries. This study, treating physicians as subjects of research, under the Chinese cultural background, explored into the inherent driving mechanism of department cultures in hospitals on job satisfaction; a model in which department cultures in hospitals affect job satisfaction via professional identity and work engagement was established, and the model has been validated. To ensure that physicians are fully devoted to their work, hospitals must build up department cultures. If department cultures are improved, there will be continuous internal driving forces for physician's devotion, which further enhances Professional identity, thus improving job satisfaction.

7.3 Limitations and outlook

7.3.1 Limitations

This thesis study Chinese physicians, a special population that has been studied in an unprecedented way; however, due to limitations from time, resources, capability and capacity, there could be some drawbacks:

1. A further exploration into items of hospital department culture that cannot be summarized as the category during the grounding theory process, such as the execution culture. The dimension components of department cultures and job satisfaction can be further expanded in details, for example, the department cultures can include the culture of execution force, and job satisfaction can still be further divided into environment, rewards, management and organization; the measuring indicators for different dimensions could be further expanded in details as well.

2. A more diversified sample pool that covers hospitals of different types, ownerships and regions. The data in this thesis is from a tertiary hospital in the city of Hangzhou, Zhejiang Province. The final verified questionnaires are 596, which can only show the state of physicians in Zhejiang Province. However, because China is a vast country with great regional and cultural diversity, it is vital to have abundant sample sources and sufficient sample data. Only by doing

this, can we make this study more representative and the results the author delivers are general and accurate.

3. An in-depth analysis of the cultural uniqueness of a specific department and the cultural differences between departments. Due to the limitation of thesis length and research time, this thesis contains no in-depth research and analysis of specific departments and cultural differences between departments.

7.3.2 Outlook for the future

In recent years, scholars from China and abroad pay more attention to hospital department culture. Researches related to this topic promote the continued improvement of related theories. According to the content and analysis of this thesis, the author finds limitations and facilitate future researches, including the following aspects:

1. Based on the literature review at home and abroad, the author can enrich and subdivide the research assumption and variables. The author can extend and subdivide the hospital department culture.

By summing up the literature from China and abroad, the study hypothesis and variables should be enriched and expanded with details. The dimensions and indicators for department cultures in hospitals, professional identity, work engagement and job satisfaction should be further expanded with more details.

2. Physicians subjects from other provinces in China should be added to bring more diversity; and the sample size should be increased as well, which could provide more complete and ample data to look into the relationship s between department cultures in hospitals, professional identity, work engagement and job satisfaction.

3. In the future, there will be exploration into the specifics of department culture and differences among different departments in the cultural sphere so that hospital and department administrators can make decisions on the basis of findings of such studies.

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Annex A: Descriptive Statistical

