ISCTE IUL
Instituto Universitário de Lisboa

Job Evaluation Model of Major Public Hospitals in China

SHU Xing

Thesis submitted as partial requirement for the conferral of the degree of

Doctor of Management

Supervisor:

Prof. Aristides Ferreira, Assistant Professor,

ISCTE University Institute of Lisbon

March, 2019

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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: 舒星 ShuXing Date: 2019.2.28

Name: ShuXing

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Abstract

The current economic climate has contributed to an increasingly competitive environment among organizations. In order to ensure competitive advantage, they must be able to promote high levels of professional performance. This research is part of this theme and aims to analyze how the job characteristics, professional knowledge, skills, competencies, training and work engagement influence the job evaluation and, consequently, the performance of employees of six public hospitals, China.

The sample consists of 546 subjects aged between 21 and 58 years (M = 37.9; SD = 8.73), with the majority being females (55.5%). For the collection of data, such scales were used as the Job Diagnostic Survey (JDS), the Knowledge, Skills, Abilities, and Other Personal Characteristics Scale (KSAOS), the Competencies and Training Scale (CTS) and the Utrecht Work Engagement Scale (UWES).

The results obtained show that the job characteristics, the professional knowledge, the skills, the training and the work engagement influence the job evaluation. It was also found that the male respondents, those belonging to the older age group, those with higher academic qualifications and those with higher positions present higher average performance in all dimensions under study.

It was also possible to verify that Autonomy is the JDS variable with greater effect on the Job evaluation and the bigger the Autonomy, Skill variety and Feedback given to the employees, the more positive their perception of Job evaluation. Data analysis also reveals that KSAO moderate the relations between job characteristics and job evaluation and the dimension with the most effect on Job evaluation is Professional Ethics and Health Law. On the other hand, the higher the competencies and professional training in the area of Organization and finance, the greater the Job evaluation. Finally, it was verified that Vigor is the only variable with significant effect on Job evaluation.

It is hoped that these results may inspire further research that contributes to a better understanding of these relationships; and at the practical level, it is intended to alert the justified investment by the organizations in the implementation of a performance evaluation model. Taking into account the current competitiveness at the organizational level, it is considered that the analysis of the relationships between these dimensions is crucial to an

organization. In this way, this project is intended to build a new process of performance evaluation in public hospitals in China, based on the competencies identified for each job.

Keywords: Job characteristics; Professional knowledge; Competencies; Job evaluation
JEL: H51; H83

Resumo

Atualmente, o clima económico contribuiu para um ambiente cada vez mais competitivo entre as organizações e para garantir a vantagem competitiva, as organizações devem ser capazes de promover altos níveis de desempenho profissional. Esta investigação insere-se nesta temática e tem como objetivo estudar como as características da função, o conhecimento profissional, as habilidades, as competências e o envolvimento no trabalho influenciam a avaliação do trabalho e, consequentemente, o desempenho dos funcionários de seis hospitais públicos . China.

A amostra é composta por 546 sujeitos com idades compreendidas entre os 21 e os 58 anos (M = 37.9; DP = 8.73), sendo a maioria do sexo feminino (55.5%). Os dados foram recolhidos através das seguintes escalas: Job Diagnostic Survey (JDS), Escala de Conhecimento, Habilidades, Aptidões e Outras Escalas Pessoais (KSAOS), Escala de Competências e Formação (CTS) e Escala de Envolvimento no Trabalho de Utrecht (UWES).

Os resultados obtidos mostram que as características da função, o conhecimento profissional, as habilidades, a formação e o envolvimento no trabalho influenciam a avaliação do trabalho. Constatou-se também que os entrevistados do sexo masculino, os que pertencem à faixa etária mais avançada, os que possuem maior qualificação académica e que ocupam posições hierárquicas mais elevadas, apresentam um desempenho médio superior em todas as dimensões em estudo.

Também foi possível verificar que a Autonomia é a variável do JDS com maior efeito na avaliação do trabalho e que quanto maior é a Autonomia, a variedade de competências e o feedback dado aos funcionários, mais positiva é a sua perceção da avaliação do trabalho. A análise dos dados também revelou que o KSAO modera a relação existente entre as características da função e a avaliação do trabalho e que a variável com maior efeito na avaliação do trabalho é a Ética Profissional e a Lei da Saúde. Por outro lado, quanto maiores são as competências e a formação profissional na área de Organização e Finanças, melhor é a avaliação do trabalho. Por último, verificou-se que o Vigor é a única dimensão do envolvimento no trabalho com efeito significativo na avaliação do mesmo.

Espera-se que esses resultados possam inspirar pesquisas futuras e que possam contribuir para uma melhor compreensão dessas relações; a nível prático pretende-se alertar os gestores

para a implementação de um modelo de avaliação de desempenho. Considerando a atual competitividade a nível organizacional, considera-se que a análise da relação entre estas dimensões é crucial para qualquer organização. Esta investigação pretende assim construir um novo processo de avaliação do trabalho nos hospitais públicos na China, com base nas competências identificadas para cada função.

Palavras-chave: Características da função; Conhecimento profissional; Competências; Avaliação do trabalho
JEL: H51; H83

摘要

当前的经济环境导致各个组织之间的竞争日益激烈。为了确保自身的竞争优势，它们必需有能力促进高水准的专业绩效。本研究是该主题的一部分，旨在分析工作特征、专业知识、技能、胜任特征、培训和工作投入等因素是如何影响工作评价并继而影响中国 6 家公立医院的员工绩效的。

样本由 546 名调查对象构成，年龄为 21 至 58 岁（M=37.9；SD=8.73），女性占多数（55.5%）。以下量表被用来收集数据：工作诊断调查表（Job Diagnostic Survey, JDS)，知识、技能、能力和其他个性特征量表（Knowledge, Skills, Abilities, and Other Personal Characteristics Scale, KSAOS），胜任特征和培训量表（Competencies and Training Scale, CTS），以及 Utrecht 工作投入量表（Utrecht Work Engagement Scale, UWES）。

结果表明工作特征、专业知识、技能、培训和工作投入等会影响工作评价。此外，研究还发现，男性调查对象、年龄较大、学历较高以及职位较高的调查对象在本研究的所有维度上都呈现出较高的平均成绩。

研究还可证实自主性是 JDS 中对工作评价影响较大的变量，且自主性、技能多样性和给予员工的反馈越大，员工对工作评价的看法越积极。数据分析还揭示了 KSAO 会调节工作特征与工作评价之间的关系，且其中对工作评价影响最大的维度是职业道德和健康法律。另一方面，组织和金融领域的胜任特征和职业培训越好，工作评价越好。最后，研究证实了精力是对工作评价具有显著影响的唯一变量。

希望这些结果能鼓舞人们开展进一步的研究，有助于更好地理解这些关系；从实践的层面讲，我们想要人们意识到组织在落实绩效评价模型的过程中需要做合乎情理的投资。考虑到当前组织层面的竞争，可以认为分析这些维度之间的关系对于任何组织来说都是至关重要的。本研究希望通过可以识别的各项工作的胜任特征，建立中国公立医院绩效评价的新流程。

关键词：工作特征；专业知识；胜任特征；工作评价

JEL: H51; H83

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Time flies! Three years of doctoral study life have gone such as a flash. The joy of receiving doctoral admission notice is just like yesterday. Now I am preparing my acknowledgements. It is 12 o'clock at night, so quiet everywhere. Looking back those three years' study in Lisbon, I have many thanks to say, not only to my dear professor, but also to my classmates and friends.

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List of Abbreviations

CFI	-	Comparative Fit Index
CTS	-	Competencies and Training Scale
Df	-	Degree of freedom
JDS	-	Job Diagnostic Survey
KSAOS	-	Knowledge, Skills, Abilities, and Other Personal Characteristics Scale
KSA	-	Knowledge, Skills, Abilities
M	-	Mean
MPS	-	Motivating Potential Score
NFI	-	Normed Fit Index
χ^2	-	Chi-square
RMSEA	-	Root Mean Squared Error of Approximation
SD	-	Standard deviation
UWES	-	Utrecht Work Engagement Scale

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Chapter 1: Introduction

Job evaluation system has been widely and deeply researched and regulated in detail by scholars abroad. It has a great effect on human resource management. Nowadays in China, many researches are focused on job analysis, but only a few of them are focused on hospital job evaluation (Bian, 2011).

In this case, we could say that job evaluation model is still in a preliminary stage of theoretical exploration and practice. Through literature review, some hospitals and scholars design hospital evaluation model by themselves or professional management consulting companies in order to carry out relevant practice. Job evaluation system contains two parts of practice in China (Chen, 2009).

One is the major hospital job evaluation system we are using now. Within this system the mostly-used method is the job classification method, which classifies and gradates job in medical institutions according to job content, positional title and administrative post. The other system is used by some hospitals in China. Within this system, the point-factor method is adopted to search job evaluation model through the following three ways:

1. Ensuring the efficient use of installed capacity, in particular by making full use of existing equipment and infrastructure and by diversifying the working time regime so as to achieve an optimum rate of use of available resources;

2. Elaboration of annual and multi-year plans in which the objectives to be reached and agreed with the trustees are defined, and the activity indicators that allow to gauge the performance of the respective management units and equipment;

3. Evaluation of the heads of management bodies, heads of departments and services and other professionals, according to the merit of their performance, which is assessed by the efficiency demonstrated in the management of resources and by the quality of care provided to the users.

According to Liu (2007), job evaluation is a process, by which we could systematically decide relative value between jobs in an organization and build a job structure. It is synthetically based on working content, skills, value to the organization, organizational culture and external market.

On the other hand, Chen (2009) considered that job evaluation is to take a specific job as the evaluation object, and also a process that ensures the relative value of the job through responsibility, work intensity, requirement of qualifications of the job. Bian (2011) pointed out that job evaluation is the result of job analysis during which some certain evaluation processes and measurement standards are designed and typical opinions from multiple evaluators are combined. Therefore, evaluation standard, evaluation process, evaluator are key factors of job evaluation.

The main intention of this investigation is to analyze the impact of job characteristics, knowledge, skills, abilities and other personal characteristics (KSAO), competencies, training and job engagement on the job evaluation model. Faced with an increasingly dynamic and demanding market, companies are forced to find new solutions that guarantee longevity and business growth. In this sense, the development of competencies has been adopted by many organizations, which see in their professionals a competitive differential (Akinyemi & Abiddin, 2013).

It is also important to emphasize that through the management of competences the performance evaluation of each employee becomes much more efficient. A management committed to the development of competencies is based on the identification and management of the organizational and individual competences most relevant to the success of the company (e.g., leadership and management, organization and finance, professional ethics and health law). At the same time, there is the alignment of the profile of its employees to these expectations and needs (Breznik & Lahovnik, 2016).

Therefore, this work is structured in five chapters. The first one is organized by the present introduction that presents the theme under study, the research problem, the framework and research questions and the relevance of the study.

The second chapter is mainly about literature review and hypotheses formulation. In this context, job characteristics– particularly the Hackman and Oldham's Model –, knowledge and skills, competencies, training and job engagement will be approached.

The third chapter is dedicated to the research methods, having a central bearing on clarifying the objectives, material and methods of this investigation. In the making of this work, a quantitative methodology will be applied since we believe it to be more adequate to the operationalization of this study.

The fourth chapter – Results – will mainly be centered on the analyses and data interpretation obtained.

Finally, in the fifth chapter, results will be discussed, denoting the most important and relevant literature in this field. A critical reflection regarding the work developed throughout the chapters will also take place, pointing out a few of its limits and allowing new investigation questions to be raised.

1.1 Research problem

Job evaluation is an important tool to help major public hospitals solve the issue of their internal fairness, because it allows to evaluate the value of the job and its contribution to major public hospitals. It can also help us to identify what kind of importance that the job is going to bring to the hospital. Reasonable job evaluation factors could be established through scientific job evaluation, that is, "reasonable factors distribution system" (Chen, 2009).

At the same time, during the process of job evaluation and grade classification of factors, we could reasonably design a hierarchy system in order to embody fairness and realize the encouragement function. According to the result of job evaluation which can prove the value of staff in combination with the external labor market status, the system could be established at that time. Thus, we may make great progress in achieving the success of distribution system reform of major public hospitals in China (Bian, 2011).

It means that it becomes of extreme importance to analyze in which way job characteristics, KSAO, competencies, training and job engagement influence the job evaluation and consequently the performance of the employees of major public hospitals in China.

1.2 Framework and research questions

Health is the foundation of human development and it relates to thousands of families (The Health Foundation, 2012). It is a necessary requirement to develop medical and public health service and improve the health level of China. In this case, human resources in medical areas become the important guarantee of medical care and public health development (State Council of the People's Republic of China, 2010). How to maximize the function of human resources and how to improve the level of human resource management are very important subjects that we are faced with in major public hospital management. For various reasons, level of human resource management in China's major public hospitals is relatively behind

the international level. Therefore, we need to have more theories and methods to improve our management level (State Council of the People's Republic of China, 2009).

The reform of the personnel system in China's health institutions started last century. It was aimed to solve the problems arising in the process of gradually deepening the reform of the personnel system, from single to comprehensive, from point to plane. The reform of health institutions in China can be roughly divided into the following four stages:

1. Preliminary exploration (1978-1987). Conforming to the reform of the education, science and technology system, the professional title appraisal system was restored, health institutions' autonomy in personnel management was expanded and the employment system was explored. The appropriate decentralization of personnel management in health institutions of authority aroused the enthusiasm of some outstanding talents;

2. Step-by-step development (1988-1992). In this stage, the main content of reform was the establishment of the system of classification management science, forming a unique management system. Health institutions' autonomy in personnel management was further expanded and the application range of the employment system was enlarged. Government achieved some results in employment system, appointment of professional and technical posts and distribution of wages;

3. Comprehensive promotion (1993-1999). In order to adapt to the socialist market economic system, reform of public health institutions came into a new stage. Management system was aligned with the market economic system, and independent legal person status of public health institutions was defined. Some health institutions even successfully separated its ownership from its management right;

4. In-depth development (2000 till now) (State Council of the People's Republic of China, 2010).

Along with the reform and development of the socialist market economic system, the "identity management" personnel system could not adapt to the new situation of the personnel allocation request in major public hospitals. How to improve the level of human resource management in major public hospitals became an imminent problem. In addition, a hospital is a highly social organization that requires talents and intensive knowledge such as the knowledge of the management object (The Health Foundation, 2012).

There is also the decision to use modern methods in human resource management, in order to follow the people-oriented management philosophy and mobilize the enthusiasm of staff. Therefore, this stage is the new stage to establish personnel management system of the

health institutions. Reform of personnel system of public health institutions starts from system and gradually permeates (Ministry of Personnel of the People's Republic of China, 2000).

Analysis of literature (e.g., Branick & Levine, 2002; Chen, 2009; State Council of the People's Republic of China, 2010; Bian, 2011) shows that job evaluation model in foreign country is established under some special circumstances and conditions, and most of those evaluation factors are highly generalized. They are very similar to enterprises, but hardly carry the features of jobs in major public hospitals. Public hospital is the major structure of China's medical service system. Its structure, property, job setting is quite different from those of foreign hospitals, and corresponding evaluation factors are not the same either.

How to build a systemic, scientific, and comprehensive job evaluation model for major hospitals in China?

How to make the value of job in major public hospitals become actual?

How could the job setting of major public hospitals provide more scientific evidences that optimize resource allocation, salary management and performance management?

How could the enthusiasm of medical staff be improved by job setting and what should we do to guide them to provide better medical service for the public?

If we could build a job evaluation model for major public hospitals in China, the results of this study will be of more practical significance. Meanwhile, major public hospitals in China share the same problems such as: large-scale, plenty of jobs, complicated job management, obviously representative and great influence. In this case, a study on the job evaluation model of major public hospitals in China may play a typical and exemplary role in the Chinese medical industry.

1.3 Relevance of the study

The constant evolution of the world forces organizations to change their organizational structures to improve their capacity for responding to the XXI century challenges.

The transformation of the surroundings and its deep changes, technology wise, strategy, markets and products has had a profound impact on the professions and on the job organization. Particularly, the ongoing contexts in which the labor activities occur and the work demands substantiate the need to create knowledge and develop new competencies. As an answer to these demands, there have been perceived management practices that facilitate and incentivize its development. Therefore, the managers and the organizations have been

reviewing some of their policies and human resource management practices, namely the systems and work analysis processes.

The comprehension of the labor activities and of the core involved contribute is an important way to improve the quality of most of the human resource management activities such as: job characteristics, knowledge and skills, competencies, training and job engagement (Boonzaaier, Ficker, & Rust, 2001; Byham & Moyer, 2005; Goffin & Woycheshin, 2006; Mayoral, Palacios, Gómez, & Crespo, 2007; Schaufeli & Bakker, 2010; Bassot, 2012).

This study is relevant because it allows understanding which factors are more important to the job evaluation of medical staff in major public hospitals, as it will draw an outline of the job evaluation model that agrees to effectively evaluate the job engagement and the performance of the workers.

Thus, at the theoretical level, it is hoped that these results may inspire further research that contributes to a better understanding of these relationships; and at the practical level, it is intended to alert the justified investment by the organizations in the implementation of a performance evaluation model. Taking into account the current competitiveness at the organizational level, it is considered that the analysis of the relationship between these dimensions is crucial to any organization.

Chapter 2: Literature Review and Hypotheses Formulation

Organizations are inserted in increasingly competitive environments, so they need to look for new solutions to increase efficiency. The achievement of sustainable competitive advantages depends, largely, on the quality of labor, since human capital is a big differential between organizations. In this sense, it is fundamental that people get used to the roles they perform, namely the content and nature of the task itself and the objective of its execution (Bontis, Richards, & Serenko, 2011). It is in this context that in the seventies the job characteristics model ascended.

According to the model developed by Hackman and Oldham (1976), there are five principal characteristics that determine the motivation degree of a worker: competencies variety, task identity, task meaning, autonomy and result feedback.

Also, the KSAO acquired by a person through work-related experience or education are decisive for the development of competencies that should generate positive work results by increasing the transparency of goals and performance measures as well as by improving the consistency of human resource practices (Li, 1995).

According to Jena and Sahoo (2012), competencies are the characteristics that lead to the demonstration of skills and abilities, which result in effective performance within an occupational area.

Continuing training is another important aspect because there are constant medical and technological advances and consequently there is a greater need to ensure that health professionals, allied teams and managers have the knowledge and skills to improve and develop healthcare services (The Health Foundation, 2012).

As any other organizations, hospitals are open systems that influence and are influenced by the context in which they are inserted, so in order to be able to survive in an increasingly competitive market, it is necessary to foment the dedication and involvement of their workers (Leiter & Bakker, 2010).

2.1 Job characteristics

The theories regarding job characteristics began to be studied when one began to try to reach the maximum efficiency in the accomplishment of the tasks. At the outset, it was argued

that the division of labor could increase the efficiency and productivity of workers. High specialization and simplification of tasks were required (Morgeson & Campion, 2003).

An example of this theory can be seen in Taylorism, where the work was divided into distinct tasks, thus allowing the workers to obtain high specialization and efficiency in them. These gains were achieved because workers did not change much between tasks, there were few distractions since there were fewer elements of work, and workers recognized a small variety of ways to continue to increase their efficiency (Galup, Klein, & Jiang, 2008).

The great problem of designing work to achieve maximum efficiency was that the tasks were repetitive and monotonous while it was necessary to provoke a high degree of motivation among the workers (Boonzaaier, Ficker, & Rust, 2001). Theorists then began discussing new ways of approaching the job characteristics that could lead to greater worker satisfaction, and which could meet their intrinsic needs, and in this context the job characteristics model of Hackman and Oldham (1975) was developed.