Table a.1 The descriptive statistical table of hospital DC, WE, PI and JS

Questions		Digital	Average	Standard deviation	Measure of skewness		Kurtosis	
		Statistical	Statistical	Statistical	Statistical	Standard error	Statistical	Standard error
MC1	Q1	567	1.95	0.752	0.687	0.103	1.082	0.205
	Q2	567	1.94	0.744	0.618	0.103	0.802	0.205
	Q3	567	1.77	0.726	0.825	0.103	1.073	0.205
MC2	Q4	567	2.05	0.829	0.618	0.103	0.438	0.205
	Q5	567	2.50	1.014	0.344	0.103	-.404	0.205
	Q6	567	2.11	0.833	0.699	0.103	0.809	0.205
	Q7	567	1.88	0.724	0.826	0.103	1.765	0.205
	Q8	567	2.25	0.958	0.790	0.103	0.486	0.205
BC1	Q9	567	1.95	0.787	0.945	0.103	1.815	0.205
	Q10	567	1.76	0.653	0.748	0.103	1.830	0.205
	Q11	567	1.77	0.756	0.981	0.103	1.591	0.205
	Q12	567	1.57	0.611	1.093	0.103	3.188	0.205
	Q13	567	1.79	0.658	0.668	0.103	1.500	0.205
BC2	Q14	567	1.90	0.712	0.759	0.103	1.566	0.205
	Q15	567	1.81	0.721	1.063	0.103	2.692	0.205
	Q16	567	1.69	0.670	0.992	0.103	2.465	0.205
	Q17	567	1.79	0.720	0.914	0.103	1.734	0.205
	Q18	567	1.70	0.683	1.121	0.103	3.092	0.205
PC	Q19	567	2.01	0.778	0.803	0.103	1.431	0.205
	Q20	567	1.90	0.681	0.592	0.103	1.205	0.205
	Q21	567	2.04	0.766	0.7363	0.103	1.277	0.205
	Q22	567	1.86	0.733	1.007	0.103	2.382	0.205
	Q24	567	1.87	0.737	1.005	0.103	2.323	0.205
	Q25	567	1.96	0.806	1.082	0.103	2.082	0.205
PC2	Q26	567	1.80	0.611	0.326	0.103	0.676	0.205
	Q27	567	1.46	0.593	1.296	0.103	3.023	0.205
	Q28	567	1.94	0.739	0.673	0.103	1.178	0.205
	Q29	567	1.69	0.643	0.760	0.103	1.631	0.205
	Q30	567	1.69	0.595	0.530	0.103	1.377	0.205

	Q31	567	1.58	0.662	1.224	0.103	2.974	0.205
SC1	Q32	567	1.66	0.717	1.243	0.103	2.938	0.205
	Q33	567	1.57	0.666	1.029	0.103	1.291	0.205
	Q34	567	1.49	0.629	1.543	0.103	4.729	0.205
	Q37	567	1.67	0.701	1.061	0.103	1.894	0.205
SC2	Q38	567	1.81	0.765	0.944	0.103	1.371	0.205
	Q39	567	1.79	0.685	0.689	0.103	1.172	0.205
	Q40	567	1.86	0.755	0.759	0.103	0.956	0.205
	Q41	567	2.06	0.841	0.567	0.103	0.202	0.205
	Q42	567	1.65	0.660	0.998	0.103	2.451	0.205
SC3	Q43	567	1.61	0.652	1.062	0.103	2.363	0.205
	Q44	567	1.48	0.606	1.142	0.103	1.997	0.205
	Q52	567	1.67	0.655	0.877	0.103	1.859	0.205
IC1	Q50	567	2.04	0.778	0.445	0.103	0.234	0.205
	Q51	567	1.73	0.659	0.766	0.103	1.615	0.205
	Q48	567	1.85	0.797	0.996	0.103	1.621	0.205
	Q53	567	2.06	0.924	0.768	0.103	0.354	0.205
IC2	Q55	567	1.85	0.813	1.092	0.103	1.864	0.205
	Q47	567	2.06	0.889	0.647	0.103	0.277	0.205
	Q56	567	2.10	0.884	0.668	0.103	0.511	0.205
WE								
	Q1	567	2.02	0.698	0.029	0.103	-0.769	0.205
	Q2	567	1.83	0.667	0.250	0.103	-0.635	0.205
	Q3	567	1.94	0.702	0.143	0.103	-0.770	0.205
	Q4	567	1.74	0.632	0.312	0.103	-0.457	0.205
	Q5	567	1.92	0.672	0.136	0.103	-0.668	0.205
	Q6	567	1.85	0.666	0.217	0.103	-0.627	0.205
	Q7	567	1.90	0.677	0.166	0.103	-0.701	0.205
	Q8	567	2.05	0.710	0.075	0.103	-0.634	0.205
PI								
	Q1	567	1.88	0.697	0.204	0.103	-0.828	0.205
	Q2	567	1.59	0.661	0.793	0.103	0.022	0.205
	Q3	567	1.80	0.649	0.376	0.103	-0.023	0.205
	Q4	567	2.17	0.593	0.240	0.103	0.362	0.205
	Q5	567	2.00	0.665	0.109	0.103	-0.398	0.205
	Q6	567	1.77	0.653	0.507	0.103	0.306	0.205
	Q7	567	1.71	0.629	0.794	0.103	0.202	0.205
	Q8	567	1.68	0.635	0.648	0.103	0.617	0.205

JS							
	Q1	567	2.24	0.686	0.106	0.103	-0.175	0.205
	Q2	567	2.18	0.664	0.145	0.103	-0.063	0.205
	Q3	567	1.80	0.615	0.429	0.103	0.738	0.205
	Q4	567	1.86	0.674	0.387	0.103	-0.016	0.205
	Q5	567	2.11	0.585	0.457	0.103	1.107	0.205
	Q6	567	2.12	0.577	0.600	0.103	1.494	0.205
	Q7	567	2.11	0.662	0.132	0.103	-0.124	0.205
	Q8	567	1.89	0.669	0.338	0.103	-0.001	0.205
	Q9	567	1.91	0.647	0.364	0.103	0.383	0.205
	Q10	567	2.17	0.671	0.212	0.103	0.038	0.205
	Q11	567	2.08	0.683	0.171	0.103	0.015	0.205
	Q12	567	2.05	0.676	0.220	0.103	-0.064	0.205

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Annex B: Cross-over Analysis

Table b.1 The influence of age to work engagement, professional identity and job satisfaction

		Sum of squares	df	Average of squares	F	Significant
56	Between groups	5.920	4	1.480	3.084	.016
	in groups	269.734	562	.480		
	total	275.654	566			
57	Between groups	5.644	4	1.411	3.222	.012
	in groups	246.071	562	.438		
	total	251.714	566			
58	Between groups	4.444	4	1.111	2.273	.060
	in groups	274.636	562	.489		
	total	279.079	566			
59	Between groups	3.784	4	.946	2.388	.050
	in groups	222.621	562	.396		
	total	226.406	566			
60	Between groups	4.776	4	1.194	2.672	.031
	in groups	251.160	562	.447		
	total	255.937	566			
61	Between groups	4.260	4	1.065	2.426	.047
	in groups	246.696	562	.439		
	total	250.956	566			
62	Between groups	4.074	4	1.019	2.240	.064
	in groups	255.576	562	.455		
	total	259.651	566			

63	Between groups	4.871	4	1.218	2.439	.046
	in groups	280.646	562	.499		
	total	285.517	566			
64	Between groups	.894	4	.223	.517	.723
	in groups	242.821	562	.432		
	total	243.714	566			
65	Between groups	.511	4	.128	.296	.880
	in groups	242.350	562	.431		
	total	242.861	566			
66	Between groups	1.920	4	.480	1.157	.329
	in groups	233.160	562	.415		
	total	235.079	566			
67	Between groups	1.061	4	.265	.740	.565
	in groups	201.525	562	.359		
	total	202.586	566			
68	Between groups	.933	4	.233	.555	.695
	in groups	236.051	562	.420		
	total	236.984	566			
69	Between groups	.952	4	.238	.567	.687
	in groups	235.782	562	.420		
	total	236.734	566			
70	Between groups	.832	4	.208	.531	.713
	in groups	220.019	562	.391		
	total	220.850	566			
71	Between groups	.410	4	.102	.265	.901
	in groups	217.710	562	.387		
	total	218.120	566			

72	Between groups	7.113	4	1.778	4.100	.003
	in groups	243.744	562	.434		
	total	250.857	566			
73	Between groups	2.568	4	.642	1.498	.201
	in groups	240.861	562	.429		
	total	243.429	566			
74	Between groups	3.222	4	.806	2.320	.056
	in groups	195.120	562	.347		
	total	198.342	566			
75	Between groups	5.230	4	1.307	3.066	.016
	in groups	239.631	562	.426		
	total	244.861	566			
76	Between groups	2.079	4	.520	1.645	.161
	in groups	177.571	562	.316		
	total	179.651	566			
77	Between groups	3.873	4	.968	3.057	.016
	in groups	177.972	562	.317		
	total	181.845	566			
78	Between groups	5.103	4	1.276	3.013	.018
	in groups	237.980	562	.423		
	total	243.083	566			
79	Between groups	2.571	4	.643	1.511	.197
	in groups	239.020	562	.425		
	total	241.591	566			
80	Between groups	4.264	4	1.066	2.670	.031
	in groups	224.322	562	.399		
	total	228.586	566			