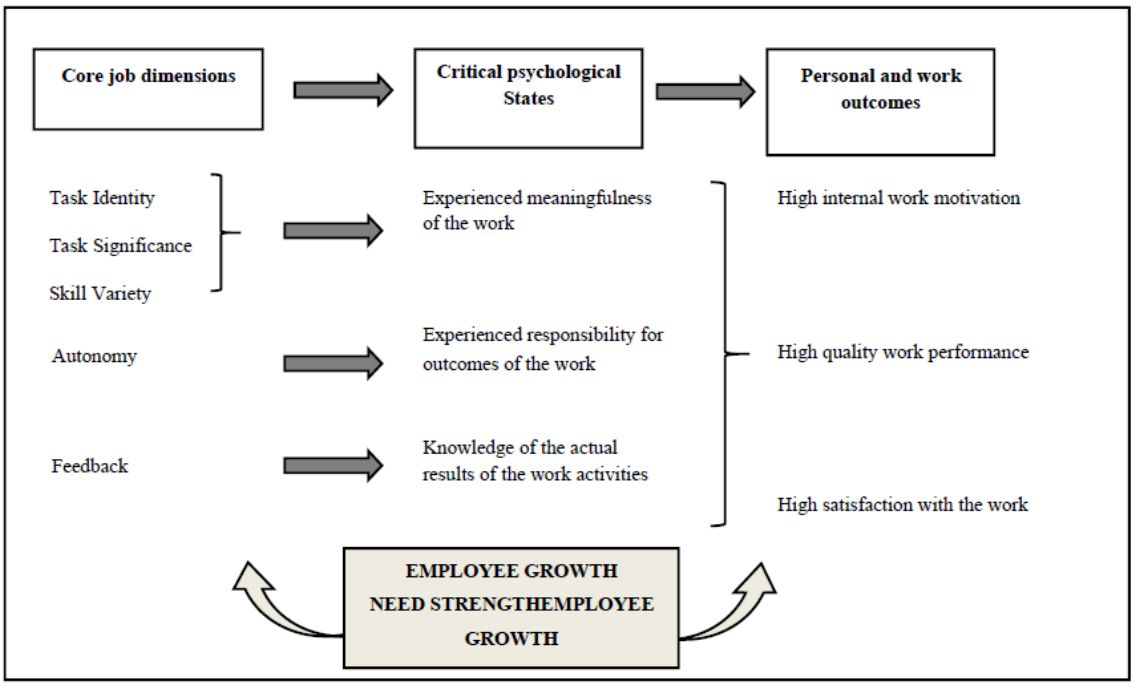
It is extremely important to get the workers to be committed and willing to give their best since their objectives must be aligned with the organization. So, this can happen, the coworkers must be motivated to achieve their tasks as that is how they will accomplish a high performance (Stringer, Didham, & Theivananthampillai, 2011).

Before this situation, theorists began to investigate new ways to approach the job characteristics that may lead to a superior performance and it is in this context that the Hackman and Oldham (1975) model is centered on the analysis of tasks that people carry out. The authors suggested that the task characteristics are fundamental to creating motivation, satisfaction and elevated performance (Oldham & Hackman, 2005). They added that intrinsic motivation emerges when tasks are considered significantly autonomous and opposed to monotonous, simple and repetitive work (Sansone & Harackiewicz, 2000).

In the same line of thought, Humphrey, Nahrgang, and Morgenson (2007) referred that the task characteristics and the way in which a work is structured contribute to a greater satisfaction and it is reflected in the members' organization productivity. On the other hand, when work allows some autonomy, the workers relate the performance to their efforts and feel responsible for their decisions. All these variables influence the relations between job characteristics and the psychological states associated with motivation.

Based on this evidence Hackman and Oldham (1975) came to the conclusion that there are five job characteristics that contribute to making the function a source of motivation: competencies variety, task identity, task meaning, autonomy and result feedback (Figure 2-1).

Figure 2-1 Hackman and Oldham job characteristics model



Source: Oldham and Hackman (2005)

The variety refers to the degree to which the function requires the application of a diverse number of capacities, skills, instinct, knowledge and personal talents. There is variety when the function presents a broad spectrum of operations or usage of diverse equipment and procedures. A function that allows variety eliminates routine and monotony and is thus challenging. With the increase of competencies, people become more qualified and flexible to perform specific functions that demand different knowledge. This factor reflects in the employee's intrinsic motivation as the variety characteristic is related to the work execution using different competencies, abilities and talents (Oldham & Hackman, 2005).

The identity refers to the degree to which a job is perceived as a whole or as an identifiable portion of visible results. It relates to the possibility of the employee to perform a complex or global work and identify clearly the activity results. There's no identity in a task in which an employee executes fragmented, partial and incomplete activities, ignoring their purpose; there is no identity either when the work environment is determined by the manager (Hackman & Oldham, 1975).

The meaning concerns the substantial impact that the work has on the life of the worker. It reflects the knowledge that the worker's accomplishment of his function has an influence on other people or on the organization. When the function is material, the worker can distinguish the important from the accessory and the essential from the accidental, so he can

accomplish the objectives of the task carried out. There is no significance in the tasks when people get only orders and directives to fulfill rather than orientation about its purpose, functionality or work objectives. The meaning of the tasks demands a complete explicitness of the work, its objectives, its usefulness and importance of its interdependency, moreover and in particular, of the internal (or external) client to whom it is directed (Hackman & Oldham, 1976).

The autonomy is characterized by the liberty degree and independence in terms of task planning and procedures to use, namely, the power of decision and the means used to execute the work. It reflects the degree of personal liberty to plan and execute the work, select the work team and decide the methods to adopt. The bigger the autonomy, the bigger the time during which the coworker is not receiving direct supervision, and the bigger the auto-management of his work (Hackman & Oldham, 1980).

Finally, the feedback is the degree to which the employee receives plain and objective information regarding the results obtained in the execution of his work. It refers to the quantity of information he gets in return to evaluate the efficacy of his efforts in the production of results. In all functions, it is important that the feedback of the employee's performance is explicit. The results can be communicated in several ways: through an evaluation commission, of its promotion, of its own work or through others (e.g., coworkers, bosses, suppliers, friends, relatives, clients). The feedback increases the effect of the specific and difficult evaluation as it allows knowing the patterns and performance expectations and the necessary information to adjust the direction, effort and strategy to attain the objectives (Hackman & Oldham, 1975).

According to this theory, the jobs that include these characteristics will probably be more satisfactory and motivating. Oldham and Hackman (2005) affirmed that when tasks have a meaning for the worker and he himself identifies with his objectives, he starts to consider his work as important, valuable and useful. When the function allows autonomy and gives feedback concerning his professional performance, the individual feels more responsible for the results achieved.

Humphrey, Nahrgang, and Morgenson (2007) said that this theoretical model is revealed fundamental to comprehending the way in which individuals adapt to their functions, as well as to understanding the impact of the job characteristics on motivation, satisfaction and performance. Through enhancement and a bigger role complexity, it will be possible to solve most of the difficulties placed to managers of organizations in the scope of satisfaction and motivation.

2.1.1 Operationalization of the Hackman and Oldham Model

To operationalize the model, Hackman and Oldham (1980) developed an instrument – Job Diagnostic Survey (JDS) – that falls upon the determinants of job satisfaction, giving release to the function characteristics. In this context, it is possible to verify that the enrichment of the function and its re-design can be triggered through the diagnosis that occurs in the JDS application. This instrument allows to develop the human factor through enrichment of functions, taking into account the identification of the motivating potential of work (MPS: Motivating Potential Score) which can be calculated through the formula presented in Figure 2-2.

Figure 2-2 Motivating Potential Score

$$MPS = \frac{(variety + identity + significance)}{3} \times autonomy \times feedback$$

Source: Oldham and Hackman (2005)

The MPS, on its own, does not have the ability to determine the individual performance that depends on the attributes and personal values. One of the factors that moderate the relation between job characteristics and individual results (e.g., motivation, satisfaction, individual performance) is the need of personal growth. In this way, the individuals with high necessity of growth respond in a more energetic and effective way to the opportunities provided by a rich and complex work (with high MPS), developing an intrinsic motivation that leads to positive individual behaviors (Oldham & Hackman, 2005).

Contrarily, the individuals with reduced necessity of growth do not explore the personal realization opportunities given by the potential of their work because they do not recognize them as an opportunity. They do not value them yet, because they perceived them as a threat that prevents them from having a good performance.

Nevertheless, the workers with inferior necessities of individual growth manage to deal in a more satisfactory way with a job of low motivational potential, for two separate reasons: first, the poor work content with low MPS is more adequate to the needs required at the moment; second, simple work can be executed in a regular way, without lots of changes, letting the energy to deal with an unsatisfactory work context. The model shows that the higher the MPS index that fits the work characteristics, the higher the motivation of the workers and consequently the bigger their satisfaction (Hackman & Oldham, 1976).

Over time, JDS has been the subject of numerous studies and reviews, involving about 1,500 individuals, who perform various functions in more than fifteen different organizations. The approach of the questions focused on each of the mentioned dimensions, being addressed and analyzed the relations with each psychological state and the obtained results.

In the 1974 study, Hackman and Oldham, collected data from 658 workers who performed different roles in seven different organizations. The functions were heterogeneous and included blue-collar, white-collar and professional work. The organizations covered industrial and service areas with a rural and urban nature. Subjects were equally distributed according to gender, age and academic level. This analysis was divided into eight sectors (function description, function identification, function impairment, satisfaction with function aspects, what others think about function, function characteristics and degree of preference, which is more important in function and demographic identification). The participants of this analysis showed a moderate agreement on the characteristics of the work and therefore Hackman and Oldham (1975) recommend that the description of functions of the JDS be complemented by independent evaluations made by individuals without direct responsibility in them.

Recently, several studies have used the Hackman and Oldham function model, relating job characteristics and job evaluation, namely by Katsikea, Theodosiou, Perdis, and Kehagias (2011). In this study, the job characteristics model and the modification of the workstation were used to investigate the relationship between the organizational structure and the characteristics and results of the work in exporting organizations. The authors sampled 160 UK exporters. The relationship between the formalization, as well as the centralization, with the levels of autonomy, variety and feedback was studied. The results indicate that high levels of autonomy at work, variety of tasks and feedback, increase the intrinsic satisfaction with the work of the export managers and consequently with the performance in the work. They also note that job satisfaction is positively related to organizational commitment.

Another relevant study was carried out by Bontis, Richards, and Serenko (2011) who investigated the impact of the characteristics of the function on the quality of service and the perception of workers on their work efficiency. A sample of 9,060 workers from a multinational telecommunications company in North America was used, which revealed that autonomy has a significant impact on work performance.

Huang (2011), on the other hand, studied the relation between the characteristics of the function and the intentions of turnover. For this purpose, a sample of 453 workers from two Chinese companies and a sample of 870 workers from two Japanese companies were used.

The author found that the higher the levels of autonomy and the greater the meaning of the task the lower the organization is outgoing intentions.

In the mentioned studies, we can verify that the autonomy is the characteristic of the work that is more positively related to the satisfaction and the performance in the work, although there are also positive relations between these variables and the variety of tasks, the feedback and the meaning of the work.

2.1.2 Job characteristics and the individual results

A factor that moderates the relation between function characteristics and the individual results resides in satisfaction in the work context, namely, the level of demotivation when it comes to salary, safety at work or the relationships between coworkers and supervisors (Stringer, Didham, & Theivananthampillai, 2011). The magnitude of satisfaction in the work context influences the magnitude and the meaning of the association between the MPS and the individual results (Hackman & Oldham, 1980).

The work variety obliges a high degree of action, thinking, training, attention, mistake avoidance and relentless search of references that aim to accompany the progression and the realization of the intended objectives. It seems that the effect of a rich work content varies according to the impact (positive/negative) that it has on the workers, depending on part of their dispositional sensibility. If in confrontation with demands and challenges at work, the workers are predisposed to practice efforts and win challenges. They will most certainly be prepared to positively acknowledge and negatively react to negative stimulus, and the elevated MPS will lead to negative reactions.

Boonzaaier, Ficker, and Rust (2001) defended that intrinsic motivation depends on the self-motivation of the coworker to have work productivity, in other words, the positive experience that people feel when correctly performing their functions and how bad they feel when that doesn’t happen.

According to Davar and Ranjubala (2012), from the motivational point of view, this model presumes that the individual obtains an internal compensation when he is experiencing that the responsibility of a task is well fulfilled, and when he worries about it and acknowledges the results of actions taken. It is possible to verify then that the motivation, the satisfaction and the worker’s realization are bigger when those states of mind are present.

Based on the theoretical approach, Bouckenooghe, Raja, and Butt (2013) referred that high levels of satisfaction promote an enhanced performance, in the same way low levels of motivation lead to innumerable negative results in the work environment such as: task and

work avoidance (abandonment), psychological defenses (medication abuse), protest (complaints and refuse to do what is asked) and aggression (theft). The same author defends that the relation between these answers, productivity and the organizational performance, is one of the motives why employees manifest concern in improving the function characteristics.

Morgeson and Campion (2003) added that the individuals might be motivated through satisfaction with the results of the role performance or the job characteristics. In accordance with the assumption, it is possible to develop ways for work organization to increase the function characteristics, in a way to increase the intrinsic motivation and individual satisfaction.

The literature (e.g., Feinberg, 2000; Cook, 2002; Goldstein, 2002; Nishii, 2008) referred that aspects such as autonomy, task identity, result feedback, task meaning or the necessary competencies variety, not only condition the work satisfaction as it reflects the way in which the role is performed. The model can yet be used to identify the specific characteristics of work that need to be improved to increase the intrinsic motivation, the satisfaction and the worker's performance.

The investigation has been showing that the five dimensions (autonomy, competencies variety, result feedback, task identity and task meaning) of Hackman and Oldham, when used together, work better than the isolated dimensions and provide a better performance predictor (Galup, Klein, & Jiang, 2008).

These principal characteristics contribute to three psychological states that trigger individual and organizational positive results, high intrinsic motivation and satisfaction, improved quality of work, low absenteeism and reduced turnover. They are perception of work significance, personal responsibility for the work done and the knowledge of the results of their work (Grant, 2007).

The first state, perception of work significance is triggered by the variety dimensions, identification of the work objectives and the task meaning. This state defines how the individual experiences the work done, in other words, whether it has the same value, utility and it is meaningful to both the individual and the organization (Katsikea, Theodosiou, Perdikis, & Kehagias, 2011).

The personal responsibility is experienced when a work is characterized by a high autonomy, in other words, the degree to which the individual feels responsible for the results obtained in the function that is being executed, being them positive or negative. It is a state related to the feeling that an individual experience when fulfilling a task. To be specific, if he has the knowledge and adequate competencies, he will experience positive feelings and if he

does not have these competencies, he will experience negative feelings. The person that lives with positive feelings will have a high intrinsic motivation (Schjoedt, 2009).

The knowledge of the results increases when a work has a high feedback, and that's why the last state is interpreted as the degree to which the individual can acknowledge continuously if he is executing his work in an effective work or not. This state refers that there are people with the need to grow and develop at a professional level; it has predicted that a high intrinsic motivation occurs when people have a complex work full of challenges. People with high needs of development live in stronger psychological states and react positively to them, contrarily to individuals without the need of development (Oldham & Hackman, 2005).

In general, the five job characteristics are determining factors of these psychological states making workers feel internally compensated by taking knowledge that they have a good performance in an important task. The close relation between essential work dimensions and the experience of these critical psychological states increase positive individual results, such as high motivation, good quality in work performance, high satisfaction and low absenteeism and turnover. Nevertheless, the five job characteristics contribute, in an uneven way, to the development of these critical psychological states. Variety, identity and significance together have an influence on the individual in terms of the meaning of the work: it is important, valuable and rewarding; the autonomy and the feedback trigger, respectively, the perception of responsibility and the efficacy significance (Katsikea, Theodosiou, Perdis, & Kehagias, 2011).

From the motivational point of view, it can be concluded that this theory suggests that intrinsic motivation and, consequently, the motivation to work occur when the worker has autonomy as well as knowledge of the results of his work through feedback. In this way, it is possible to relate performance to efforts and decisions, in the sense that the worker feels responsible when having knowledge of the result of the work (Grant, 2007).

As any other Hackman and Oldham theory (1975), it has a few limitations and has been targeted by several criticisms. Taking in consideration that it was elaborated in the 70's, question in the nowadays organizational culture is possible to draw the work tasks according to the five criteria model of the function characteristics. The workers may not be prepared to a change in tasks, so the organization must have available means that provide an environment open to learning, assuring necessary measures for the draft of a new task. It is necessary to be careful not to demand too much, as that will inhibit the motivation of the worker. The workers' qualifications must be adjusted to the new tasks.

Molander (1996) referred that to be successful an organization needs its employees to present a strong wish to remain in it. In this context, the intrinsic motivation should be focused on to captivate the loyalty and the commitment of the employees. After several studies about establishing objectives in organizational context, Kinicki and Kreitner (2006) concluded that:

1. Diverse tasks lead to better performances;

2. Specific and hard goals lead to a superior performance in the task realization. The specificity of the aim translates into the capacity for quantifying the objectives. Several studies have shown that establishment of specific and hard objectives contributes to a better performance when compared to easy objectives;

3. The feedback increases the effect of the specific and difficult goals, since the objectives allow the individual to know the patterns and expectations of the performance; and the feedback provides the necessary information to adjust the direction, effort and strategy to attain the objectives. With this in mind, we specifically propose:

Hypothesis 1: *The job characteristics (competencies variety, task identity, task significance, autonomy and feedback) influence the job evaluation.*

2.2 Knowledge and skills

Byham and Moyer (2005) defended that professional competence is a determinant for the development of the context analyses where the personal cognitive experiences are acquired once the knowledge associated with work relates directly to the knowledge and experience at the workplace. According to the author, different types of knowledge can be distinguished:

1. Know-what that refers to the factual knowledge related to the set of insights that each professional category must possess;

2. Know-why that characterizes the theoretical or professional, that influences the technological development and the rhythm and the characteristics of its application in the industries or organizations;

3. Know-how that concerns the capacity for working with competency in different contexts;

4. Know-whom that's acquired through social practices and through the participation in particular networks that combine different competencies, especially social competencies that

allow the access and usage of knowledge of someone else, most of the times designed for interim of networks of professional and personal relations.

Each type of knowledge can be obtained through different apprenticeship. The simpler cases are the know-what and the know-why that can be acquired through the normal knowledge obtainment (e.g., reading, training, research in database). The know-how and the know-whom search support in the practical experience and require the existence of informal social channels, as they depend on the dynamical corporate organizations. The professional training evolves into a practical part in the workplace, as it is considered the main way of acquiring know-how.

The knowledge associated with work contains a tacit dimension and at the same time depends on particular social contexts. In this way, the context creates a dynamic balance between the know-what (theory) and the know-how (practical). Relatively to the know-how, it is important to monitor, comprehend and be capable of fitting to the continuous changes, not just in the organizations where people work, but in the whole sector. But it is the know-why that really allows the individual to develop the abilities in accordance with their own will, facilitating the understanding of their actions at the workplace, searching new ways to sort out problems and encouraging the identification with their own work (Goffin & Woycheshin, 2006).

In a general way, the knowledge associated with work is a complex matter that has different aspects and dimensions, sometimes contradictory, and can be synthesized in types of relation between explicit and tacit knowledge. The organizations that hold activities that depend on the continuous development of knowledge with work are interested in knowing if their workers are capable of contributing in a significant way to the creation, transmission and diffusing of the knowledge.

The attributes necessary for an effective performance may be grouped into knowledge, skills, abilities and others characteristics (KSAO). The knowledge is the degree to which the work dominates technical aspects related to the performance of the function.

The skills are the capacity for performing tasks that demand the usage of tools, equipment and machinery.

The abilities to manage physical and mental activities demanded by the tasks of the profession, where the usage of tools, equipment and machinery is not a relevant/dominant factor.

And the other characteristics concern the interest, values, tempers and personality traits that suggest that a worker is prone to do something, instead of worrying about the fact that how well he can develop the task to the maximum (Brannick & Levine, 2002).

The first three dimensions, cognitive, functional and social competencies, are universal and clearly consistent with the KSA (Knowledge, Skills, Abilities) approach in professional training. The knowledge and comprehension are associated with cognitive competencies, the skills are associated with the functional competencies and the behaviors and attitudes are associated with the social competencies (Le & Winterton, 2005).

The world has undergone several transformations in the development of work in all spheres. Currently only the knowledge acquired in the course of university training, does not guarantee the placement of a professional, and even the fact of having worked for many years in the same company, which was considered an important factor, is no longer taken into consideration at the moment of professional integration. For a number of years' organizations have been creating and developing knowledge and experience to meet the changing global landscape, aligning HR policies with company strategy, and combining individual needs with those of the organization (Akinyemi &Abiddin, 2013).

Given this scenario, where the labor market is competitive and organizations are seeking more and more qualified people, to meet their strategic objectives, it is necessary to think about the necessary skills, which enable the individuals to enter and establish themselves in the job market. This happens through the development of their qualifications, aiming to meet the basic needs of the organization and its business, to guarantee results in the market (Bassot, 2012).

To design the professional, it is necessary to have some basic skills, such as: knowledge, skills, attitudes, interests, values and other personal characteristics, which are important to the performance of activities. These competences are often recognized when applied in the business context, characterizing the professional profile of the individual and favoring his professional development (Breznik & Lahovnik, 2016).