81	Between groups	4.711	4	1.178	2.694	.030
	in groups	245.705	562	.437		
	total	250.416	566			
82	Between groups	5.207	4	1.302	3.052	.017
	in groups	239.682	562	.426		
	total	244.889	566			
83	Between groups	11.250	4	2.812	6.799	.000
	in groups	232.465	562	.414		
	total	243.714	566			

Table b.2 The influence of income to work engagement, professional identity and job satisfaction

		Sum of squares	df	Average of squares	F	Significant
56	Between groups	2.472	5	.494	1.015	.408
	in groups	273.182	561	.487		
	total	275.654	566			
57	Between groups	2.516	5	.503	1.133	.342
	in groups	249.198	561	.444		
	total	251.714	566			
58	Between groups	1.252	5	.250	.505	.772
	in groups	277.828	561	.495		
	total	279.079	566			
59	Between groups	.545	5	.109	.271	.929
	in groups	225.860	561	.403		
	total	226.406	566			
60	Between groups	.777	5	.155	.342	.888
	in groups	255.160	561	.455		
	total	255.937	566			
61	Between groups	2.490	5	.498	1.124	.346
	in groups	248.466	561	.443		
	total	250.956	566			
62	Between groups	1.238	5	.248	.538	.748
	in groups	258.413	561	.461		
	total	259.651	566			

	Between groups	1.364	5	.273	.539	.747
63	in groups	284.152	561	.507		
	total	285.517	566			
	Between groups	1.938	5	.388	.899	.481
64	in groups	241.776	561	.431		
	total	243.714	566			
	Between groups	1.732	5	.346	.806	.546
65	in groups	241.129	561	.430		
	total	242.861	566			
	Between groups	1.187	5	.237	.569	.724
66	in groups	233.893	561	.417		
	total	235.079	566			
	Between groups	1.622	5	.324	.906	.477
67	in groups	200.963	561	.358		
	total	202.586	566			
	Between groups	1.647	5	.329	.785	.561
68	in groups	235.338	561	.419		
	total	236.984	566			
	Between groups	1.861	5	.372	.889	.488
69	in groups	234.873	561	.419		
	total	236.734	566			
	Between groups	.591	5	.118	.301	.912
70	in groups	220.259	561	.393		
	total	220.850	566			
	Between groups	3.167	5	.633	1.653	.144
71	in groups	214.953	561	.383		
	total	218.120	566			
	Between groups	1.743	5	.349	.785	.561
72	in groups	249.114	561	.444		
	total	250.857	566			
	Between groups	1.509	5	.302	.700	.624
73	in groups	241.919	561	.431		
	total	243.429	566			
74	Between groups	1.952	5	.390	1.115	.351
	in groups	196.390	561	.350		

	total	198.342	566			
	Between groups	1.731	5	.346	.799	.551
75	in groups	243.130	561	.433		
	total	244.861	566			
	Between groups	1.670	5	.334	1.053	.386
76	in groups	177.981	561	.317		
	total	179.651	566			
	Between groups	1.264	5	.253	.785	.561
77	in groups	180.581	561	.322		
	total	181.845	566			
	total	181.845	566			
	Between groups	2.170	5	.434	1.010	.411
78	in groups	240.913	561	.429		
	total	243.083	566			
	Between groups	2.771	5	.554	1.302	.261
79	in groups	238.819	561	.426		
	total	241.591	566			
	Between groups	1.523	5	.305	.753	.584
80	in groups	227.063	561	.405		
	total	228.586	566			
	Between groups	2.331	5	.466	1.054	.385
81	in groups	248.085	561	.442		
	total	250.416	566			
	Between groups	.661	5	.132	.304	.911
82	in groups	244.228	561	.435		
	total	244.889	566			
	Between groups	1.007	5	.201	.466	.802
83	in groups	242.707	561	.433		
	total	243.714	566			

Table b.3 The influence of job position to work engagement, professional identity and job satisfaction

		Sum of squares	df	Average of squares	F	Significant
56	Between groups	5.213	3	1.738	3.617	.013
	in groups	270.442	563	.480		
	total	275.654	566			
57	Between groups	7.924	3	2.641	6.100	.000
	in groups	243.790	563	.433		
	total	251.714	566			
58	Between groups	4.530	3	1.510	3.096	.026
	in groups	274.549	563	.488		
	total	279.079	566			
59	Between groups	5.551	3	1.850	4.717	.003
	in groups	220.855	563	.392		
	total	226.406	566			
60	Between groups	2.714	3	.905	2.011	.111
	in groups	253.223	563	.450		
	total	255.937	566			
61	Between groups	6.820	3	2.273	5.243	.001
	in groups	244.136	563	.434		
	total	250.956	566			
62	Between groups	6.623	3	2.208	4.912	.002
	in groups	253.028	563	.449		
	total	259.651	566			
63	Between groups	6.456	3	2.152	4.341	.005
	in groups	279.061	563	.496		
	total	285.517	566			
64	Between groups	5.225	3	1.742	4.112	.007
	in groups	238.489	563	.424		
	total	243.714	566			
65	Between groups	3.688	3	1.229	2.894	.035
	in groups	239.173	563	.425		
	total	242.861	566			
66	Between groups	2.910	3	.970	2.352	.071
	in groups	232.170	563	.412		

	total	235.079	566			
	Between groups	3.047	3	1.016	2.866	.036
67	in groups	199.538	563	.354		
	total	202.586	566			
	Between groups	3.862	3	1.287	3.109	.026
68	in groups	233.122	563	.414		
	total	236.984	566			
	Between groups	2.782	3	.927	2.232	.083
69	in groups	233.951	563	.416		
	total	236.734	566			
	Between groups	1.140	3	.380	.974	.405
70	in groups	219.710	563	.390		
	total	220.850	566			
	Between groups	2.541	3	.847	2.212	.086
71	in groups	215.579	563	.383		
	total	218.120	566			
	Between groups	1.743	5	.349	.785	.561
72	in groups	249.114	561	.444		
	total	250.857	566			
	Between groups	1.509	5	.302	.700	.624
73	in groups	241.919	561	.431		
	total	243.429	566			
	Between groups	1.952	5	.390	1.115	.351
74	in groups	196.390	561	.350		
	total	198.342	566			
	Between groups	1.731	5	.346	.799	.551
75	in groups	243.130	561	.433		
	total	244.861	566			
	Between groups	1.670	5	.334	1.053	.386
76	in groups	177.981	561	.317		
	total	179.651	566			
	Between groups	1.264	5	.253	.785	.561
77	in groups	180.581	561	.322		
	total	181.845	566			

	Between groups	2.170	5	.434	1.010	.411
78	in groups	240.913	561	.429		
	total	243.083	566			
	Between groups	2.771	5	.554	1.302	.261
79	in groups	238.819	561	.426		
	total	241.591	566			
	Between groups	1.523	5	.305	.753	.584
80	in groups	227.063	561	.405		
	total	228.586	566			
	Between groups	2.331	5	.466	1.054	.385
81	in groups	248.085	561	.442		
	total	250.416	566			
	Between groups	.661	5	.132	.304	.911
82	in groups	244.228	561	.435		
	total	244.889	566			
	Between groups	1.007	5	.201	.466	.802
83	in groups	242.707	561	.433		
	total	243.714	566			

Table b.4 The influence of different specialty to work engagement, professional identity and job satisfaction