The labor market can be understood as a supply and demand mechanism, consisting of companies and job opportunities. It is also the process of attracting a pool of candidates to a particular position. Meeting the need of a person or a group of people is still an activity of exchange, implying a negotiation and conflict of ideas about the exchange in question. This means that the market is based on the exchange of products or goods to meet the needs of both sides, so that everyone is satisfied (Byham & Moyer, 2005).

The labor market undergoes constant changes, with them are required more skills of the professional who wishes to join or remain in it. These competencies are linked to the characteristics that the organizations possess, acquired through the technological advances. The continuous changes occur due to globalization, which favors the technological advances and require the adaptation of the professionals, favoring the competitiveness between the people and the companies. And to be competitive professionals must have characteristics such as agility, flexibility, proactivity, innovation and entrepreneurship, among after (Ennis, 2008).

From the new technologies, it is realized that not only the machines and equipment become obsolete, the skills and competences too, so people seek to aggregate new knowledge to gain competitive advantage (Mayoral, Palacios, Gómez, & Crespo, 2007).

The competitive advantage is the candidate's strengths compared to other competitors. Some characteristics considered as competitive advantages are: professional skills, intellectual training, and professional experiences and, above all, human relations skills, since organizational structures are nowadays composed of teams (Jena & Sahoo, 2012).

In addition, organizations are outlining a new employee profile, with features that are extremely important to the new organizational context, such as creativity, initiative, business vision, customer focus, entrepreneurial spirit. To increase employability and expand opportunities in the job market, practitioners need to adjust their skills and competencies to the profile that is required in organizations. The more adapted the professional, the greater their employability (Sinnott, Madison, & Pataki, 2002).

The labor market, increasingly competitive, seeks professionals with multi-qualification that involves knowledge, skills and attitudes, with a profile based on the skills acquired with the know-how, perfected by the experiences lived in the course of its trajectory. The constant search for the improvement of their knowledge is a fundamental requirement to achieve professional success (Breznik & Lahovnik, 2016).

Johari and Yahya (2016) add that positive impact of skill variety, task significance and feedback on job performance promoting high level of job performance. The authors also point that enriched and motivating job design should allow employees to have the opportunity to use different skills and talents to perform tasks, associate or identify themselves closely with the task completed, feel empowered in performing the job through autonomy obtained from the job and get adequate feedback from the job done.

Empirical evidences (Chiu & Chen, 2005; Thakor & Joshi, 2005; Christen, Iyer, & Soberman, 2006; Wood, Veldhoven, Croon, & Menezes, 2012) have demonstrated a significant and direct influence of job characteristics on job evaluation. On the other hand,

Langfred and Moye (2004) asserted that moderate variable in the job characteristics theory is crucial in further articulating the theory. In light of these assertions, work involvement is integrated as a moderator factor in the hypothesized link between job characteristics and job evaluation.

Thus, we propose our second hypothesis:

Hypothesis 2: *The KSAO (knowledge, skills, abilities and other characteristics) moderate the relations between job characteristics and job evaluation.*

2.3 Competencies

The term competency has been assuming a broad and marked expression in academic literature and a more significant role in the human resource management as far as organizations. In the past few decades, there have been attempts to find a platform to understand the term. However, when it comes to globalization, the competency concept has been diversified and applied in so many domains that today it is much harder to understand its connotations (Le Deist & Winterton, 2005).

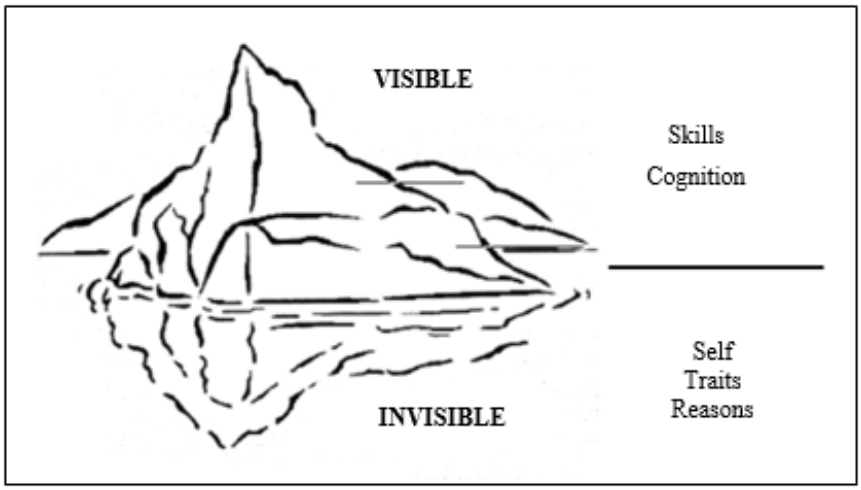
The competencies model is a tool of description that identifies the necessary needs to perform a specific task/position at work, organization or industry. In a simple way, it is a description of behaviors at work that can be defined for each occupational role and each labor (Ennis, 2008).

According to Boyatzis (1982), the competencies may be nested in five categories:

1. Motivation;
2. Character traits;
3. Self-concept;
4. Cognition;
5. Cognitive and behavioral competencies.

The motivation concerns the underlying need that leads, directs and selects the individual behavior; the character traits reflect the way of acting or responding; the self-concept characterizes what people did or wish to do; the knowledge refers to the notions, technical procedures and personal experiences; the behavioral and cognitive competencies concern active listening and the interpersonal relations (more visible) and the deductive and inductive intellect (less visible). It was in this context that the explicative competencies model is shown in an iceberg way (Figure 2-3).

Figure 2-3 Central and superficial competencies



Source: Boyatzis (1982)

This model purposes the existence of a dividing line between the internal and external competencies. The internal competencies – inputs – include the person's motivation, the personality traits, the self-concept and the personal values. These competencies are related to the personality and are given out to the task or function. It is less visible, so it stays in the inferior part of the iceberg.

In the superior part of the iceberg, there are the identified competencies. They are the visible ones including the abilities and the knowledge, that is, the skills that a person demonstrates in his performance.

The holistic model approach of competencies is spreading out and it offers an opportunity to coordinate and align the education in provision, as well as explore and take advantage of the synergies between formal education and learning through experience to develop professional competencies.

Nowadays, the productivity development in an organization is different from what it was a few years ago when successful companies were the ones that knew how to seize their potential at the individual competencies level.

The concept of competency has been taking a central place in the human resource management. Organizations are advised to identify their key competencies as well as their unique and distinctive competencies, which allow them to obtain competitive advantage. The management of competencies consents the increase of flexibility, encourages the individual to acquire certain competencies, intensifies the compromise and the evolvement with the organization and facilitates the resolution of complex problems.

According to Berman (1997), competencies are strong predictors of success in management. In this sense, it is necessary that the organization develop certain practices of human resource management that capacitate and operationalize those competencies, as the results of the organization depend not only on the quality of the resources detained but also on the way they are managed.

In accordance with the literature and in a general way, the concept of competency is not new. The competency approach to human resource management is also not new. Back in the day, the Romans practiced this approach to select what they called "the good soldier" (Mayoral, Palacios, Gómez, & Crespo, 2007). The same happened in the Chinese empire where the acknowledgement of personal and formal education qualities through exams was a requisite for holding a post in civil service. In the mediaeval times, the apprentices, through imitation, searched to learn the specific abilities required to execute a certain task, just like a master-artesian would. For thousands of years, educators have also defined knowledge, aptitude and attitudes to elaborate their curricula.

McClelland (1973) defined the competency variables that could be used as predictors of task performance and those variables were not based on indicators such as ethnic, genre or social-economic factors. His investigations helped to identify the necessary capacities for performing a role in which the coworker's attributes were not the only thing considered. According to the author, the competencies are defined as a set of knowledge, capacities, attitudes, self-concept, values and motives that are straightly related to job performance or important results in the routine that differentiate amongst the medium and superior performances.

Although the competencies are considered as an important tool to the various fields of application, there is no agreement between the scientific communities because the term results in several different interpretations. Besides, there is some confusion and several reference debates between the concepts of competence and competency. Some authors (*e.g.*, Winterton, Le Deist, & Stringfellow, 2005) used the term competencies as the plural form of competence or consider both to be synonymous; other authors (*e.g.*, Cheetham & Chievers, 2005) argued that competency in the USA complements competence used in the United Kingdom and others (e.g., Le & Winterton, 2005) related competency to functional areas and competence to behavioral areas.

Byham and Moyer (2005) added that competencies can be grouped into three categories (Table 2-1).

Table 2-1 Competencies categories

Categories	Groups	Designation
Extra personal elements (Attributes)	Attribution	Rights that people can (should) make use of, inherent to their specific role/function
	Qualifications	Set of qualifications (know-how) that people can acquire through education or professional training
Intrapersonal elements (Capacities)	Traits or personal characteristics	Set of traits, motivations and aptitudes that differentiate the individuals with distinct performances
Interpersonal phenomenon (Performance)	Behavior or action	The competencies are realities in act, as they are visible, witnessed, measurable with objectivity

Source: Byham and Moyer (2005)

The systematic revision of the competency concept helps managers and coworkers do regular evaluations of knowledge, capacities, aptitudes and other necessary characteristics for an effective performance. Nevertheless, the competencies only provide a foundation to these purposes. It is necessary to build competencies groups and realize tests in a combination variety and circumstances so that it is possible to determine the necessary components in a function or filed of expertise.

To Sinnot, Madison, and Pataki (2002), the competencies development may be observed as a cycle of life. The principal steps of this cycle of life can be identified in the following way:

1. The creation of a competency model through the identification of work requisites, roles and relevant competencies;
2. The evaluation of the existent competencies;
3. The analysis of the existent competencies;
4. The competencies demanded for a specific role or task;
5. The definition of the developing program of competencies or programmed unities to minimize the discrepancies identification;
6. The continuous monitoring of performance and the evaluation to confirm improvement.

A concept that arises several times associated with competency as well is competency modeling, typically characterized as the identification and definition required for the success

of the function performance (Bartram, 2004). According to this concept, competency models creation can be done through several approaches, but the most common ones are staged at the function level or organization level (Mansfield, 2004). The two anterior approaches as a way of identifying the necessary characteristics for the success of a given role are frequently referred to as a model, similar to function analysis.

The second approach takes in consideration the organization purposes, the vision, the strategy and tries to develop a set of competencies that are applied to the organization as a whole, to one area of the organization or to one function inside the organization. This broad definition covers two analyses: the orientation of the individual, mostly referred to the specificity and the function necessities; and the orientation of the task in which there is an attempt to identify relevant function behaviors and how it is done (*e.g.*, tools, technologies, information).

One of the most important parts in any competency model or function analysis involves the efforts of human resource technicians, experts or function analysts and the workers themselves to stagger the importance of each competency, of tasks and reference behaviors (Dierdorff & Wilson, 2003).

In a society that gets increasingly competitive, it is necessary to increase the acquired competencies, in order to continue the learning process. Nonetheless, the acquisition of competencies implies an effort made together by the worker and the organization, as this project must involve not just leading managers but also the workers.

In this scope, Besucco and Tallard (1999) defended the creation of a competency model that as its foundation in the individual evolution to a professional level and with an evaluation by the organization that would pass for detaining a major role in the acknowledge of competencies of its workforces.

Boyatzis (2009) adds that the concept of competence can be integrated into four approaches:

1. The powers as attributions that are considered external to the person and relate to certain advantages inherent to specific positions, functions or responsibilities and not to their characteristics and performance;

2. Skills such as qualifications which relate to a set of technical knowledge / fields that can be acquired through the formal education or vocational training system;

3. Competences as traits or personal characteristics define what the person is, by what he does, that is, it is an intrinsic characteristic of the person that results in the superior performance in a given activity;

4. Competences such as behaviors or actions, relate to the capacity and potential that the person has to perform certain tasks successfully.

Skills can also be grouped into three broad categories (Mahlangu & Govender, 2015):

1. The cognitive skills that encompass systemic thinking and pattern recognition;

2. Emotional competences that relate to self-confidence, self-control, adaptability, positive vision and results orientation;

3. And social skills that involve empathy, organizational awareness, influence, conflict management, teamwork, support and development, and inspiring leadership.

These assumptions are in line with the studies developed by Krumm, Kanthak, Hartmann and Hertel (2016) according to which competency models are crucial for decision making (e.g., recruitment, training, remuneration) so it is not surprising that several authors consider them extremely important in the day-to-day of organizations.

However, technical skills are no longer sufficient to ensure a prominent place in the labor market, because organizations are beginning to look for professionals with differentiating attitudes, behaviors and transversal skills, so-called soft skills (Bedwell, Fiore, & Salas, 2014).

Among the soft skills most valued by organizations are: leadership capacity, teamwork, critical thinking, logical reasoning, communication skills, holistic thinking, assertiveness, creativity, results orientation and negotiation ((Brill, Gilfoil, & Doll, 2014).

Leadership capacity characterizes people who decide, take initiative, take responsibility, perform, take calculated risks, guide and coordinate an activity, supervise, delegate, give responsibility and motivate others (Trivellas & Drimoussis, 2013).

Teamwork, in turn, is fundamental to increase productivity because it is through the sharing of knowledge, skills, attitudes, behaviors and motivation among the group members that it is a structure that allows learning, change and, consequently, the competitive advantage (Nadal, Mañas, Bernadó, & Mora, 2015).

Critical thinking qualifies individuals who detect inconsistencies and solve problems in a systematic way (Lovelace, Eggers, & Dyck, 2016) and logical reasoning defines people who are able to determine a conclusion by applying rules that include deduction, induction and abduction (Gustavsson & Hallin, 2014).

In turn, the ability to communicate concerns the ability to express ideas clearly and objectively (Brill, Gilfoil, & Doll, 2014) and holistic thinking characterizes people who understand that the whole is more than the sum of the parts (Liedtka, 2008).

Assertiveness qualifies professionals who have the ability to control what happens at social gatherings and who have high tolerance for criticism whether positive or negative

(Mitchell, Skinner, & White, 2010), and creativity describes the skills that are used to create, invent, discover and develop good ideas and solve new problems in order to achieve the organization's goals (Rao, 2012).

With regard to results orientation, Dubey and Ali (2011) report that it is a professional who focuses on achieving the objectives in order to ensure that they are achieved, is fully aware of their priorities and is persistent with regard to obstacles and adversities that may arise. Finally, negotiation concerns the ability to overcome conflicts and reconcile interests (Shuayto, 2013).

The labor market values people who adapt easily to new contexts and who know how to maintain a positive outlook because, in addition to influencing their colleagues with the energy, joy and enthusiasm they possess, they are more productive and determined when they want to achieve a goal (Martowska, 2014).

Organizations want professionals who are able to understand problems and solve them efficiently, effectively, and in a timely manner, thus revealing that time management is another key competency to achieve professional success (Farrell, 2017).

Brown, Bimrose, Barnes, and Hughes (2012) add that goal setting, prioritization, work planning and organization are increasingly valued by organizations as they are essential to respond to today's market demands.

Deepa and Seth (2013), in turn, point out that only those who want to learn more often, have good communication skills and are able to make new contacts, can thrive and achieve success, so that competency models are essential to identify the ability to perform a specific task or function in an organization. Dabke (2015) adds that successful companies are those that know how to take advantage of the potential of their employees and manage their individual skills.

One of the models of competences most mentioned in the literature is Great Eight, developed by Bartram (2002). According to the author, this model is able to predict performance and organizational effectiveness through the evaluation of observable behavior.

The Great Eight model is based on the following assumptions:

1. The world of work differs quantitatively rather than qualitatively, so skills can be defined across the same dimensions, regardless of the dominant country or culture;

2. Key behaviors and competency components can be identified for different types of functions and objectives;

3. The content of any template should not be totally fixed, as its elements may change over time.

This model is composed of eight factors: leadership and decision-making, support and cooperation, interaction and interpersonal relations, analysis and interpretation, creation and reconciliation, organization and execution, adaptability, and entrepreneurship and performance (García, Olea, & De la Torre, 2014).

The first factor Leadership and decision-making concerns the ability to organize and manage individuals and / or teams through the use of the potential of employees, motivating them, involving them and defining tangible objectives and converging with the objectives of the organization (Ruiz, Sánchez, & Pedro, 2014) in order to obtain results and the development of the collaborators' competences.

The factor Support and cooperation characterizes a person who understands and supports others, builds team spirit, recognizes and rewards employees, knows how to listen, communicates proactively, shows empathy, tolerance and consideration, follows principles and values, and acts with integrity, social and environmental responsibility (Raina & Zameer, 2016).

The Interaction and Interpersonal Relations factor describes a person who knows how to manage conflicts, negotiate, argue, convey information easily and who shows great credibility (Wei, Chiang, & Wu, 2012).

The factor Analysis and interpretation describes people who write clearly and fluently, know how to develop and apply technical knowledge, make use of technological resources, share knowledge, analyze and evaluate information, investigate and test hypotheses, present solutions and have systemic thinking (Foster, Smith, Ariyachandra, & Frolick, 2015).

The factor Creation and Conjecture characterizes a person who learns and thinks quickly, knows how to gather information and manage knowledge, establishes and develops work strategies and thinks holistically (Brill et al., 2014).

The Organization and Execution feature describes a person who knows how to plan, organize and set goals, manage time and resources, oversee progress, meet customer expectations, set high quality standards, work systematically, maintain productivity levels, and committed to the organization (Bartram, 2005).

Adaptability integrates adaptation to change and dealing with pressure and setbacks. People with high values in this dimension easily adapt to change, accept new ideas, demonstrate intercultural awareness and emotional self-control, deal with ambiguity, and balance work and personal life (Eisenberg et al., 2013).

Finally, Entrepreneurship and Performance describes people who meet personal and professional goals and objectives, work energetically and enthusiastically, are ambitious, have

business and business thinking, are attentive to markets and competition and know how to identify business opportunities. The manifestation of behaviors oriented to this domain is related to the continuous search for new knowledge that is relevant to the professional activity and that responds to the demands of the market (Bartram, 2005).

The eight factors that make up the model, besides providing a unique framework to make predictions from the assessment of the potential of the competences, have the advantage of quickly and efficiently selecting the right person for the right place, since each one provides an area of performance (Bartram, 2012).

In addition to the mentioned competencies, expressions such as personal characteristics, soft skills and non-cognitive skills are increasingly used to refer to a wide variety of attributes considered valuable in an organizational context (Lievens & Sackett, 2012). This type of competency allows individuals to adopt the roles needed to manage conflicts, coordinate their work, and perform it in a more cooperative and integrated way with peers, hierarchical superiors and clients (Ga á, Szab ó, & Csepregi, 2013).

A study developed by Robles (2012) revealed that the ten transversal competences considered most important by the organizations are: communication, courtesy, flexibility, integrity, interpersonal relations, positive attitude, professionalism, responsibility, the work of team and professional ethics. Most of the executives who participated in the study pointed to integrity and communication as extremely important competencies in an organizational context.

According to Williamson and Lounsbury (2016) soft skills are character traits, attitudes and intangible behaviors that increase professional performance and career prospects. Its relevance is that they are widely applicable and as such are not confined to a profession. There are several studies dedicated to its importance in the workplace, among which we highlight Klaus (2010), who states that the performance of employees depends mainly on this type of skills; and that of Deepa and Seth (2013) reveals that most managers involved in the recruitment and selection process consider soft skills very important for professional success.

Dabke (2015) argues that these skills are just as important as cognitive skills, because they make the difference between being or not being selected from countless candidates and lacking them can ruin a promising career, even for those with high technical skills and professional experience. The author also points out that soft skills are among the competencies that most influence the levels of performance in management positions and occupy the first position among the skills most valued by the organizations, because it is through the professionals who possess them that the competitive advantage is achieved.

The research also suggests that soft skills can be more efficient as predictors of performance than technical knowledge and academic training (Rao, 2012). In turn, Bartram (2005) argues that skills should be understood in terms of activity and not a predisposition, so its operationalization should be done through observable behaviors that people adopt in order to achieve a goal. Consequently, each sector strives to achieve excellence at the individual level and due to the scarcity of shared resources and inconsistency in performance, the conflict between functions begins to emerge.

Robles (2012) considers that soft skills are the sum of interpersonal skills (e.g., sympathy, time management) with the personal attributes (e.g., communication, teamwork) needed for the performance of the function, as they relate to the traits of character, attitudes and behaviors, not technical skills or knowledge. According to the author, soft skills besides being intangible are not limited to a profession, as they are continuously developed and transmitted from everyday life to the workplace.

2.4 Training

From an organizational perspective, for almost all organizations, people represent an important item in operating costs, so it is important to manage well, especially in view of the need for efficiency. In this sense, several themes and approaches to human resource management have been developed, one of the areas that has been developing in the last decades is the area of professional training (Alvarez, Salas, & Garofano, 2004).

In this way, the training should be understood as an integral part of the organization's business plan and as an investment that in the short, medium and long term will generate results. A proper diagnosis of training needs, the use of appropriate forms and types of training, and a rigorous assessment are essential conditions for maintaining or streamlining training activity in organizations as an integral part of successful human resources management (Groot & van den Brink, 2000).

However, there is no single methodology to follow, there are several methodologies for identifying training needs, various training methods and various ways of evaluating training, all using their own tools and differentiated. However, there is a common theme, the methods used at any stage of the training cycle should take into account the strategic objectives of the organizations as well as their purpose in this dynamic, and should be known to the various actors involved in the training (Kirkpatrick, 1996).

According to Tréopos (1992), the professionalism is not reduced just to the qualification but is associated with a personal history, social, technical and cultural context in which the intelligence, the project, the execution, the efficiency and creativity are analyzed. The insufficiency and mismatch of the training given by the teaching system and the consciousness of the new demands coming from the social-economic dynamism itself have been contributing to the widening of the professional training systems. On the one hand, there are the young people who have just left school without any specific competencies for a professional activity; on the other hand, there are the grown-up workers who are already inserted in the professional life but are in need of perfection of skills or new competencies.

The rapid technological evolution and the marked increase in professional mobility contribute to the transformations of the organizations and the work processes that appeal to new ways of thinking and training management. In this context, it is important to diagnose in a good time the necessity for certain sectors to develop adequate competencies and reinforce future competencies. Due to constant work market mutation, training is indispensable to increase the probability of success and the capacity for responding to market competitiveness. Even though the training is effective, it is necessary that the competencies or the learned behaviors be extended to the work context and kept during the time after training (Kirkpatrick & Kirkpatrick, 2005).

Professional training is characterized by a set of activities aimed at acquiring knowledge, practical skills, attitudes and forms of behavior required for a particular profession and enabling people to find, progress or keep work and must be contextualized with one's own job market. The training looks at the individual as a worker in a logic of learning and by this attribute's skills to the profession, already the teaching looks at the individual as a citizen in a global way in an educational context and assigns Qualifications (Lewis, 2005).

Professional training must be of a quality and qualifying, that is, it should be framed in objectives (assigns qualifications) and relevant since it must serve some purpose (e.g., needs of the economy). Thus, the training market must be seen as the place where the supply and demand of training is confronted and the training needs of an individual, organization and territory are determined, and the demand for training is the responsibility of individuals, companies and other training clients (Salas & Cannon, 2001).

The supply is induced by the existing training apparatus (public or private training structures). The training market is, in its social dimension, regulated by the public authorities that decide on privileged target audiences, training areas of greatest need, regions that are most in need, and funding to be allocated. There is also a private training offer, essentially

taken up by companies in terms of qualification of their human resources. We therefore have training sub-markets, the private and public market (internal to organizations), the private market (external to organizations) and the public market (external to organizations) (Aguinis & Kraiger, 2009).

The training market functions as the input of the job market, since the training gives the indication on the people who have the conditions for the job, being that the job market is the consumer of the training, provided that it is qualifying and relevant for the economy (Al & Zairi, 2002).

According to Berkenbosch, Bax, Scherpbier, Heyligers, Muijtjens, and Busari (2013), professional training corresponds to instruction in a classroom, seminar or work place, through various means of information, seeking the development of skills and aptitudes. Professional training is characterized by a set of activities aimed at acquiring the knowledge, practical skills, attitudes and behavior required to perform the functions of a profession or group of professions in any branch of economic activity.

For Campbell and Kuncel (2001) vocational training is defined as a planned learning experience that is designed to result in a permanent change in the knowledge, attitudes or skills critical to the good performance of an individual's job. The training fulfills the double objective of contributing to the personal and professional development of the individuals and, consequently, to contribute to the improvement of the organizational performance.

According to Noe (2008) training is the process, be it formal or informal, planned or not, through which people learn new knowledge, skills, attitudes and behaviors relevant to the performance of their work. The definition of training in this perspective allows the inclusion of training in a more recent aspect such as mentoring and coaching.

Training seeks to develop in the formation of behavior patterns and attitudes towards efficiency, effectiveness and professional fulfillment within the organization, that is, it promotes personal development (Wallennborn, 2010).

Regarding the individual component, training plays a fundamental role in the level of employability of the individual. Employability is generally considered at the individual analysis level and concerns the employee's ability and willingness to remain attractive in the job market. Although training does not create employment, it contributes to the adjustment of the labor market, and training and qualification are the basis of organizations' competitiveness (Carbery & Garavan, 2005).

According to Alvarez, Salas, and Garofano (2004), companies contribute to the construction of employability and work contexts have received increasing attention from

researchers due to the increasing differentiation of human resources management strategies in order to seek new advantages competitive within a technical-economic paradigm associated with technological development.

This new technical-economic paradigm places at the center of the debate the importance of dynamic competitiveness models based on the capacity of innovation in the production processes, products and organizational base. In this context, the construction of employability ceases to be a strictly individual problem or the public authorities'; it becomes also a responsibility of organizations who need to make it become a true corporate social policy (Campbell & Kuncel, 2001).

By requiring the learning of change, the construction of employability becomes a practice of human resources management capable of sustaining processes of technical and organizational innovation, indispensable to modern competitiveness (Lewis, 2005).

In order to promote individual and / or collective learning processes, organizations have two privileged instruments: vocational training strategies and forms of work organization (Salas & Cannon, 2001).

Regarding the first instrument, in adopting structured vocational training strategies, organizations are not only strengthening their competitive capacity, given that in the light of human capital theory this implies an increase in labor productivity, but they are also promoting greater commitment of the workers to the organization, while valuing their competences within a framework of potential professional mobility. However, this relation presents some limitations due to the different levels of investment in training, the existence of discrimination mechanisms in access to training and the options regarding training modalities (Wallennborn, 2010).

Several authors (e.g., Salas & Cannon, 2001; Carbery & Garavan, 2005; Aguinis & Kraiger, 2009) call attention to the lags in investment in training between countries and between companies. It follows that, since there is a link between employability and investment in training, its promotion is already marked by the different national contexts as well as by the type of company in which the worker is inserted.

In a labor market increasingly characterized by the instability of contractual relations, the acquisition of new professional skills and their constant updating, through participation in various training actions, constitutes a critical factor of professional valorization and employability, that is, of ability to survive in the labor market. Individuals who took advantage of training and development opportunities were those who recognized their skills failures, accepted that change was forward-looking and also wanted to ensure that they

widened their knowledge to be employable elsewhere, if that were necessary (Wallennborn, 2010).

In this perspective and taking into account the concept of lifelong learning, all learning activity at any point in life, with the aim of improving knowledge, skills and competences, within a personal, civic, social and / or related to employment, appears strongly associated with the concept of employability (Noe, 2008).

Yet, according to the same author, lifelong learning means that if a person has the desire to learn, he will be able to do so regardless of where and when it occurs. For that, the confluence of four factors is necessary:

1. The person must be predisposed to learn;
2. Existence of appropriately organized learning environments (e.g., centers, schools, companies);
3. Existence of people who can assist in the learning process (learning agents);
4. Learning must meet the needs of the labor market if it is to meet unemployment.

The globalization of world markets, new forms of work organization, changes in the demographic characteristics of the working population and the problems of literacy have led to new demands not only on individuals in isolation but also on organizations as a whole to achieve competitive advantage (Alvarez, Salas, & Garofano, 2004).

Currently, the performance of a function requires the permanent use of new knowledge and increasingly complex skills, and therefore continuing professional training plays a key role in this process. Training is, for organizations, the privileged mechanism for incorporating new knowledge and skills, or improving existing ones (Carbery & Garavan, 2005).

Lewis (2005) considers that there are several causes that can lead to poor performance in organizations, from unrealistic expectations to insufficient means, to the definition of contradictory objectives or to the lack of motivation of those who are supposed to achieve them. They report that in a meta-analytical study aimed at evaluating the effects of psychologically based organizational interventions, several types of intervention programs were considered, tending to be more powerful those involving training, setting goals and redesigning sociotechnical systems.

From a macro perspective, the performance of organizations tends to be evaluated in different ways depending on the objectives, values and interests of those who carry out the analysis. However, in order for training to offer a competitive advantage, its focus must go beyond the development of basic skills through the creation and sharing of knowledge, i.e., through the creation of intellectual capital (Wallennborn, 2010).

Many companies have adopted this broader perspective, which is associated with strategic business objectives, and use a process of training design that ensures that it is effective and that is the basis of the organization's competitiveness (Tatoglu, 2011).

This position or performance stresses the importance of creating a close link between training and organizational strategy. The professional training courses developed or promoted by the organizations must be in the strategic direction of the organization and the training objectives should be aligned with the organizational objectives (Campbell & Kuncel, 2001). In fact, many companies have lost investment channeled to training because they do not conceive it in alignment with their strategy and because their effects have not been adequately assessed, i.e., many companies still invest in training simply because they believe it is a thing good to do (Noe, 2008).

As mentioned above, another of the key characteristics of training activities that contributes to organizational competitiveness is the way in which training programs are designed. The process of designing a training action refers to a systematic approach in the development of training programs which must take six steps into account (Kirkpatrick, 1996):

1. Diagnosis of training needs;
2. Preparation of trainees for training;
3. Creation of a learning environment;
4. Creation of a training transfer environment;
5. Selection of training method;
6. Evaluation of the training program.

More broadly, the three main phases that need to be ensured when developing a training action are:

1. The diagnosis of training needs to determine the need for training;
2. The implementation of training, in which the use of the most effective training method is decisive;
3. The evaluation of training, to determine if the objectives initially outlined were or were not achieved (Taylor & O'Driscoll, 1998).

Bertalanffy (1968) founder of the General Theory of Systems, came to originate a new theory in the understanding of the organizations. In this model, it is assumed that organizations are systems that, like organisms, are open to the environment and that they must develop with it an adequate relation to survive. Organizations are understood as an open system, in a process of permanent exchanges with the surrounding systems.

This model gives particular importance to the environment within which the organization exists, and sees the organization as a set of interrelated subsystems. Since organizations are open systems, they present some particularities because they import energy to develop their activity. Systemic organizations do not consume pure inputs, transforming them to generate outputs (Bertalanffy, 1979).

In the application of the systemic perspective to the organizations, the transaction of the inputs that through the transformation generate outputs. In this perspective organizations are nothing more than transaction systems that transform the inputs of the environment into outputs for the same environment, seeking to achieve organizational objectives (Bertalanffy, 1972).

Vocational education and training systems have complex structures and have multifunctional relationships with other systems, such as education in general, the labor market, legal and economic systems. These complex interactions do not follow simple input-output mechanisms because they imply certain contingencies. For system reforms and restructurings, this complexity must be taken into account, incorporating emergency concepts that can promote systemic solutions that may not be predictable (Wallenborn, 2010).

The training programs offered to different groups by vocational education and training systems are good examples of emerging adaptations of systems to a changing environment. Following this logic and considering the professional formation as a system framed in the strategy of the organizations, triggered from inputs for the resolution of problems, one obtains a result, the output (Noe, 2008).

Formation as a process can be unfolded in several phases, generally referred to as the formation cycle. This cycle begins with the identification of the training needs, proceeds with the programming of the training activities, realizes the evaluation of the whole process. This evaluation, not always done, can be useful to improve future training moments. The entire process must be inspired by the organization's training strategies, and more globally in its strategy (Campbell & Kuncel, 2001).

After the planning process, each action has formation process. In order to ensure the mutation process and obtain effective knowledge, the training process should be based on five different stages (Kirkpatrick, 1996):

1. Stage 1, it is important to understand the training needs of the target audience, taking into account the reality of everyday life. It is important to define the criterion of evaluation of the action that makes it possible to assess, after completion of the training process, its effectiveness;

2. Stage 2, the action should be planned and the objectives to be achieved with the training should be defined. It is at this stage that the way of action (e.g., in the classroom, on job, on line, outdoors), pedagogical methods and session plans are defined;

3. Stage 3, the goal is to introduce change in behavior or knowledge;

4. Stage 4, sometime after the training action, and based on the evaluation criteria defined in phase 1, a pre-assessment of the training results should be carried out;

5. Stage 5, the objective is to facilitate the process of crystallization after formation, guaranteeing the stage of maintenance of the stage of superior development achieved in the formative action, eliminating the differences detected in the previous phase. From the criteria defined in the diagnostic phase, it is necessary to evaluate the results achieved in all phases of the training process (phase 5), assessing whether the previously detected needs were effectively filled. At this stage, the evaluation of the outward-directed impact of organizations is also included.

According to Lewis (2005), training should be seen as a philosophy of organizational life and not only as a practice of organizational life, concretized at defined times. Thus, training is a central element in building the capacity for continuous organizational learning. It is also a permanent means of adjusting the organization to the environment, a way for human resources to meet the strategic objectives of the organization, and a fundamental means for people to maintain employment, develop their employability and be able to put their service for a better quality of life and greater personal fulfillment.

One of the most important steps in developing training is an analysis of training needs. This first step in the development of training focuses on the process of deciding who and what should be formed (Salas & Cannon, 2001).

According to Taylor and O'Driscoll (1998), the diagnosis of the training needs is the starting point of the training programs of a company, from which an analysis must be done that, includes the anticipation of future needs that allow the organization to act proactively over the context.

There are several sources of diagnosis, which may be internal, internal-external and external. As a conclusion of the need's assessment, the competences to be acquired, the competences to be developed, the proactive activating competencies and the competencies to be inhibited should be defined by individual, group or for the organization (Wallennborn, 2010).

According to Sallán and Armengol (2003) to carry out a good analysis of training needs, it is necessary to obtain information, essentially from four sources:

1. New projects to be developed by the organization that promote medium and long-term changes;

2. Changes of legal and regulatory requirements;

3. Problems and difficulties in the organization;

4. Evolution of professional skills, resulting from constant changes in the different ways of working.

However, it is necessary to bear in mind that the analysis of training needs can be done from a reactive and proactive perspective. The proactive vision is the one that anticipates the problem, which identifies future qualifications that will arise from the implementation of new projects or strategic plans; identifies the competencies that must be acquired by workers to achieve the organization's new objectives (Sallán & Armengol, 2003).

The reactive vision focuses on solving the problems or difficulties that already exist or on the action or situation that must be developed taking into account the needs of the moment (Noe, 2008).

According to Sallán and Armengol (2003), the stages of the process of detecting training needs are the collection of information, analysis of problems, or areas to be improved, analysis of factors inducing training, creation of competencies directory, validation of analysis, identification of training needs and identification of jobs and people involved in training. In order to collect information, three levels should be taken into account:

1. Level 1, that refers to top management and consists of analyzing the organizational system, organizational culture, sectoral policies and strategic projects. At this level it is imperative to analyze whether human resource policies are adequate to achieve the organization's overall objectives and policies;

2. Level 2, that refers to the intermediate leaders and consists of analyzing the activities that take place in the organization to see how they are done and explain, if necessary, because the expected results are not obtained. At this level it is possible to obtain relevant information so that in later phases it is possible to define competency profiles necessary to obtain the desired results;

3. Level 3, which is based on the workers' point of view, is to evaluate the way in which workers have their tasks, the difficulties they face, the problems they have, the opportunities for improvement they have or the factors that intervene to achieve them the results that the organization expects from them.

In the process of diagnosing training needs, it is useful and important the participation of all employees of the organization, since people feel involved in the process of detecting training needs, which makes them more involved with the final product (Kirkpatrick, 1996).

Once the problems or areas are identified, it is necessary to analyze, on the one hand, to determine why problems occur and, on the other hand, to find the causes that give rise to these problems (Lewis, 2005).

In the survey of training needs, it is important to identify if the expected competencies for the workers, the knowledge, the skills and the necessary attitudes, so that they can fulfill the objectives established by the organization, so it is convenient that the direction of the organization validate their competencies (Sallán & Armengol, 2003).

Once the needs analysis is completed, it is important to validate with all the agents who participated actively throughout the diagnostic phase. These people should have the ability to establish a degree of reliability of the analysis itself. To achieve a good identification of training needs, it is essential to do so through an absolutely participatory process, resulting from the dialogue and consensus between management and workers (Salas & Cannon, 2001).

The methods suggested by various authors for the analysis of training needs are essentially individual interviews, surveys and observation. The most appropriate way of thinking about training needs analysis is to insert it within the framework of a quality improvement strategy in an organization. It is not only aimed at detecting specific problems, but also providing relevant information that allows us to act strategically and act on the causes of problems (Meignant, 2014).

Bamley (2003) defines three levels of analysis of training needs:

1. Organization, that refers to the strategic orientations of the organization. Any change in the company's strategy is only effective if it is communicated to employees, which presupposes some kind of modification in the relationship between organization and work;

2. Work, which concerns the requirements of the job and answers the question: what knowledge, know-how and behavior should the holder have and exercise? If the employee does not have the skills that the job requires, it is necessary to think about the training in order to provide the employee with the tools and resources that enable him to carry out his work successfully;

3. Person, who concerns the needs and expectations of personal and professional development of the employee.

According to Cheetham and Chivers (2005) for a good diagnosis of training needs it is necessary to develop instruments that allow obtaining data that allow an interpretation of the

state of things, both the current situation and the desired situation. These instruments must be tailor-made, taking into account the specific characteristics of the target audience and of each level of analysis: the organization, the job position and the expectations and needs felt by each of the employees.

In the diagnosis of training needs, data should be collected on what is to be measured: knowledge, attitudes and behavior and depending on time and other more technical and logistical issues, different methods can be used, so it is convenient to use more than a method, so as to enable data to be crossed and thus obtain more reliable results (Kirkpatrick & Kirkpatrick, 2005).

The training based on competencies defends that the curricula elaboration of the work training will be more effective considering the two anterior phases (identification and competencies of normalization), once the references and the norms will minimize the impact provoked in the entrepreneurial sector (Brightwell & Grant, 2013).

Beyond that, it becomes necessary that the training programs possessed didactic resources and flexible pedagogical strategies, in a way that it can allow a bigger admission facility and worker reintegration to the market using a continuous training through a useful life. In this context, the certification provides workers a quality guarantee of their professional performance and allows the entrepreneurs to know their competencies, which are required in the organization. The certification is usually voluntary and not compulsory for practice, wherefore it is not related to governmental actions, or controlled by the government (Cheetham & Chivers, 2005).

To Le and Winterton (2005), the competencies are composed of professionalization strategies activated by concerned subjects from the ways and recognizable and codified knowledge, elect for themselves a determined market segment and fix the limits of their own specialization, giving those fundaments that consent operating in liberal context. In the past, this process was recognized by the formative routes, controllable from the specification of abilities and knowledge, transmissible, transferable and certified by an institution. With the tasks growth and the new professions linked to evolution of assets of an interior production of a heterogeneous work market, it becomes complex to articulate the curriculums and the valorization of the definition criterion of abilities and competencies, for which it is not always possible to be a complete formalization.

The training professional is considered as an activity, which helps evolve the personalities of individuals, starting from the acquired knowledge and life experiences.

Enables obtaining elements of realization more completes of itself and a better adaptation to the environment where it is put in, namely in the socio-professional plot.

Al and Zairi (2002) constituted a considerable development factor and at the same time, acted at all levels, a preponderant role in the organization adoption to the accelerated rhythm of change. In this context, emerges just like a pressing need and as a strategic factor that allows qualifying their human resources and, in that way, gives a response to the demands for giving more quality to their products or service provision. In this way, it can be considered an instrument of change, as it facilitates the behavior change, the competencies development and in proportion the acquisition of professional qualifications.

The process of professional training tends to differentiate the role of regular teaching as its central goal is work and productivity. In reality, the training presents, evidently, diverse benefits, such as efficacy promotion: the increase in workers' motivation; the increase in individuals' capacities for knowing the information, for expression, for communication, for sociability, and for integration; allowing the emergence of individual and collective projects in the professional field; provoking positive changes at the imaginary level; habit debate, cultural models; propelling the workers culturally and socially (Kirkpatrick & Kirkpatrick, 2005).

To sum up, induces modifying processes and organizational alterations whose effects reflect in the construction level or evolution of the corporative identities. The new debates on quality of training allude to the unbalances in the access of training and to the type of training practiced, through the administration of technical training limits to the lower personal levels and a training of a broader range, of rational or behavioral order, to superior charts, endowing in a robust outlay of competencies. In this sense, it is passable to affirm that professional training is a tremendous asset for the labor context, since it promotes more competencies to the workforces. Thus, we posit the third hypothesis:

Hypothesis 3: *The professional training competencies have a positive impact on job evaluation.*

2.5 Job engagement

The constant changes occur in the health organizations evidence the need of studies focused on the importance of the involvement of the workers for the organizational success. Thereby, it is crucial that the organizations have the ability to not only attract and recruit

exceptional workers but also to inspire and motivate its human resources and apply all their aptitudes, competencies and knowledge in the task they perform. In this sense, it is a requirement to have competent, motivated, energetic, dedicated and engaged employees (Leiter & Bakker, 2010).