		Sum of squares	df	Average of squares	F	Significant
	Between groups	12.168	16	.760	1.587	.067
56	in groups	263.486	550	.479		
	total	275.654	566			
	Between groups	10.749	16	.672	1.533	.083
57	in groups	240.965	550	.438		
	total	251.714	566			
	Between groups	14.861	16	.929	1.933	.016
58	in groups	264.219	550	.480		
	total	279.079	566			
	Between groups	11.415	16	.713	1.825	.025
59	in groups	214.991	550	.391		
	total	226.406	566			

	Between groups	13.560	16	.848	1.923	.016
60	in groups	242.376	550	.441		
	total	255.937	566			
	Between groups	15.592	16	.975	2.277	.003
61	in groups	235.364	550	.428		
	total	250.956	566			
	Between groups	15.850	16	.991	2.235	.004
62	in groups	243.801	550	.443		
	total	259.651	566			
63	Between groups	11.790	16	.737	1.481	.101
	in groups	273.726	550	.498		
	total	285.517	566			
	Between groups	12.124	16	.758	1.800	.028
64	in groups	231.590	550	.421		
	total	243.714	566			
	Between groups	16.797	16	1.050	2.554	.001
65	in groups	226.064	550	.411		
	total	242.861	566			
	Between groups	10.517	16	.657	1.610	.062
66	in groups	224.562	550	.408		
	total	235.079	566			
	Between groups	9.618	16	.601	1.713	.041
67	in groups	192.968	550	.351		
	total	202.586	566			
	Between groups	9.497	16	.594	1.435	.120
68	in groups	227.487	550	.414		
	total	236.984	566			
	Between groups	6.609	16	.413	.987	.469
69	in groups	230.124	550	.418		
	total	236.734	566			
	Between groups	7.577	16	.474	1.221	.246
70	in groups	213.273	550	.388		
	total	220.850	566			
71	Between groups	6.896	16	.431	1.122	.330

	in groups	211.224	550	.384		
	total	218.120	566			
	Between groups	8.433	16	.527	1.196	.266
72	in groups	242.425	550	.441		
	total	250.857	566			
	Between groups	8.985	16	.562	1.317	.181
73	in groups	234.443	550	.426		
	total	243.429	566			
	Between groups	6.889	16	.431	1.237	.235
74	in groups	191.453	550	.348		
	total	198.342	566			
	Between groups	8.874	16	.555	1.293	.196
75	in groups	235.986	550	.429		
	total	244.861	566			
	Between groups	5.700	16	.356	1.126	.326
76	in groups	173.951	550	.316		
	total	179.651	566			
	Between groups	5.557	16	.347	1.084	.367
77	in groups	176.287	550	.321		
	total	181.845	566			
	Between groups	6.274	16	.392	.911	.557
78	in groups	236.809	550	.431		
	total	243.083	566			
	Between groups	10.448	16	.653	1.554	.077
79	in groups	231.143	550	.420		
	total	241.591	566			
	Between groups	6.710	16	.419	1.040	.412
80	in groups	221.875	550	.403		
	total	228.586	566			
	Between groups	7.469	16	.467	1.057	.394
81	in groups	242.947	550	.442		
	total	250.416	566			
82	Between groups	4.663	16	.291	.667	.827
	in groups	240.225	550	.437		

	total	244.889	566			
	Between groups	5.201	16	.325	.750	.743
83	in groups	238.513	550	.434		
	total	243.714	566			

Table b.5 The influence of different education degree to work engagement, professional identity and job satisfaction

		Sum of squares	df	Average of squares	F	Significant
56	Between groups	2.883	2	1.441	2.980	.052
	in groups	272.771	564	.484		
	total	275.654	566			
57	Between groups	2.272	2	1.136	2.568	.078
	in groups	249.443	564	.442		
	total	251.714	566			
58	Between groups	2.472	2	1.236	2.520	.081
	in groups	276.607	564	.490		
	total	279.079	566			
59	Between groups	1.298	2	.649	1.626	.198
	in groups	225.108	564	.399		
	total	226.406	566			
60	Between groups	1.847	2	.923	2.049	.130
	in groups	254.090	564	.451		
	total	255.937	566			
61	Between groups	5.361	2	2.681	6.156	.002
	in groups	245.595	564	.435		
	total	250.956	566			
62	Between groups	3.614	2	1.807	3.980	.019
	in groups	256.037	564	.454		