In fact, the job engagement is a fundamental part in the development of human capital, since it is an essential element of the coworkers' health and well-being and it helps them deal with the demands of work and allows them to create a positive tie with the organization (Schaufeli & Salanova, 2007).

Although job engagement is a relatively new concept, it is a keystone element for the professionals who deal directly with people. According to Salanova and Schaufeli (2008), the term engagement may be defined as a positive and motivating construction, related to the work itself that is characterized by the vigor, dedication and engagement that people dedicated to tasks performed.

The vigor corresponds to the demonstration of the high energy levels, big mental resistance and strong desire and persistence facing the labor daily tasks; the dedication is ruled by the involvement, enthusiasm, inspiration, pride and challenge that the work provides; and the absorption is characterized by a high intrinsic satisfaction, concentration and happiness at work, such as, that the worker does not even notice the time going by while performing tasks.

The coworkers that obtain high results in the scales that evaluate the job engagement tend to have very positive energy and to be fully integrated into and motivated by the profession performed, as they feel competent to work out the issues that may arise at a professional level. The engaged workers are active workers that take initiative and conceive new changes at work (Schaufeli & Salanova, 2007).

The job engagement promotes positive emotions, increases the intrinsic motivation and the personal and professional resources acquisition (e.g., increase of self-efficacy, identification with work itself, high performance and productivity, low absenteeism). Being a motivational state, the higher the levels of job engagement, the bigger the commitment of the workers to successfully attain the goals they have set (Bakker & Bal, 2010).

This positive vision of the workers' dedication to their job – job engagement – emerged initially, as the opposite of job burnout, in an attempt to cover the full spectrum of well-being that goes from unwell-being to well-being of the worker (Maslach, Schaufeli, & Leiter, 2001).

Job resources are considered the main antecedents of job engagement, considering that the more resources the worker has at his disposal, the more involved will be in his work

(Bakker, Demerouti, & Sanz, 2014). The literature confirms this relationship, namely, according to Schaufel and Bakker (2004), resources were the only predictors of job engagement. In addition, Christian, Garza, and Slaughter (2011) verified that resources such as autonomy and variety of tasks were some of the main predictors of this concept of well-being.

Another factor that may be the origin of job engagement is personality, so Bakker, Tims and Derks (2012) studied the relationship between proactive personality and job engagement, evidencing that individuals with this type of personality have a greater tendency to restructure their work in order to increase their resources and, consequently, promote their job engagement.

On the other hand, individuals who experience job engagement are not passive in relation to their work context. A study by Schaufeli, Taris, Le, Peeters, Bakker and De Jonge (2001) confirms this, demonstrating that subjects who experienced job engagement demonstrated a greater initiative in their work.

The consequences of the job engagement are associated with positive organizational results, as workers who demonstrate this state of mind demonstrate greater organizational commitment as well as high levels of individual and organizational well-being (Crawford, LePine, & Rich; Demerouti & Cronpanzano, 2010).

According to Bakker, Schaufeli, Leiter, and Taris (2008) individuals with high levels of job engagement perform their tasks better because they experience positive emotions and have a good health condition, being able to expend energy to carry out their work. Bakker (2009) also mentions that workers with higher levels of work engagement have higher levels of energy, mental stamina, ability to persist even in the face of adversity, without showing fatigue, and to maintain their enthusiasm at work.

In this way, the literature identifies several predictors of work engagement: self-efficacy, optimism, autonomy, control, recognition, rewards, social support, learning and professional development opportunities, feedback from the superior and a strong sense of self-esteem associated with organizational belonging (Bakker, Demerouti, & Xanthopoulou, 2012).

Christian, Garza, and Slaughter (2011) (e.g., task variety, tasks with meaning, autonomy, feedback, social support, problem solving, work complexity), the leadership and dispositional characteristics of the worker such as proactive personality and conscientiousness. These authors also identified the performance of the task performed and the contextual performance as consequences of job engagement.

According to Shuck, Reio, and Rocco (2011) job engagement mirrors the dedication of the individual's physical, cognitive and emotional resources to the work he performs. The empirical study of work engagement suggests that this is a motivational variable with implications for individual and organizational performance, as the more employees feel enthusiastic about their work, the more they will allocate their resources and their potential to its action in the labor context in favor of the organization (Bakker, 2010).

Schaufeli and Salanova (2007) suggest that individuals who have high levels of job engagement invest more in their work and have a broader conception of their role, more often crossing the formal boundaries of their role, in order to improve the functioning of the organization. Thus, these individuals are expected to more frequently perform extra-paper behaviors. Yet, we know relatively little about the reasons why work engagement is associated with higher levels of job performance.

Schaufeli and Bakker (2010) added that the job engagement can be faced as a psychological state that foments the compromise and motivation and that leads the workers to invest in excellence performance patterns and in the organization success. According to the authors, there is a strong and direct connection between job engagement and the increase of profit of the organizations that can be corroborated through the production increase, customer satisfaction, services provided and workers' retention. With this in mind, we specifically propose:

Hypothesis 4: *Job engagement have a positive influence on job evaluation.*

2.6 Conclusions of theoretical background

Health has a unique situation within the various sectors of activity, since it is the sector that has the highest percentage of graduates in the field professionals. However, we are living in a time of great transformation in organizations, motivated by the need to reduce operating costs, so it is vital to increase productivity and improve the quality of services. These changes have highlighted the importance of people, considered as the most strategically relevant resource for organizations, given their creativity, innovation and potential (Tang, Meng, Chen, Bekedam, Evans, & Whitehead, 2008).

To achieve high levels of efficiency and effectiveness, hospitals need to be designed as an organization and assume their role in service production, because one cannot forget that the

hospital is a business and how any business needs to make a profit in order to survive in the marketplace (Wu, He, & Al, 2010).

According to Dressler, Pistoria, Budnitz, McKean, and Amin (2006) the greatest asset of a hospital is its intellectual capital, in particular its workforce, so there is a concern to keep employees qualified and skilled in the performance of their duties, because the services rendered are valuable only when service users feel satisfied with the service. In this way, it is fundamental to have a continuous training process that guarantees the efficiency of work processes.

When the competency management is applied and internalized in the organization, it fulfills three strategic tasks, namely:

1. The articulation of human resources actions with the organizational strategy and consequently with the results of the business;
2. The integration of key management processes to make them more coherent and consolidated;
3. Linking people's performance to the organization's strategies (Tang, Meng, Chen, Bekedam, Evans, & Whitehead, 2008).

It should be noted that the organization and the people have their own set of competencies. In the case of the organization, the construction of competence is born of its development process that establishes competitive advantages within the context in which it is inserted. With respect to employees, the construction of competence is characterized by the integration of three axes: the competences, the training and the professional situation of the person (Bian, Jing, & Sun, 2007).

The challenge for companies is to develop mechanisms that can direct people's efforts towards goals that are not just for the organization but above all that serve the interests and motivations of people in order to integrate personal goals with organizational goals (Meng, 2012).

However, traditional methods of work evaluation have some limitations, which have forced organizations to look for more innovative, creative and participatory forms, which are also characterized by a new concept of self-assessment, focus on the future and continuous performance (Dainty, Asce, Cheng, & Moore, 2005).

When the evaluation of the work is correctly carried out, it is a very efficient support tool for the management of people, since it allows evaluating the employee under various aspects of his performance, helping to further improve his professional skills, since only these way

organizations can overcome the competitiveness that characterizes the current market (Zhong, Yan, & Liu, 2015).

The current context and its implications for people management must also be reflected in hospitals and other health institutions because in providing services to society they have an obligation to be faithful to the purposes of promoting health, preventing disease and treating the citizen within of a good technical standard and excellent level of humanization (Brightwell & Grant, 2013).

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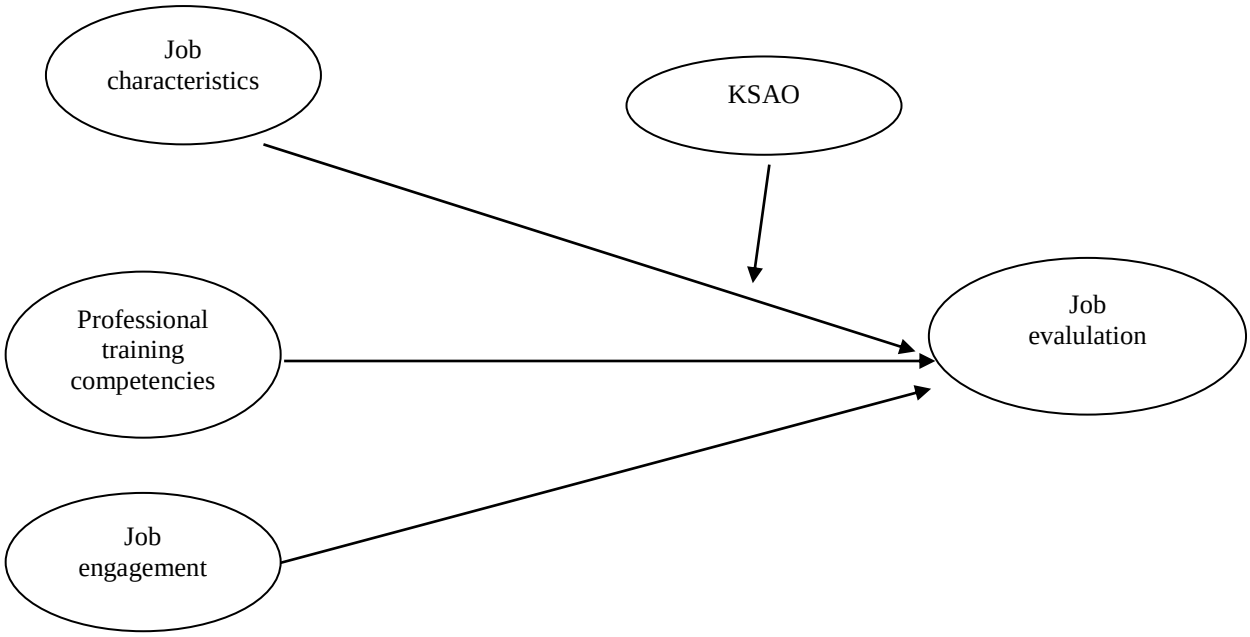
Chapter 3: Methodological Framework

3.1 Methodological options

The methodological procedure used in the present investigation is questionnaire survey. This is a correlational study anchored in the hypothetical deductive quantitative research paradigm that seeks to determine the extent to which the variables under analysis are related to each other.

To test the hypotheses formulated and to respond to the objectives – main and specific – initially delineated, the following conceptual model is proposed (Figure 3-1).

Figure 3-1 Conceptual model



Note: Job characteristics includes the following dimensions: Skill variety, Task identity, Task significance, Autonomy and Feedback; KSAO, is composed of the following dimensions: Detect and resolve problems and conflicts, Participative influence, Understand rules and regulations and other written material, Monitor and control and improve staff performance, Schedule and prioritize and Develop staff; CTS includes the following dimensions: Leadership and management, Organization and finance, Operational management and Professional ethics and health law; and the UWES is composed of: Vigor, Dedication and Absorption.

3.2 Sample

Participants in the study consist of 546 subjects from six major public hospitals in Guangzhou, aged between 21 and 58 years (M = 37.9; SD = 8.73), being the majority (55.5%)

female (Table 3-1). Regarding the education level, the majority of these respondents (33.3%) have a bachelor's degree.

Table 3-1 - Sample characterization

	n	**%**
Gender		
Male	243	44.5
Female	303	55.5
Age (*M* = 37.9; *SD* = 8.73)		
Less than 30 years	153	28.0
31 to 40 years	188	34.4
41 to 50 years	172	31.5
51 years or more	33	6.0
Education level		
PhD	100	18.3
Master	126	2
College	182	33.3
Specialist	138	25.3
Job role		
Doctor	290	53.1
Nurse	140	25.6
Technician	48	8.8
Manager	68	12.5
Department		
Cardiology	29	5.3
Neurobiology	13	2.4
Respiratory	37	6.8
Nephrology	37	6.8
Hematology	18	3.3
Endocrinology	15	2.7
Pediatrics	22	4.0

Cardiac surgery	30	5.5
Hepatobiliary surgery	17	3.1
Neurosurgery	49	9.0
Thoracic surgery	32	5.9
Gastrointestinal surgery	21	3.8
Ophthalmology	37	6.8
ENT Department	18	3.3
Stomatology	27	4.9
Orthopedics	20	3.7
Oncology	26	4.8
Pediatrics surgery	26	4.8
Gynecology	49	9.0
Obstetrics	23	4.2
Years of work experience as a specialist (*M* = 13.4; *SD* = 6.69)		
Less than 5 years	105	19.2
6 to 10 years	81	14.8
11 to 15 years	184	33.7
16 to 20 years	42	7.7
21 years or more	134	24.5
Seniority (*M* = 10.19; *SD* = 5.63)		
Less than 5 years	125	22.9
6 to 10 years	199	36.4
11 to 15 years	155	28.4
16 years or more	67	12.3
Wage (*M* = 7,226.19; *SD* = 4,405.48)		
Less than 5,000 yuan (1 yuan=0.14 euro)	276	50.5
5,001 to 10,000 yuan	148	27.1
10,001 yuan or more	122	22.3

It should be noted that more than half of the participants (53.1%) are doctors and 25.6% are nurses. The constitution of the sample was sought to be representative of the reality of the

hospitals, which included the largest possible number of departments, and the number of participants was similar in each one.

In respect of years of work experience, it was found that most of the participants have played roles in the current specialty for over 10 years and 12.3% have worked in the current hospital for 16 years or more.

Regarding the salary, it was possible to verify that more than half of the participants receive less than 5,000 yuan monthly (50.5%).

3.3 Measures

For the collection of data, four instruments were used: Job Diagnostic Survey (JDS) (Hackam & Oldham, 1980), Knowledge, Skills, Abilities, and Other Personal Characteristics Scale (KSAOS) (Goffin & Woycheshin, 2006), Competencies and Training Scale (Berkenbosch, Bax, Scherpbier, Heyligers, Muijtjens, & Busari, 2013) Utrecht Work Engagement Scale (UWES) (Schaufeli & Bakker, 2003) and a measure to assess job evaluation

All questionnaire items were originally in English and then were translated into Chinese by a bilingual speaker of Mandarin and English. The items were translated back to English by another bilingual speaker of Mandarin and English to ensure that both English and Mandarin version of items were comparable with high accuracy. All scale items were modified according to characteristics of China's hospitals. After that, several physicians, department leaders and hospital leaders were asked to help in revising the questionnaires for better application. The instruments are described below.

For the sociodemographic characterization, data were collected on gender, age, education qualification, job role, department, work experience, wage, seniority, last performance evaluation results, number of days of absence due to health problems and number of days of absence without justifications in the last six months.

3.3.1 Job diagnostic survey

The JDS of Hackman and Oldham (1980) evaluates the perception of the characteristics of the work through fifteen items that are organized into five subscales:

1. Skill variety (e.g., My work position requires a variety of competencies);

2. Task identity (e.g., My work position is organized in a way that I can finish a work I start);

3. Task significance (e.g., My work position is very significant or important taking in consideration the hospital reality);

4. Autonomy (e.g., My work position gives the chance to think and act independently;

5. Feedback (e.g., My work position provides feedback about the quality of my work).

Each subscale is composed of three items that must be answered through a seven-point Likert scale, ranging from 1 (strongly disagree) to 7 (totally agree).

The internal consistency of each subscale in the present study was adequate (Skill variety: $\alpha = 0.75$, Task identity: $\alpha = 0.78$; Task significance: $\alpha = 0.70$; Autonomy: $\alpha = 0.84$; Feedback: $\alpha = 0.74$).

The respondents should indicate the degree of accuracy and precision that each statement describes and the tasks it performs, that is, their perception of how each characteristic is present in their work.

3.3.2 Knowledge, skills, abilities, and other personal characteristics

To evaluate the KSAO, a questionnaire developed by Goffin and Woycheshin (2006) was used. The instrument consists of 39 self-completing items, which evaluate six different dimensions:

1. Detect and resolve problems and conflicts (e.g., I manage disputes and conflicts);

2. Participative influence (e.g., I determine strategies to improve production);

3. Understand rules and regulations and other written material (e.g., I maintain standards for my behavior and appearance);

4. Monitor and control and improve staff performance (e.g., I write performance appraisals);

5. Schedule and prioritize (e.g., I schedule my work and set my priorities);

6. Develop staff, includes recognizing strength and weaknesses (e.g., I provide advice on performance and personal development).

For each sentence, there are seven possibilities of response, presented in a Likert scale ranging from 1 = strongly disagree to 7 = totally agree. The results of each dimension are determined by the sum of the scores of the items that compose it, so the higher the score the higher the domain in that competence.

The Cronbach's α for the various subscales in present study was adequate, oscillating between 0.87 and 0.92 (Detect and resolve problems and conflicts: $\alpha = 0.92$; Participative influence: $\alpha = 0.91$; Understand rules and regulations and other written material: $\alpha = 0.90$;

Monitor and control and improve staff performance: $\alpha = 0.90$; Schedule and prioritize: $\alpha = 0.87$; Develop staff: $\alpha = 0.92$).

3.3.3 Competencies and training scale

The Competencies and Training Scale (CTS) developed by Berkenbosch, Bax, Scherpbier, Heyligers, Muijtjens, and Busari (2013), is composed of 30 items that evaluate four dimensions:

1. Leadership and management (e.g., Residents know how to handle their personal financial situation and what they can expect in the future);
2. Organization and finance (e.g., Residents know how their specialty's department is organized and financed);
3. Operational management (e.g., Residents take the costs of healthcare resources into account when allocating them);
4. Professional ethics and health law [e.g., Residents know where they can find medical resources (books, internet and databases) to keep up their medical knowledge].

The reliability (Cronbach's alpha) of each scale amounted to 0.85, 0.78, 0.72, and 0.81, respectively.

The respondents were asked to rank their perceived level of competencies of the residents on a five-point Likert scale, with 1 = completely disagreeing and 5 = completely agreeing with a statement.

There were seven items, which assessed how medical specialists perceived the need for management education among medical residents (training variables). This section not only investigates the need for management training for the residents, but also the preferred management topics (e.g., career options, leadership, practice management), the preferred method of instruction (e.g., lectures, workshops, discussion groups), when the training should take place (e.g., during medical school, pre-residency period, during residency), and the length of the training.

3.3.4 Utrecht Work Engagement Scale

Engagement was assessed with a short version of UWES (Schaufeli & Bakker, 2003). A manual test of the UWES, as well as several language versions, may be downloaded from www.schaufeli.com. The items of the UWES are grouped into three subscales that reflect the underlying dimensions of engagement:

1. Vigor (three items; e.g., When I get up in the morning, I feel like going to work);

2. Dedication (three items; e.g., I am enthusiastic about my job);

3. Absorption (3 items; e.g., I feel happy when I am working intensely).

All items are rated on a 7-point scale rating from 0 (never) to 6 (always).

A study developed by Schaufeli, Taris, and Bakker (2006) with ten different countries (N = 14.521) revealed adequate internal consistency indices, with values of Cronbach's alpha of the three-item Vigor scale varied across countries between 0.60 and 0.88 (mean = 0.77), the three-item Dedication scale varied between 0.75 and 0.90 (mean = 0.85), whereas alpha values of the three-item Absorption scale varied between 0.66 and 0.86 (mean = 0.78). Finally, Cronbach's alpha of the total nine-item scale varied between 0.85 and 0.92 (mean = 0.92).

3.3.5 Job evaluation

To know the individual performance of employees, they were asked about the results of their last evaluation, and the answer was given through four options: 1 = inadequate, 2 = sufficient, 3 = good and 4 = excellent.

3.4 Procedures

Prior to the collection of data, the service directors of the various specialties were contacted to obtain the necessary authorization for the application of the questionnaires. The requests were made in writing and through which the objectives of the study were explained and the guarantee of confidentiality of the results was given.

Before the application of the questionnaires the purpose of the investigation was explained to the participants and the preservation of their identity was guaranteed. Each subject received the questionnaire within an envelope and returned it to the same form after completing it, thereby ensuring their anonymity.

After the receipt of the questionnaires, the data were processed statistically using *IBM-SPSS (version 22) and AMOS 20.0.*

3.5 Introduction of target hospital

At the very beginning, I choose 20 hospitals in China to be my target hospital. Finally, I take 6 of them to collect my questionnaires. Most of them are very famous in China (China's top 100 hospitals) No.1 to No.6 hospitals are my final choice.

1. Guizhou Provincial people's Hospital

Guizhou Provincial People's Hospital in Dongshan scenic spot, Guizhou Provincial capital of Guiyang, held for the provincial government, the provincial health department head of a medical treatment, teaching, scientific research, health care, prevention, rehabilitation of cadres, first aid for the integration of grade iii-a large General Hospital. Is a province, Guiyang Medical College second affiliated hospital of the Red Cross, the provincial women's and children's Hospital. Under the Guizhou Provincial cardio vascular Hospital (Institute of cardiovascular disease in Guizhou province), saving Institute of respiratory diseases and orthopedics hospital, nursing school, the provincial people's Hospital, the provincial center for clinical testing, hearing rehabilitation center. This part of the existing 2000 beds prepared, with clinical and medico-52, 40 specialist outpatient clinics. In cardiology, cardiac surgery, respiratory medicine, Anesthesiology, general surgery, liver and gallbladder surgery, urology, pediatric medicine, Gynecology, orthopedics, neurosurgery, emergency department focus on discipline. Hospital workers in this part of 2,810, including 455 Vice-high above medical technicians, medical master's degree 289, Ph 77; saving expert and core experts, and enjoy government subsidy of 27. Hospital has first-class rooms and equipment, which enable surgical building completed in 2008, 22-storey building, with a total construction area of 45,000 square meters, Baiji, Qianji operating rooms equipped with modern, intensive care unit (ICU), logistics automatic transmission system, central air conditioning, air purification systems, central supply room. Hospitals with advanced medical equipment, Germany Siemens series equipment: dual-source CT, 3.0T, MRI 1.5T MRI digital gastrointestinal machine, robot-style universal flat panel detector imaging system, x-ray imaging system (CT), single photon emission computed tomography system for SPECT/CT. Medical up three photon line Accelerator, and has comparison advanced of Eagle depending on cool eye associate molecular laser, and large automatic biochemical Analyzer, and medical with 2 Micron laser surgery system, and fluorescent surgery microscope (Germany Lycra), and Super anesthesia workstation (Germany Europe up), and double door type low temperature plasma sterilization system (United States Johnson), and automatic digital cleaning disinfection sterilization system (Switzerland hundred Li virtues), and large oxygen class, large molecular sieve system oxygen system, also has province within equipment best of reproductive laboratory and Center laboratory,,

Hospital equipment in the domestic advanced level. Hospital has been rated as "Advanced Unit of national health system", "National Advanced Unit for discipline inspection", thousands of physicians throughout the country supporting the rural "Advanced

Group", in Guizhou province, "five" labor Prize (Advanced) of title, "Guizhou province, advanced unit of the Red Cross", provincial health systems " Model Hospital of medical ethics ", in Guizhou province," spiritual civilization "Advanced Unit, the Union issued the" earthquake relief, worker pioneer "award, the Ministry of health 2005—2007 the annual" national advanced unit of hospital management year ","second prize of quality evaluation of medical records ".

2.The Affiliated Hospital of Guizhou Medical University

The Affiliated Hospital of Guizhou Medical University was established in 1941. It is one of the earliest affiliated hospitals of higher medical colleges in southwest China. It was founded by Professor Li Zongen, a famous early tropical disease scientist, medical educator, then president of the National Guiyang Medical College and later transferred to the head of the Peking Union Medical College Hospital. Since its establishment, the hospital has gathered a large number of medical elites, such as Professor Yang Jishi, Professor Wang Jiwu, Professor Yang Jingbo, Professor Zhou Yude, Professor Shen Kefei, Professor Zhu Maogen and Professor Yang Chongrui. Most of the experts came from the Union Medical College Hospital, and the hospital also referred to the Union Medical College Hospital in the concept, rules and regulations, organizational structure, and formed a standard of diagnosis and treatment, rigorous academic style of work, at that time was known as "small harmony".

Our hospital is the strongest comprehensive strength of Guizhou Province, set medical teaching and scientific research as one of the large-scale comprehensive tertiary hospital. There are 3000 open beds. As of February 2018, the total number of hospital staff and workers was 4,301, including 3,695 health technicians, 606 administrative and logistical personnel, 86 doctorates and 706 postgraduates; 887 senior titles, 681 intermediate titles, 975 junior titles, outstanding professional and technical personnel in China and tens of millions of national talents and workers Cheng was selected, the winner of the Chinese Youth Science and Technology Award, the Ministry of Health has outstanding contributions to youth experts, core experts and other high-end talents 54. The hospital also introduced a number of international migratory bird talents, including Australian physicians and the Nobel Prize winner, Professor Barry Marshall, who was invited to serve as honorary director and visiting researcher of the Clinical Medical Research Center of our hospital.

It has 55 clinical departments, 11 medical and technical departments, 19 functional departments, 17 clinical teaching and research departments, 33 master's degree awarding points and 2 doctoral awarding points, 4 key national clinical specialty construction projects, 25 national drug clinical trials (GCP) specialties (28 directions), 9 national bases and 1

national key research laboratory. 1 National Stem Cell Research Institute, 1 National Senior Stroke Center, 1 National Chest Pain Center, 1 National Innovation Team, 1 National Teaching Team, 1 National Emergency Medical Rescue Team, 1 Academician Workstation, 2 Academician Workstation, 9 Academician Workshops, 11 Provincial Key Specialties, Guizhou Provincial Linlin Bed key specialty training project 8, provincial characteristic key discipline 1, regional first-class construction discipline 1, Guizhou first-class professional construction project 2, Guizhou first-class platform construction project 1, Guizhou first-class teachers team construction project 3, provincial teaching team 1, provincial medical quality control center 20, provincial medical treatment in Fourteen hearts, three medical research institutions in Guizhou Province, 12 provincial talent training bases and 9 provincial innovation teams. The number of qualifications obtained by hospitals at or above the provincial level is in the forefront of Guizhou Province, which has become an important support force for medical services, scientific research innovation and personnel training in Guizhou Province.

Guizhou Provincial Remote Command and Control Center, Guizhou Provincial Cardiovascular Disease Prevention and Treatment Center, Guizhou Provincial Organ Transplantation Center, Guizhou Provincial Hematopoietic Stem Cell Transplantation Center, Guizhou Provincial Prenatal Diagnosis Center, Guizhou Provincial Children's Medical Center, Guizhou Provincial Hypertension Diagnosis and Treatment Center, Guizhou Provincial Diabetes Center, Guizhou Provincial Dementia The Provincial Epilepsy Prevention and Treatment Center, Guizhou Trauma Treatment Center, Guizhou Emergency Treatment Center, Guizhou Mental Health Center, Guizhou Hepatobiliary, Pancreatic and Spleen Disease Research Institute, Guizhou Institute of Hematology, Guizhou Institute of Cerebral Neurological Diseases are all established in our hospital. The hospital also has the only gamma knife treatment center, interventional treatment center, PET / CT and hybrid operating room in Guizhou Province. Intelligent new surgical building with 1200 beds has been built, and the largest clinical laboratory center, disinfection center and physical examination center have been set up by integrating resources. Infrastructure has been further consolidated and medical conditions have been improved. In 2017, more than 1.9 million outpatient and emergency visits, nearly 50,000 inpatient operations and nearly 100,000 discharged patients were conducted.

The National Emergency Medical Rescue Team (Guizhou) and Guizhou Provincial Emergency Rescue Center are located in our hospital. They are responsible for dispatching medical emergency resources of the whole province and launching emergency rescue of

major public health emergencies. They have played an important role in the rescue of "anticoagulation and freezing to protect people's livelihood", "Wenchuan earthquake" and local mine accidents.

The leading group of the hospital had the courage to innovate and formulated the transformation and development strategy of building a "national regional medical center" and a "high-quality hospital for medical teaching and research". Four non-profit hospitals, including Tumor Hospital affiliated to Guizhou Medical University, Baiyun Branch Affiliated to Guizhou Medical University, Wudang Hospital Affiliated to Guizhou Medical University and Anshun Hospital of Guizhou Medical University, were set up successively. The "1+X" group reform and development road, and the Zunyi Municipal Government to cooperate with the construction of Guizhou Medical University affiliated Zunyi Hospital, and Gui'an New District, Huazhong University of Science and Technology Tongji Hospital affiliated to Tongji Medical College, the establishment of Gui'an Hospital affiliated to Guizhou Medical University, further expand the group medical.

3.Affiliated hospital of Zunyi Medical University (ZMU)

Zunyi Medical University (ZMU), a key medical university at the provincial level in Guizhou Province, is located in Zunyi, a city celebrated historically, culturally and scenically. ZMU’s predecessor, Dalian Medical University, was established in 1947. It was, by order of the State Council, moved to Zunyi in 1969 to support the development of the Southwestern China and renamed as Zunyi Medical University. The 64 years since its foundation has witnessed ZMU developing into a highly accredited multi-disciplinary and multi-specialty medical education institution.

ZMU’s two completed campuses (one in Zunyi, Guizhou Province; the other in Zhuhai, Guangdong Province) cover a floor area of 827,077 square meters, and a campus under construction, Xinpu campus, covers 1.3 million square meters. Its administrative and classroom buildings total 161,435 square meters, students’ dormitories 71,067 square meters, and sports grounds 43,165 square meters.

The university boasts 93.64 million RMB worth apparatuses and equipment for teaching and research, 67 multi-media classrooms and 9 language laboratories and 1,312 computers for teaching and experiment. The computerized library with a floor space of 19,110 square meters and convenient access to resources navigation enjoys a collection of 1,510 thousand books, including 690 thousand electronic ones.

It has established links with about 400 universities and medical institutions across the country in exchange for resources.

The library, a provincial authorized institution for academic searching, has now got the authorization for academic searching of Ministry of Education of the People's Republic of China. The university established its campus network in 2001, making it the one among the first three provincial universities with access to CERNET.

ZMU offers programs, 14 undergraduate programs: Clinical Medicine, Stomatology, Anesthesiology, Human services administration, Pharmaceutical Preparation, Nursing, Diagnostic Radiology, Medical Test, Physical education, Bioengineering, Information and Computer Science, English, Forensics Preventive Medicine37 master programs and 1 joint doctoral program. The university is composed of 21 schools and departments: Zhuhai Campus, School of Preclinical Medicine, No.1 Clinical School, Stemmatological School, Pharmaceutical School, Nursing School, Graduate School, Adults& Further Education School, Humanities & Social Science Department, Human Services Administration Department, Anesthesiologic Department,

Aesthetic Medicine Department, Diagnostic Radiology Department, Medical Test Department, Forensic Medicine Department, Physical Education Department, Medical Information Engineering Department, Foreign Languages Department, Bioengineering Department, etc. The university has 116 teaching and research sections, 22 teaching and scientific research laboratories, 4 research centers, 3 directly affiliated and 7 non-directly-affiliated hospitals, 25 teaching hospitals, 25 non-medical teaching and training bases. Among them, Teratology, anesthesiology, clinic medicine are the leading undergraduate programs at the national level;

Clinical Medicine, Stomatology, Anesthesiology, Diagnostic Radiology, pharmaceutical preparation and nursing are leading undergraduate programs at the provincial level.

Subjects like pharmacology, molecular biology, internal medicine, stemmatological clinical medicine, anesthesiology and immunology are key disciplines at the provincial level.

The pediatric surgery section, oncological section and anesthesiologic section are key medical sections at the provincial level.

The university is renowned by atop-quality course at the national level, 12 at the provincial level, 22 at the collegiate level and 10 collegiate quality courses. It boasts a training base accredited by The Ministry of Health, 6 provincial ones, 1 accredited by China Medicine Association, 2 innovation bases for postgraduates, 1 national model center and 2 provincial

ones for experiment and teaching, 1 provincial center for medicine humanities, 2 provincial key laboratories.

153 professors, 271 associate professors, 254 lecturers, and 23 teaching assistants, of whom 393 hold masters or Ph.D. degrees, constitute the numerally substantial, structurally reasonable and professionally competent faculty. Among them, there are 8 doctoral supervisors, 326 master supervisors, and 5-star teachers accredited by the provincial government.

International Exchange and Cooperation

On the basis of intercollegiate coordination, the university has held academic exchanges and cooperation in researches with Purdue University, Hannover medical school, The Institute of Neurology of CAS' Shanghai Institutes for Biological Science, Sichuan University, Dalian Medical University, Chongqing Medical University,

Shanghai University of Traditional Chinese Medicine and Kiangwu Nursing University of Macau. Experts from the USA, the UK, Japan, Canada, New Zealand, Switzerland, Germany and other countries arrive here in succession to give lectures at the university's invitation.

ZMU has won many honors, such as: A Level University for Undergraduate Teaching, A Level University for Physical Education Course, A Level University for the implementation of Regulations for School's Physical Education, A Level Teaching Affairs Office, National Advanced Unit for bringing scientific, cultural and medical services to the rural areas, National Advanced Unit for Caring the Next generation, National Advanced Unit for Auditing, Guizhou Advanced Unit for Teaching and Administration, Guizhou Civilized Unit, Guizhou A Level Teaching Affairs Office.

4.Nangfang Hospital

As the first affiliated hospital to Southern Medical University (the former First Military Medical University), Nangfang Hospital is an integrated hospital which combines medicine, teaching and scientific research into one unit and is honored as one of the first Class Three Grade A Hospitals and National Top Hundred Hospitals. It was founded in 1941 and once located in Qiqihaer and Changhai. In 1972, it finally moved to Guangzhou. According to the decision of Central Military Committee, it was transferred to Guangdong Province on 24th, Aug, 2004 and then named as Nanfang Hospital of Southern Medical University formally. The hospital was located at the east side of Baiyun Mountain, covering 200,300 square meters. Its construction area is 427,200 square meters and it owns 1743 sick beds. The general assets

of equipment, which include the latest CT-PET, reach 500 million Yuan and the general assets of imported equipment reach 420 million Yuan. The yearly patient number of out-patient and emergency department was 843,400 persons/times in 2005 and the patient number of in-patient was 38,400 persons/times.

Today, Nanfang Hospital has 46 disciplines and departments, 14 teaching departments and 26 specialized laboratories. Among them, there are one national key discipline (Digestive Disease Medicine), two national key disciplines of TCM (Encephalopathy and Nephropathy), two national key specialized disciplines of TCM (Chronic Headache and Rheumatism), five Guangdong Provisional key disciplines (Digestive Disease Medicine, Hematology, Epidemiology, Ontological Surgery and Neurology) and two Guangdong Provisional key laboratories (Basic of Hepatitis, Renal failure). It is also one of two hospitals which are the pharmacological bases for national western medicine and TCM. Now, Nanfang Hospital is able to confer doctor degree on first-level disciplines and master degree on 13 disciplines. Obvious advantages exist in digestive disease, renal disease, liver disease, hematic disease, prevention and treatment of cardiovascular and cerebral vascular diseases, comprehensive treatment of tumor, organ transplantation, micro-surgery (neurology), orthopedics and traumatology and spine surgery center, burns and plastics, eugenics, integration of TCM and western medicine, medical image and intervention technique. The technological layout of Nanfang Hospital is that “hospital has emphasis, department has features and personnel has specialty”. Many technology projects are leading domestically, and some achieved international advanced level, which enjoys great fame in china, especially in southern China and Southeast Asia.

Nanfang Hospital has the largest-sized, technologically strongest and most advanced endoscopy treatment center and it is the first one to perform mucosal resection under colonic endoscope; it is leading in research of acute renal injury, failure mechanism and prevention and treatment. The numbers and success rate of stem cell transplantation rank No.3 all over the country; it is the first one to treat pemphigus successfully by using autologous stem cell transplantation in world; it is the first one to treat chronic leucocythemia by adopting gene targeting; it successfully performs the first umbilical cord blood transplantation in China and treats Mediterranean anemia by maternal marrow stem cell transplantation firstly in the world; it is the first one to treat fulminant myocarditis by percutaneous cardiopulmonary support; it is the first one to develop MRI research and acquire the first class new drug certificate of national biological products; it is the first one domestically to develop Molecular Diagnostics Technologies in diagnosing α and β Mediterranean anemia; it is the first one to develop

Gamete Intrafallopian Transfer and Assisted Reproductive Technologies successfully and the level of tube-test baby achieves world advanced level; it is the first one domestically to use X-knife to treat brain diseases; it is the only hospital home and abroad to treat intractable epilepsy under the guide of PET; it can perform multi-organ transplantation and performs multi-organ (liver, pancreas and duodenum)transplantation successfully; it is the first one to put forward criterion for ideal embellishing of cerebral aneurysms; it performs 10 amputated fingers replantation within shortest time and achieving best curative effect; it is the first one to use two-bridge flap transplantation to treat trauma of low extremities; it is the first one to construct tissue engineering bone of goat with vessels by using micro-technique, which is a breakthrough of human tissue engineering material; it performs hand allotransplantation successfully which are No.1 and No.2 in Asia , and No.3 and no.4 in world and it performs reconstruction of amputated five fingers successfully which is no.4 in the world. It is the first one to perform PDN replacement domestically; it is the first one to use the Phase I operation to treat serious spondylarthroses, which is applied widely home and abroad now; it is the first one to operate tumor resection on upper parts of ilium bone and thighbone and performs reconstruction of pelvis and total hip; it is the first one to treat tissue injuries in different parts of body by all kinds of free flap transplantation; it is the first one to apply the innovative skin tissue transplantation of thin pedicle thin flap; the comprehensive sequential treatment and diagnosis of tumor reaches domestic advanced level; and it is the first one to supply aerial aid service in China. Integrating medical, health care and rehabilitation into one unit, Huiqiao Department (Huiqiao Building) of Nanfang Hospital is the earliest and largest comprehensive medical service institution for special need, which admits most overseas patients in China and is the only overseas patents center in the Chinese People's Liberation Army (PLA). In March, 1995, the Central Military Committee authorized Nanfang Hospital the honorary title of “Model of Excellent Medical Service” and Jiang Zemin wrote inscription of “saving the dying and the injured, making unselfishness contributions, working hard and preserving the nature” personally.

Now, Huiqiao building becomes medical famous brand which enjoys great popularity home and abroad. Nanfang Hospital undertakes more than 100 high-level scientific research tasks of 973, 863, National Natural Science Foundation and so on and the fund of scientific research tasks goes up to 20 million Yuan; By 2007, the hospital had won 300 prizes above third prizes of PLA and province, including 8 second prizes of “National Science and Technology Progress Award”, 15 first prizes and 113 second prizes of PLA and province and so on. Since 2000, the level and number of scientific achievements of Nanfang Hospital rank

No.1 among all large hospitals in Guangdong Province, the numbers of papers published in national core journals and collected by SCI which are written by scientific and technology personnel of Nanfang Hospital come to the top ten among all medical institutions of the whole country, ranking No.1 in Guangdong Province. Nanfang hospital has two journals which are national source journals of paper statistics and "Chinese Journal of Orthopedic Trauma" is one of journals of Chinese Medical Association. In addition, Nanfang Hospital has established southern PET center, photon knife and image-guided percutaneous RF ablation system treatment center; it owns the largest High-Pressure Oxygen in Southeast Asia; it is equipped with the first-class Laminar Flow Operation Room and ICU; the digital hospital has been realized by using domestic advanced hospital information management system. Nanfang Hospital has invented and developed PACS system on its own, which reaches the domestic advanced level; "film-less" has been achieved and tele-radiologic conference system within hospital and between hospitals has been established; two-way bar code has been adopted to replace paper. After being transferred from the PLA to Guangdong Province, Nanfang Hospital adapts to the needs of transfer. On the basis of that, Nanfang Hospital adheres to the goal of "improving the core service ability and competitive ability and making the hospital bigger, stronger, more professional and more specialized", promotes a variety of reforms firmly and actively, innovates the mechanism, strengths the management and makes a great effort to realize the new-round development after transfer.