	total	259.651	566			
63	Between groups	1.747	2	.873	1.736	.177
	in groups	283.770	564	.503		
	total	285.517	566			
64	Between groups	.688	2	.344	.798	.451
	in groups	243.027	564	.431		
	total	243.714	566			
65	Between groups	2.959	2	1.480	3.479	.032
	in groups	239.901	564	.425		
	total	242.861	566			
66	Between groups	.566	2	.283	.680	.507
	in groups	234.514	564	.416		
	total	235.079	566			
67	Between groups	4.926	2	2.463	7.028	.001
	in groups	197.660	564	.350		
	total	202.586	566			
68	Between groups	.383	2	.192	.457	.633
	in groups	236.601	564	.420		
	total	236.984	566			
69	Between groups	1.950	2	.975	2.343	.097
	in groups	234.783	564	.416		
	total	236.734	566			
70	Between groups	2.869	2	1.434	3.712	.025
	in groups	217.981	564	.386		
	total	220.850	566			
71	Between groups	1.137	2	.569	1.478	.229
	in groups	216.983	564	.385		

	total	218.120	566			
72	Between groups	1.400	2	.700	1.582	.206
	in groups	249.458	564	.442		
	total	250.857	566			
73	Between groups	.390	2	.195	.452	.637
	in groups	243.039	564	.431		
	total	243.429	566			
74	Between groups	.799	2	.399	1.140	.321
	in groups	197.544	564	.350		
	total	198.342	566			
75	Between groups	1.579	2	.789	1.830	.161
	in groups	243.282	564	.431		
	total	244.861	566			
76	Between groups	.547	2	.274	.862	.423
	in groups	179.103	564	.318		
	total	179.651	566			
77	Between groups	3.000	2	1.500	4.730	.009
	in groups	178.845	564	.317		
	total	181.845	566			
78	Between groups	.436	2	.218	.506	.603
	in groups	242.647	564	.430		
	total	243.083	566			
79	Between groups	3.299	2	1.649	3.904	.021
	in groups	238.292	564	.423		
	total	241.591	566			

80	Between groups	1.573	2	.787	1.954	.143
	in groups	227.012	564	.403		
	total	228.586	566			
81	Between groups	.392	2	.196	.442	.643
	in groups	250.024	564	.443		
	total	250.416	566			
82	Between groups	.494	2	.247	.570	.566
	in groups	244.395	564	.433		
	total	244.889	566			
83	Between groups	.633	2	.317	.735	.480
	in groups	243.081	564	.431		
	total	243.714	566			

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Annex C: Questionnaire

Table c.1 Final questionnaire

Primary indicator	Secondary Indicator	Tertiary Indicator
I. Material Culture	A. Cultural Identification (guide marks, slogans, cultural walls)	1. The medical procedures in the hospital department are clear. 2. The guide marks for hospital department are clear. 3. The hospital department publicity column (cultural wall) has positive significance for the propaganda of department culture. 4. The cultural slogans of the hospital department have a great incentive.
	B. Department Environment (public space, sanitation, staff dressing, interpersonal relationship, working equipment)	1. I think the spatial layout of the hospital department is reasonable. 2. The environmental sanitation of the hospital department is good. 3. The dress code of the physicians in the hospital department is standardized. 4. The equipment of the hospital department can be obtained and put into use at any time. 5. The working atmosphere of the hospital department is good.
Ⅱ. Behavioral Culture	A. Public Relations (external image, brand)	1. The patients recognize the medical technology and services of their departments. 2. The department has a certain reputation in the industry. 3. The medical technology provided by the hospital department is professional. 4. The medical services provided by the hospital department can reflect respect and care for patients. 5. The medical services provided by the hospital department are homogenized.
	B. Staff Interpersonal Relationship (teamwork)	1. Colleagues in my department can trust, help and support each other. 2. I can often report to the higher level in the work. 3. My communication with the superior leader/manager is effective. 4. I am in harmony with the leadership of the department. 5. During the work, hospital departments can actively cooperate with each other.
Ⅲ. Policy Culture	A. Management System	1. The various management systems of the hospital department are easy to understand. 2. I believe that the various management systems of the hospital department are reasonable and practical. 3. The leadership of the hospital department attaches great importance to the construction and implementation of the systems. 4. There are people in my department who do not obey the systems.