Nanfang Hospital was founded in Qiqihar, Heilongjiang Province, during the period of China's War of Liberation. As the former first affiliated hospital of the First Military Medical University, Nanfang Hospital becomes the affiliated one of Southern Medical University after holistic handover from military system to the local government of Guangdong Province. Nanfang Hospital is a general hospital handling health care, medical education and scientific research. It is one of First-Class Grade-A hospitals named and approved at the first nationwide review and judgment and one of the two licensed institutions which handle clinical research on western medical drugs and traditional Chinese medical drugs. Nanfang Hospital is located at Qilin Hillock, the eastern ridge of Baiyun Mountain. The 1800-bed world-renowned medical center, covering an area of 200,000m^2, with a building area of 500000m^2, is home to 50 clinical departments, 28 teaching departments and 26 laboratories. Nanfang Hospital has a 3,000-member medical staff including over 300 doctors and nurses with higher professional titles, among whom 53 ones hold the academic titles of directorship and associate directorship of academic institutions at the provincial or above level. In 2004, Nanfang Hospital ranked the first among the large hospitals at the first Guangdong provincial

review and judgment of well-known doctors' program. As the first clinical college affiliated to Southern Medical University, Nanfang Hospital has fostered a group of outstanding teachers at state level, military level and provincial level. It has been entitled to confer the doctoral degree of class I academic subject. The hospital with 130 supervisors of master's and doctoral degrees, homes a work station for postdoctoral research. Additionally, the hospital is one of the 19 clinical doctors training bases nationwide approved by the state at the first review and judgment. Since 1990, the faculty have been funded with over 800 programs and awarded scientific research achievement prize in 376 programs including 7 second-class awards of the State Science and Technology Advancement Award.

The hospital ranks the first among the hospitals in Guangdong Province in view of the quantity and quality of scientific research achievement, and on the top among the nationwide large hospitals and medical institutions in respect of publication of medical papers. Nanfang Hospital has gained honors such as "Bethune Cup" for the Military Quality Service Competition, "100 Best Hospitals in China", "National Model Institutions of Supporting the Government and Cherishing the People". The Department of Hui Qiao Buildings of the hospital was awarded an honorary title of "Department of Hui Qiao Buildings, Model of the Excellent Medical Service" by the Central Military Committee of PLA, in March, 1995. Nanfang Hospital is equipped with medical instruments of 4,580 sets (pieces), the value exceeding 500 million yuan, 80% of which are the most sophisticated ones currently in the world. It has been appraised as Garden Institution by Guangzhou municipal government for 11 years on end and as one of the 400 National Best Institutions of Planting Trees.

5.The First Affiliated Hospital of Sun Yat-sen University

The First Affiliated Hospital of Sun Yat-sen University, originally known as the Affiliated Hospital of Guangdong Public Institution of Medicine, was founded in 1910 by Dr. Paul Jerome Todd (an American medical missionary) with 40 western doctors. It is composed of the Headquarters, East Division and Hui Ya Hospital. The Hospital is an important base for research, medical service, medical education, preventive care and rehabilitation in South China. It is well known for its high quality and excellent service in China and Southeast Asia. For years, it has been recognized as the most reliable hospital in mainland China by Hong Kong residents.

Departments

There are 5 National Key Disciplines - Nephrology, General Surgery, Neurology, Otorhinolaryngology and Endocrinology. There are also 28 "National Key Clinical Specialties"

in the hospital, such as Endocrinology and Metabolic Diseases, Gastroenterology and Hepatology, Nephrology, Neurology, etc. Department of Rehabilitation has been selected as a WHO Collaborating Center for Rehabilitation. The Laboratory of Nephrology and the Laboratory on Assisted Circulation are Key Laboratories of the Ministry of Health.

Scientific Research

Over the past 10 years, the hospital has won 90 awards for achievements in research and development. They include 3 "The Second Prize for National Science & Technology Progress", 16 "The Prize of Chinese Medical Science & Technology", 5 "The First Prize for Science & Technology Progress in Guangdong". It has undertaken 885 various research projects supported by Ministry of Science & Technology, "973 Project", "863 Project", and the National Natural Science Fund. From 2010 to 2014, there are 1500 SCI papers published by our hospital with the first author / correspondent author. Currently, 49 experts in the hospital are appointed as the chairs of different medical societies in Guangdong and China.

Health Care

The hospital serves more than 4.90 million outpatients every year. There are more than 71,800 surgical operations and 106,100 discharges annually. The hospital has a Private Medical Center, which draws patients from around the world and offers a specialist medical service for them. The hospital is also equipped with a variety of advanced medical equipment's such as Da Vinci surgical robot, PET-CT, 3T-MRI, 64 Slides Spiral CT, ECT, TCD, EMG, Doppler, bidirectional cardio angioplasty equipment, heart monitoring system, extracorporeal shockwave lithotripter, electronic endoscope, etc. Based on its advanced technology, the hospital successfully diagnosed and cured many critical, difficult and rare diseases, such as the first case of dieresis in the country for conjoined twins and the craniopagus twins, the operation to rectify a child born with 3 legs and the first operation in Asia to transplant the kidney and liver simultaneously.

Medical Education

The hospital is the biggest clinical teaching base of Sun Yat-sen University, taking up more than 40% of the clinical teaching tasks as well as post-graduate education and continuing education. There are over 800 students graduating from the hospital with PhD or master degree. The hospital is also an important base for national continuing medical education. It undertakes more than 130 continuing medical education programs each year. It offers clinical training programs for doctors and other health professionals from all over the world and more than 1,100 medical workers receive their medical training in the hospital each year.

International Partnerships

At present, the hospital has established academic collaboration with hospitals from more than 20 countries and regions, such as Harvard Medical School, UT Southwestern Medical Center, Johns Hopkins Hospital, UCLA Health System in U.S.A., University of Birmingham in U.K., Lund University in Sweden, Prince of Wales Hospital in Hong Kong, etc. It hosts more than 10 international academic conferences each year.

In the years to come, The First Affiliated Hospital, SYSU will continue to strive for betterment in medical services, teaching and research, and develop itself into a leading institution in the country and a renowned modern comprehensive hospital in the world.

6.The First Affiliated Hospital of Shantou University Medical College

Shantou University (STU), founded in 1981， is a comprehensive university jointly supported by the Ministry of Education, the Guangdong Provincial Government and the Li Ka Shing Foundation. It is the only public university in the world that receives long-term funding from the Li Ka Shing Foundation. The University campus is located in the northwestern part of Shantou, a seaside city, covering a total area of 1.26 square kilometers with a floor space of 435,200m^2.

The University consists of 8 colleges and schools, namely, College of Liberal Arts, College of Sciences, College of Engineering, Medical College, Law School, Business School, Cheung Kong School of Art and Design, and Cheung Kong School of Journalism and Communication. It enrolls qualified students from all over the country (including Special Administrative Regions of Hong Kong and Macau, as well as Taiwan). Currently, the University has 1 National Key Discipline, offers Cheung Kong Scholar Professorships, provides 5 Postdoctoral Programs, 1 Doctoral Program for first-level discipline and 25 Doctoral Programs for second-level disciplines, 10 Master’s Programs for first-level disciplines and 84 Master’s Programs for second-level disciplines, as well as 7 Professional Master's Degree Programs. It also has 7 National Distinctive Programs, 1 National Key Laboratory, 6 Provincial Key Laboratories, and 2 National Pilot Sites for Innovative Talents Training. Currently, STU has 1,540 staff members and over 10,056 students and has nurtured over 90,000 graduates.

The University library has been digitalized to meet the growing need for an electronic library. The affiliated hospitals, including the First Affiliated Hospital, a tertiary hospital that

was awarded the “Nation’s 100 Best Hospitals”, with a total of 5,523 patient beds, provide ample opportunities for student training.

Since its inception, Shantou University has received a generous support from the distinguished philanthropist and international entrepreneur, Mr. Li Ka Shing. The Li Ka Shing Foundation has earmarked grants of HK$8 billion through 2018 to support Shantou University (Cheung Kong Graduate School of Business included). Mr. Li has given his heart and soul to the development of the University, a manifestation of his lofty ideal to “serve the good of all” and his firm conviction that education is vital to the young generation of the country.

In September 2013， the Technion － Israel Institute of Technology and Shantou University signed a Memorandum of Understanding for jointly establishing Guangdong Technion - Israel Institute of Technology (GTIIT), an institution of higher learning in Shantou. On April 9th 2015, the Ministry of Education approved the preparation for the establishment of GTIIT.

Shantou University is committed to offering student-centered education with the educational idea of “Building Up Oneself for the Pursuit of One’s Selflessness”. It is engaged in reforms related to university governance and talent development, and also planning to relocate Medical College into the main campus and to develop a globally advanced curriculum focusing on life science. Since 2001, the University has conducted a profound internationalization-oriented reform, and overseas talents have been recruited to serve as provost, vice president and deans. Through a series of reforms in curriculum design, teaching, resources management and human resources system, it aims to offer a platform for the exploration of higher educational reform in China.

Shantou University is striving for a top-tier university that provides quality education, develops advanced governance system, shows distinctive feature of internationalization, endeavors to meet the major demands for economic development of the nation and Guangdong, and places high value on innovation, creation and entrepreneurship.

7. Beijing Children's Hospital, Capital Medical University

Beijing Children's Hospital, Capital Medical University is a comprehensive 3A pediatric hospital that combines medical care, research, teaching, and health care. Its predecessor is Beiping Private Children's Hospital established in 1942 by Academician Zhu Futang, the founder of China’s modern pediatric medicine. The Hospital covers an area of 70,000 square meters, and the floorage is 120,000 square meters. It possesses 970 registered beds, receives

an average of 3 million outpatients, over 70,000 inpatients and performs more than 23,000 operations per year. In 2017, the hospital has been approved by the National Health and Family Planning Commission as the National Center for Children's Health, China (Beijing).

Beijing Children's Hospital is home to a suite of comprehensive and advanced facilities and are well backed by technical expertise. Medical services at the Hospital is provided by 44 clinical and technical departments including pneumology, urological surgery, intensive care unit, and hematology/oncology center. It sets up the National Clinical Research Center for Respiratory Diseases, and is home to five national key clinical specialties of Pediatric Critical Care, Pediatric Pneumology, Integrated Traditional Chinese and Western Pediatrics, and Pediatric Surgery and Clinical Care; four Beijing Municipal Key Laboratories of Molecular Subtyping of Pediatric Blood Disorders and Tumors, Pediatric ENT, Head & Neck Surgery, Pediatric Respiratory Tract Infections Study and Pediatric Chronic Nephrites and Blood Purification; 16 municipal level medical centers including Beijing Engineering and Technology Research Center for Children's Orthopedic Appliances, Pediatric Congenital Heart Disease Treatment Center, Pediatric Solid Tumor Treatment Center, and Children's Sleeping Disorders Center. The Hospital is a domestic authority in, and best-equipped for, the diagnosis and treatment of conditions such as complex congenital heart conditions in children (surgical), the correction of various spinal deformities, the correction of urological deformities in children, laparoscopic and thoracoscopic treatment, the treatment of acute abdominal diseases and trauma, neurology, respiratory diseases, endocrinology, kidney diseases, hemodialysis, ENT, bronchoscopy, and video imaging, etc. The Hospital has also been the first in the country to extend pediatric patient age to 18 years old.

A total of 2656 individuals work in Beijing Children's Hospital, among them are 733 doctors, 1163 nurses, and 369 medical technicians, 197 with senior professional titles, 227 with associate professional titles and 561 with intermediate professional titles. The only 3 academicians in domestic pediatric community, Zhu Futang, the Chinese Modern Pediatric founder, Hu Yamei, academic leader in children leukemia, and Zhang Jinzhe, one of the founders of Chinese Pediatric Surgery have been working in the hospital. Others that have won national honors are: six experts with outstanding contributions, 10 individuals receiving special allowances from the State Council, one selected by the national New Century Talents Project, one won the National Science Foundation for Distinguished Young Scholars, and a total of 34 receiving the "Ten, A Hundred, A Thousand" Talent Funding Support.

The Hospital is the supporting institution of School of Pediatrics, Capital Medical University and the university's Pediatrics Department, owns the National Key Discipline of

Pediatrics under the Ministry of Education, boasts an outstanding national-level faculty, including more than 98 professors and associate professors and 76 doctorial and masters' advisers. The Hospital undertakes multi-level teaching tasks for master's and doctor's degree candidates, seven-year pediatric students, nursing college students and continuous medical education recipients, and has established a postdoctoral research station, cultivating a large number of excellent pediatric professionals for society.

Beijing Children's Hospital has been giving full play to its leading position in pushing forward pediatric development. In 2013, it initiated the idea of building Beijing Children's Hospital Group (BCHG), and created a new model of "patients stay while doctors move" to better serve the patients. So far there have been 20 BCHG member hospitals. The Hospital not only enjoys a high reputation at home, but also well regarded in the international pediatric community. It has established good relations and extensive collaborations with other pediatric institutions in countries like the United States, Russia, Canada, Italy, Australia, Sweden, Germany, France, Japan, Singapore, and the Czech Republic, and has approved by the Ministry of Science and Technology as an International Science & Technology Base of China.

Over the years, to provide convenience for patients, the Hospital has been open around the clock and also set up night-time outpatient clinics. As part of the current efforts to reform the public hospitals, the Hospital has been promoting a "registration by appointment" system, being the first in the country to apply full non-emergency appointment and addressing targeted ordinary people's difficult access to doctors and admissions in hospitals. The Hospital's efforts have been widely recognized by the National Health and Family Planning Commission and the public in general. Apart from its day-to-day operations, the Hospital is also involved in campaigns and missions entrusted by the National Health and Family Planning Commission and the Beijing Municipal Health Bureau, such as the prevention of hand, foot and mouth disease (HFMD); screening of milk powder products; H7N9 influenza screening, earthquake rescues and other public emergencies.

Throughout its history, the Hospital adheres to the principle of "putting patients first and serving the children whole-heartedly", and promotes the spirit of its motto "Public-mindedness, Benevolence, Diligence, Harmony" to create its own moral brand. A number of outstanding individuals emerge, such as Dr. Jia Liqun, a national moral model and an "Excellent CPC member". The Hospital has been committed to promoting public good with "Care for Children and Care for Health", it has established the "Beijing Children's Health Foundation" and organized fund-raising campaigns among its employees, encouraged its outstanding staff to lend a helping hand to Xinjiang and Tibet, sent medical experts to suburbs

of Beijing, held large-scale free clinics, offered medications, medical care and health care services to children in remote regions and at the community level, provided free treatment to Tibetan children with congenital heart disease and cleft lips and palate, and hosted summer camps for young patients with hemophilia, diabetes and leukemia, so as to let the patients feel the warmth and care from society.

Beijing Children's Hospital has also received a great number of awards and titles, including the "National Model Institution", "Exemplary Civilized Unit in Beijing", the "Civilized Service Demonstration Unit in Beijing", the "Most Popular Specialized Hospital", the "Double Top-Ten People's Choice Hospital", the "Beijing's Most Popular 3A Hospital", the "Beijing Labor Award" and the "National May 1 Labor Award".

8. Beijing You'an Hospital

In the 43rd year of Jiajing reign period of the Ming Dynasty, the You'an Gate was built in the southwest part of Beijing, which means "stable and peaceful", to protect the city's good health. In the initial period of the founding of P.R.C., Mayor Peng Zhen visited You'an men wai personally, planning to found Beijing No.2 Hospital of Infectious Diseases, which ranked first in Asia by construction size and discipline settings. In 1989, the hospital was renamed as Beijing You'an Hospital.

In 2003, it became Beijing You'an Hospital, Capital Medical University and No.9 Clinical Hospital of the Capital Medical University. The Hospital also has such clinical research institutions as the Beijing Hepatic Disease Research Institute, Beijing Integrated Chinese and Western medicines infectious disease institution, National Key Specialty of Integrated Chinese and Western Medicines, The Key Laboratory of Translational medicine of Hepatitis B and liver cancer in Beijing, The Key Laboratory of AIDS in Beijing, The major disease clinical data sample repository of Beijing, National Drug Clinical Trial Institution, The Capital University of Medical Sciences Institute of Liver Disease and Liver Cancer Clinical, Beijing international science and technology cooperation translational medicine base of infectious diseases. The hospital has cooperated with University of Washington, University of Oxford and University of Calgary, and has constructed: China US clinical study of infectious diseases and chronic diseases Cooperation Center; China Britain joint infection and infectious disease clinical research base; China Canada Joint Institute of liver diseases and other clinical research cooperation institutions. At the same time, it is training base for specialists of infectious disease, Infectious diseases and AIDS Chinese medicine treatment base for State Administration of Traditional Chinese Medicine of China.

In the past 56 years, along with the rapid growth of medical science and technology, transformation of medical mode, and continuous deepening of medicine and health system reform, the Hospital has made significant progress in diagnosis, treatment of infectious diseases, response to emergent public health events, and research, teaching and management, which has revealed the splendid achievements made in the prevention and treatment of infectious diseases since the founding of New china. In recent 30 years, to deal with population ageing, chronical infectious diseases and people's increasing needs of health care, You'an hospital has adjusted its medium- and long-term development orientation and strategic planning. You'an Hospital is a large comprehensive medical center offering service for patients with infectious and chronic diseases, combining functions of prevention, medical treatment, health care and rehabilitation. It has built up an international high-end research platform for clinical and translational medicine of high and new pharmaceutical science and technology. It has carried out integrative strategy, which is the scope of services transform from infectious disease to infection, infection and acute, chronic diseases; object of services transform from individual and diseases to disease group; operation transform from pursuing economic benefit to providing high-quality service for the society and patients; mode of service transform from merely treatment to integrating diagnosis, treatment and prevention; the pattern of development transform from specialty hospital to comprehensive medical center within key disciplines as infectious disease; the capacity of service transform from single partial branch to improving personal comprehensive ability and overall strength of the hospital.

At the same time, You'an hospital has developed clinical and Translational Medicine "One two eight" development strategy. With integration of clinical, teaching, research as the core of strategic guidance, deepen the cooperation with research institution, struck up strategic friendship with pharmaceutical companies to achieve bilateral cooperation and collaboration. It has constructed eight support platform, they are: standardized electronic medical record platform based on research data; clinical research resource platform based on data sample bank; centralized discipline system platform based on systemic diseases; electronic information network platform based on modern information technology; medical equipment platform based on clinical and translational research required; evidence-based medicine top design platform based on clinical research; human resource platform based on clinical and translational research directed and the widespread international and domestic academic communication cooperation platform.

In terms of discipline development, it has constructed six development direction which are: viral hepatitis and liver cancer; HIV/AIDS and emerging infectious diseases; infection, cancer and transplantation immunity; microbial biology and regenerative medicine; integrated Chinese and Western medicines and clinical and translational research.

Based on system disease and combined with medicine, surgery, medical laboratory and clinical research laboratories, it has formed the hepatic disease center, infection center, maternal and children center, minimally invasive intervention center, urology center, ENT center, emergency center, clinical laboratory center , medical image center, clinical pathology center, biomedical information center and chronic disease management center which based on Recovery home, Loving care home and family doctor system.

Within a few years, it has constructed complete academic developing chain in these fields: mechanisms and epidemiology of viral hepatitis infection; virus test and anti-virus diagnosis and treatment research; hepatic disease incretion and immunology research; hepatic biology treatment technology; alimentary canal endoscope for hepatic diseases; artificial liver technology; technology of lying-in women's mother-baby transmission of hepatitis B; diagnosis and treatment and care technology for critically ill patients; liver transplantation technology; integrated diagnosis and treatment technology of liver cancer; combined TCM and Western medicine therapy of plague and hepatic diseases; AIDS clinical and basic research; establishment of national drug clinical trial organizations as well as biomedicine information network and analytic technology. Of which, molecule diagnosis marker screening and early intervention technology for hepatitis B related liver cancer in early stage; diagnosis and treatment program for combined ADV-TK gene therapy of liver cancer by using clinical new strategy; active immunology reconstruction of hepatitis B after operation of liver transplantation and organ function protection technology during operation of liver transplantation have reached international advanced level, serving as the Hospital's key dominant disciplines.

During the 11th and 12th Five-Year Plans, the Hospital performed national significant special tasks in the research field of hepatitis and liver cancer, AIDS and emerging infectious diseases, including more than 350 research tasks of National Major Projects of infectious disease control ,"973 Program", "863 Program", National and Beijing Natural Science Development Fund, Ministry of Education Development Fund, Beijing Science and Technology Program, and Capital Special Development Program in Health, with accumulated research funds of RMB 300 million over, more than 1600 papers have been published (including more than 130 SCI papers, impact factors are more than 400 points),obtained 19

patents and intellectual property; translated 25 books. The hospital has won 4 National Science and Technology Progress second prize; 2 first prizes, 3 second prizes, and 2 third prizes of Chinese medical science award; and two first prize, four second prize and ten third prize of The Beijing municipal science and technology awards.