		5. The current management of my department is standardized.
		6. The fairness in my department is good.
	B. Policies and Regulations	1. The workers are familiar with laws and regulations and industry norms related to work.
		2. The "practical practice according to law" is the bottom line for medical services.
		3. We can point out the illegal practice behavior around me and report it to the relevant departments of the hospital.
		4. Workers take the initiative to participate in the training of relevant laws and regulations and industry norms organized by the hospital department.
		5. The physicians in the department can act in accordance with the management rules and regulations.
	A. Hospital Spirit (values)	1. I love the hospital department which I am in.
		2. The department is like a big family; we care about each other.
		3. I love my professional or job.
		4. "Saving the wounded and dying" is the duty of physicians in our department.
		5. The values (work values) generally pursued by physicians in my department are consistent.
		6. I am very proud to work in my department.
	B. Ideals and Beliefs (struggle goals)	1. There is a model for learning in my department.
		2. We are aware of the development goals of the department.
		3. We have a clear career plan and put it into action.
		4. Our department emphasizes the sense of competition and achievements, and constantly raises the goal to gain an advantage in the competition.
Ⅳ. Spiritual Culture		1.We are more concerned about the future development of the hospital department.
		2. I will recommend my friends and relatives to the department to seek medical advice.
	C. Cohesion (loyalty)	3. The personal future and department development are closely related.
		4. I am satisfied with the current situation of hospital department management and management.
		5. The unique culture of my department is easy to understand.
		6. I can systematically explain the core concept of the hospital department culture.
Ⅴ. Innovation Culture	A. Innovative Concepts	1. The department is now suitable for reform.
		2. My department emphasizes finding new resources, developing new technologies, and developing new projects.
		3. For the current work, I often have some doubts.
		4. When I have new ideas, I will apply them to the actual work immediately.
		5. I always pay attention to the frontier development of the discipline.

B. Innovation environment (mechanism guarantee)	1. We can get timely information on the progress of the frontier of the discipline. 2. We have received training and guidance on reform and innovation organized by the hospital department. 3. The leadership of the department is very concerned about the innovation of the discipline. 4. The department can provide timely innovation policy support and financial support. 5. The hospital department encourages and rewards physicians for innovative behavior and is willing to bear certain risks.
Work Engagement WE	After getting up, I happily go to work. When I work, I feel I am fully of energy. When I am working, I would forget everything around me. When I am working, I feel time flies. When I am devoted to my work, I feel very happy. I am full of passion for my job. The work I do can continuously motivate me. It is very difficult for me to drop the work at hand.
Professional Identity PI	A physician is a lofty and respectable job. The physician's job is related to life and death of people and it is of high responsibility and risk. Approval from my leaders and colleagues makes me happy. If given a second chance, I still want to be a physician. Being a physician can help me achieve my personal value in life. Relieving patients of their pain and illness gives me a sense of achievement. I give weight to communication with patients. I am willing to participate in training and further my education to improve my practice.
Job Satisfaction JS	I am satisfied with my salary level. I am satisfied with my promotion opportunities. I get along with colleagues very well. I am proud of my job. My superior is very qualified for his/her job. My leader approves my job very much. I am very satisfied with a physician's social status. I have a sense of identity and belonging in the hospital where I work. There are many opportunities for physicians to receive professional training and further education. I am very satisfied with the current practicing environment. I am optimistic about the career prospects of physicians. I am very satisfied with the incentive policies on research and innovation and with the working environment.