The hospital treasures talented people and teaching, it has 8 master's degree postgraduate education sites, 4 doctor's degree postgraduate education sites and 2 post-doctor workstations. In recent 5 years, it has recruited 15 returned overseas talents, 5 the sea poly project of Beijing overseas talents, 178 masters and doctors; 300 doctors and nurses have passed GCP training of SFDA, 31 PI have passed senior clinical research training of NIH, 143 nurses have passed clinical evidence based nursing research training, the hospital has gained accreditation of AAHRPP, it means the clinical research of the hospital has moved towards to the international stage. The hospital has considered science and education are the power source of development. It has been built to be a comprehensive medical center with reasonable organizational structure, complete professional disciplines, efficient service operations, exquisite techniques and infectious diseases as key discipline, through strategic restructuring and mechanisms transformation, achieved leapfrog development overall objectives.

The people of You'an Hospital carries forward the culture idea of "respect to morals and virtues, bless and protect safety", adheres to "be practical, dedicating, exquisite, and innovative", and carries forward the spirit of hardship-enduring, enterprising, and dedicating. It follows the service tenet of "let every staff member begin to work in a pleasant mood every day, let every patient receive satisfactory medical service every time in a simple way, treat medical workers as foundation and patients as center, create a hospital satisfying the people". It has established You'an Medical Alliance, with members from 78 hospitals spreading over national 25 provinces, municipalities and autonomous regions. It has also created You An Hepatic Disease and AIDS Fund of China Primary Health Care Fund to develop public welfare career proactively, and build a robust system for prevention, treatment, protection and rehabilitation of infectious and chronic correlated diseases.

Today's You'an Hospital has set up a large integrated medical center combining clinic and research, featuring clinical therapy, public emergency response, research, medical education and health instruction. It has been the State's main force in terms of response to emergent public health events. With advanced medical instruments and equipment, well-established basic research facilities, excellent specialized medical technology, untied and enterprising discipline echelon, and extensive academic exchange and cooperation, You'an Hospital has been a medical institution well known at home and abroad. Consecutively, the

Hospital has been listed as advanced unit in national health system, and model unit in the Capital's cultural and ideological progress. It was awarded the honors of National May 1st Labor Diploma, National March 8th Red Flag Collective, and so on. Party and national leaders including President Hu Jintao, Premier Wen Jiabao, Vice Premier Wu Yi, Vice Premier Wang Qishan, Secretary of Beijing Party Committee Liu Qi, Health Minister Chen Zhu, and Party Committee Secretary Zhang Mao of the Ministry of Health visited the Hospital one after another, inspiring and encouraging the people of You'an Hospital significantly. You'an Hospital makes a hit through arduous efforts. In the building of international hospital and public health rescue and treatment system in the new age, the people of You'an Hospital are working hard to build a research-innovative, resource-saving, and people-harmonious medical center at international level with full reforming and innovating spirit.

Beijing You'an Hospital will surely stay in the front edge of internal competition of medicine science and technology, and will be listed among world famous medical institutions!

9.Affiliated Hospital of Nanjing Medical University

Nanjing Medical University was founded in 1934 as Jiangsu Provincial College of Health Policy and Management. In the year of 1957, it moved from Zhenjiang to Nanjing and changed its name to Nanjing Medical College. In 1962, it became one of the first groups of medical colleges in China to offer six-year medical programs, and in 1981, it was approved to award master and doctoral degrees. In 1993, it was renamed as Nanjing Medical University and is one of the key universities sponsored by Jiangsu Province. In September 2015, NMU has been approved to be one of the first groups of medical universities which are co-sponsored by the Ministry of Education, National Health and Family Planning Commission of the People's Republic of China and Jiangsu Provincial People's government.

The university consists of twenty-two schools and one independent school (Kangda School). It has twenty-four affiliated hospitals and more than fifty teaching hospitals in Jiangsu, Shanghai, Zhejiang, and Shandong Provinces. Presently the university has more than 1600 employees, including 825 skilled teaching staff, 188 professors, 252 associate professors, 422 doctoral supervisors and 1746 master tutors (including people from the affiliated hospitals). Among them, there is one academician of the Chinese Academy of Engineering, one foreign academician of Institute of Medicine at the American National Academy of Sciences, three "Cheung Kong Scholar" Distinguished Visiting Professors, one young scholar of the "Cheung Kong Scholar Incentive Plan", one leading talent of the "Ten Thousand Talents Plan", seven recruited global experts from the National "Thousand Talent" Program,

seven winners of the China National Funds for Distinguished Young Scientists, eight winners of the Outstanding Youth Fund, one winner of the National Award for Distinguished Teachers, seven winners of the funds from New Century Excellent Talent Support Program of the Ministry of Education, three "State-Level Teaching Teams", and one "Innovation Team" from the Ministry of Education. The university is the training base for the High-Level Talent Training Plan of Jiangsu Province, which is also known as the "333 Project". And NMU has been awarded many times by the superiors for the cause of talent-cultivation

The university now has eight first-level discipline doctoral programs (basic medicine, clinical medicine, dental medicine, public health and preventive medicine, pharmacy, special medicine, nursing, humanistic medicine), fifty second-level discipline doctoral programs, eleven first-level discipline master's programs, seventy-three second-level discipline master's programs and seven postdoctoral research stations. Options for discipline programs have crossed the boundaries between medicine, science, engineering, management, law, education and literature. It also has three state-level key disciplines, one key discipline for state-level cultivation, 28 national clinical key specialties, two programs of state key discipline (first-level disciplines of Jiangsu) of cultivation and construction, and three key Jiangsu first-level disciplines. Five disciplines – Clinical Medicine, Molecular Biology and Genetics, Biology & Biochemistry, Neuroscience & Behavior and Pharmacology & Toxicology have ranked among the top 1% disciplines around the world according to ESI. Four disciplines of the university – namely basic medicine, public health and preventive medicine, clinical medicine, and dental medicine – are Strong Disciplines among Jiangsu colleges and universities.

The university has twenty undergraduate programs and three "5+3" integrated programs (undergraduate + postgraduate). Currently it has more than 13,000 students. The university has formed a comprehensive and multi-level educational system that covers undergraduate and graduate programs, as well as post-doctoral training, for full-time students, adults, and international students.

Nanjing Medical University now has one state-level key laboratory, four ministry-level key laboratories, and sixteen provincial-level key laboratories (engineering centers). Since the beginning of the "Twelfth Five-year Plan", the scientific research level of NMU has continually ascended and the university has undertaken many "863" programs as well as the "973" programs. NMU has also made new breakthrough in the field of receiving National Natural Science Foundation. What's more, the number of articles indexed in Science Citation Index (SCI) and the impact factors have increased by leaps and bounds. In 2016, 265 projects of NMU were approved by the National Science Foundation, which has ranked the 1st place

among the independent medical universities and colleges in China. And NMU has been awarded as the "Advanced University for Science and Technology of Jiangsu Province" in succession.

NMU has developed five state-level excellent courses and four state-level excellent resource sharing courses. There are also five state-level featured programs, five provincial-level featured programs, four provincial-level brand programs and two state-level bilingual education model courses. The university has set up two state-level exemplary experiment teaching centers, nine provincial-level exemplary experiment teaching centers, and nineteen laboratories jointly funded by central and local governments. It also has a state-level experiment zone for innovation of talent cultivation modes. In addition, it has edited six textbooks under the guidance of the nation's "Twelfth Five-Year Plan". The enrollment and employment cause of the university have warmly received good judgment and the employment rate is always above 95%. The university has been awarded "Graduate Employment Advanced Collectives of Jiangsu Province" many times.

The university has two campuses, Wutai and Jiangning. Jiangning Campus, located in the university town in Jiangning, Nanjing, has a land area of eighty-seven hectares and is a center of administration, teaching and research. Wutai Campus, located at the south foot of Wutai Hill in Gulou District, Nanjing, has a land area of eight hectares and is a center of clinical teaching and research. With more than 1,080, 000 printed medical resources, more than 1,500,000 e-resources and over 6,000 journals in a variety of languages, the university library boasts a vast collection of resources that makes it a center of medical literature in Jiangsu province. NMU is also responsible for publishing 11 academic journals.

In recent years, the university has extensively carried out exchange activities and has actively developed multi-model relationships and cooperation with other colleges and universities. It has established cooperation and academic exchange with medical colleges and universities in the U.S., Canada, Australia, Sweden, Japan, Taiwan Province, Hong Kong SAR, etc. In 2002 the university resumed the admission of international students and students from Hong Kong, Macao, and Taiwan; and it now has more than 500 such students.

All the faculty members and staff of the university will spare no effort to unite as a whole, making overall plans, launching innovation and reform and try the best to achieve the goal of making NMU grow into a world-renowned high-level research medical university with distinctive features.

10.The First Affiliated Hospital of Xiamen University

The First Affiliated Hospital of Xiamen University founded in 1937 is a Class a Grade 3 General Hospital. It is also a training hospital for Fujian provincial medical University, possessing multidisciplinary of medical treatment, disease prevention, scientific research, teaching, rehabilitation, community service, etc. After more than 70 years of development, has been formed with three branch, two nursing homes, six medical cluster community health service centers, medical treatment, teaching, scientific research, prevention, rehabilitation as one of the largest levels of first-class comprehensive hospital in West-south Fujian Province.

The number of staffs in the hospital is 2673, including 718 doctors and 1197 nurses. The hospital consists of 15 administrative sections, 49 clinical and technical departments. The hospital has developed rapidly in the past few years. Many new medical methods and high techniques were adopted and promoted, such as Children's Medical Rescue Center, Xiamen Cancer Center, Xiamen Neurology Center, Xiamen Urinary Center, PET /CT Center, Endocrine Metabolic Disease Center, Cardiovascular Medicine Center, Endoscopes Center. The Department of Minimally Invasive Gastrointestinal Surgery is one of the key Surgery Oncology departments in Cancer Center; the Department of Medicine Oncology and the Department of Radiation Oncology are also the special superiority departments in Xiamen City.

The hospital is installed with many high-tech equipment’s, such as PET/CT, 3.0T and 1.5T MR imaging systems, DSCT, spiral CT, DSA system, color ultrasound, Olympus endoscope and automated bio-chemistry analyzer, etc. In 2010, the clinical laboratory was approved by China's conformity assessment (CNAS) national committee, as the first international standard for ISO15189 medical laboratory quality and recognition of medical laboratory in Fujian province.

The departments, divisions, programs, centers, institutes and labs all play a crucial our search for eliminating disease. The hospital offers a number of education and training opportunities for undergraduates, graduates, postgraduates, residents, fellows and those seeking continuing medical education. The hospital is equipped with central laboratory, interventional heart, high blood pressure research lab, microsurgical laboratory, neurology laboratory, cancer research laboratory, and so on. More than 20 specialties for national drug clinical trials were approved by the National Drug Clinical Trial Institution. More than 300 scientific research projects were authorized by Ministries of Science and Technology.

The First Affiliated Hospital of Xiamen University insists on the principles of serving the people, carries forward the spirit of solidarity, innovation, high quality, and dedication, and

sets up the comfortable environment and the advanced service system. Based on the high quality of human resources, development of science and technology, the hospital is in great progress with the informational advancement. It also got many honors, such as Fujian Province's the Best Civilized Service Unit, etc. From 2003, the hospital has won the award of the Chinese medical doctor five times approved by the Nation Health Ministry.

11.Peking Union Medical College Hospital

Peking Union Medical College Hospital (PUMCH) is a Class A tertiary comprehensive hospital committed to delivering state-of-the-art clinical care, innovative scientific research and rigorous medical education. It is designated by the National Health Commission as one of the national referral centers offering diagnostic and therapeutic care of complex and rare disorders, national demonstrative bases for higher medical education and standardized residency training, core national for clinical research and technological innovation, as well as one of the earliest Chinese hospitals offering medical care to senior leaders and foreign patients. PUMCH enjoys high reputation for its full range of disciplines, cutting-edge technologies and outstanding specialties. According to "China's Hospital Rankings" released by Hospital Management Institute, Fudan University, PUMCH has topped the ranking for consecutively 9 years.

PUMCH was founded by the Rockefeller Foundation in 1921. From the very beginning, it was intended to be built into the "best Medical Center in Asia". Over the past 98 years, the spirit of "preciseness, ever-improving, diligence, and devotion" has been passed on from generations to generations, during which a culture of compatibility also developed. The hospital has also formed the modern medical education concept of "Three Basics" and "Three Stricts". We have been proud of our "Three Treasures", namely, professors, case files and libraries. PUMCH has fostered many medical pioneers and masters in modern China such as Dr. Zhang Xiaoqian and Dr. Lin Qiaozhi. In addition, generations of administrative personnel have been trained in PUMCH and spread all over China. More than ten renowned comprehensive or specialized hospitals were originated from PUMCH.

Basing on more than 90 years' experience, PUMCH innovatively proposed the notion for running the hospital-treat patients as family and boost their satisfaction, treat colleagues as family to boost their happiness, put forward the grand vision to build an academic, quality and humanistic PUMCH as connotation of "the century PUMCH".

Currently, there are four campuses in PUMCH, with a total construction area of 560,000 square meters. PUMCH has more than 4,000 employees, 3 academicians of the Chinese

Academy of Sciences and Chinese Academy of Engineering, 53 clinical and medical departments, 20 national key disciplines, 29 National Key Clinical Specialties, 32 doctoral training programs, 26 master training programs, and 6 national medical further education centers, 19 national standardized residency training center, and 8 national standardized fellow training centers. PUMCH offers 2,000 beds, operated 58,904 cased and discharged over 100,000 patients in 2018. PUMCH was awarded many honors, such as “National Civilized Units”, “Advanced Institution in National Health System”, “National Pioneer Advanced Grass-root Party Organization”, and “National Advanced Model Unit for Promoting Unity and Progress of Ethnic Groups”. Meanwhile, PUMCH also takes on the responsibilities of medical security for underdeveloped and remote areas, emergencies and major national events.

Consistently guided by the needs of our patients, we aim to provide the best service with our solid faith, professional ethics, unreserved contribution, and rigorous academic attitude. On the journey to our century anniversary, sticking to the orientation-all for our people and all for the patient, we are making strenuous efforts in building a “top in the world, best in China” hospital.

12.West China School of Medicine/West China Hospital of Sichuan University (WCSM/WCH)

West China School of Medicine/West China Hospital of Sichuan University (WCSM/WCH), also as known as Huaxi Hospital or The International Hospital of Sichuan Province, is a prestigious and well-known medical center located in Chengdu city, Sichuan Province.

WCSM/WCH has adopted a unique system in which one leadership team manages both institutions. This "dual organization" has continuously innovated its management model and initiated a series of scientifically-based reforms, which has ensured sustainable development of the hospital. WCH has been ranked among the best several times in the annual competition "Hospital Management Year" conducted by the Ministry of Health, and it won the Asian Hospital Management Award in 2008. Its management and achievements have been widely recognized at home and abroad, and it has hosted hundreds of visits by leaders from large and medium-sized hospitals each year in the recent decade.

WCSM/WCH continues to pursue the philosophy of "Care and Service" with the spirit of "serving humanity, exploring science and pursuing excellence". It strives to uphold the motto of the hospital – "Morals, distinction, knowledge, truth, innovation and excellence" by serving

its homeland and world with selfless dedication. WCSM/WCH forges ahead towards the goal of establishing itself as an internationally acclaimed center of research and clinical excellence.

When the Wenchuan earthquake of 8.0 on the Richter scale hit Sichuan Province in 2008, WCH, as the regional healthcare center closest to the epicenter, acted as a "Diagnosis and Treatment Center for Earthquake-wounded Persons and Patients with Difficult and Complicated Diseases", as a "Technical Supporting Center for Hospitals in the Affected Areas", and as a "Logistics Support Center for Medical Rescue Teams from Other Provinces". WCH ranked at the top among hospitals nationwide for the number of severely wounded persons treated and the rate of patient survival, achieving several miracles in the history of medical rescue efforts. After the earthquake, WCH was referred to as the "backbone" of the medical rescue efforts by the media. Its staff was praised by Premier Wen Jiabao as "not only morally respectable but also highly skilled", and the hospital was awarded the honorary title of "Heroic Organization in Earthquake Relief and Rescue" by the Central Committee of the Communist Party of China, the State Council, and the Central Military Commission. A 7.1-magnitude earthquake hit Yushu in China's Qinghai Province on April 14, 2010. West China Hospital sent a medical team to the disaster area on the same day, then donated medical supplies worth 5.5 million yuan to aid relief work in the area. Meanwhile, the hospital treated more earthquake victims than any other hospitals outside Qinghai Province.

The precursors of the WCH, Cunren and Renji Hospitals, were set up in 1892 by the joint efforts of Christian missions from the United States, Great Britain, and Canada. In 1914, the School of Medicine of West China Union University (WCUU) was established and both Renji and Cunren Hospitals became the teaching hospitals of the university. In 1924, the WCUU opened enrollment to women and became the first co-educational university inland.

In 1937, when the War of Resistance Against Japan broke out, the universities in the affected areas such as Nanjing Central University, Jinling University, Jinling Woman Arts & Science College, Yanching University, and Cheeloo University were moved to Chengdu and managed together with WCUU. At that time, the Huaxi medical campus became a gathering place for medical experts and talents. In July 1938, the Union Hospital was established together by WCUU, Nanjing Central University, and Cheeloo University. In 1946, a new hospital of WCUU, named "University Hospital" or "West China Hospital", was built in Guo Xue Alley, Chengdu City, where it still stands today.

The school and the hospital have changed their names for many times due to different reasons. WCUU was taken over by the Central Government of PRC in 1950 and renamed Sichuan Medical College in 1953 as part of an organizational adjustment, and the hospital was

renamed as the College Hospital of Sichuan Medical College accordingly. Subsequently in 1985, Sichuan Medical College was renamed as West China University of Medical Sciences, and the hospital was renamed as the First University Hospital of West China University of Medical Sciences (WCUMS). Finally, when West China University of Medical Sciences and Sichuan University merged in October 2000, the school was officially named the "West China School of Medicine/West China Hospital of Sichuan University" till now.

13.The General Hospital of the People's Liberation Army (PLAGH)

The General Hospital of the People's Liberation Army (PLAGH) was founded in 1953 and was formerly the Second Clinical Medical College Affiliated to the China Union Hospital. Over more than half of a century, it has developed itself into a large modern general hospital that has numerous professional talents, all clinical disciplines, state-of-the-art equipment and unique predominance. With medical care, education and research well integrated, the PLAGH has provided health and medical care to the leaders of the CPC Central Committee, the Central Military Commission, the PLA General Headquarters, and to the troops stationed in Beijing. It has also provided diagnosis and treatment for the critically-ill who are transferred from different areas of commands of the PLA. Meanwhile it is open to civilian patients.

The PLAGH is at the same time the PLA Medical College that was founded in 1958. It is the same institution that has two names and is the only hospital-run education institution in the PLA.

The PLAGH has 125 clinical, medical and technological departments, 4000 patient beds, and annual volumes of more than 3.8 million outpatient visits, over 110000 admissions and more than 65000 operations.

In this new era, under the leadership of the Party Committee of the PLAGH, aiming at building a first-class modern research-based hospital and following the principle of "being the leading force in the army, a first-class hospital in China and a high-level medical care provider in the world", the medical workers of the hospital have promoted the concept of scientific development and social harmony and written a new chapter about the achievements of the hospital.

Through opening up to the world, the PLAGH has expanded foreign exchange and cooperation, learned about the latest international medical accomplishments and experiences, and brought itself in line with international medical practice in all aspects. The hospital has established relationships with over 100 countries and regions for exchange and cooperation in medical areas. The cooperation with Hainan Province to build Hainan Branch of the PLAGH

has embarked on the establishment of a new branch in another area, and therefore has extended the space and scope of the hospital.

The hospital has always stressed the concept of "patients first and quality first" and tried to perfect the ideas, systems and means of its services, optimize the environment of care, provide individualized, value-added, private and best care to patients so as to improve the quality of medical care at the hospital. It has maintained the principle of "of the army, by the army and for the army", enhanced its power of medical logistics under modern war conditions, and spared no effort to provide medical logistic support to the troops. Particularly, it has made important contributions to disaster relief, for instance, in times of SARS and other major disasters, and to the medical care for the athletes at the Olympic Games. The PLAGH has been honored as one of the nation's "Top 100 Hospitals", one of the "Patient-Trusted Hospitals" and one of the "Model Military Hospitals that Best Serve the Troops"

The PLAGH has reformed its educational system for the purpose of cultivating science-based professionals. Encouraged by the making of "one hundred well-known doctors, one hundred young experts, one hundred leading specialties and one hundred privately-owned cures", the hospital boasts a large number of senior experts with profound knowledge and excellent expertise who are well known home and abroad, middle-aged professionals with rich experience and young talents with sound qualification and pioneering spirits, who have been strong supporting forces and intelligence for the development of the hospital. The hospital now has over 1000 senior professionals, 6 members of the Chinese Academy of Engineering, 139 experts with Rank 3 and above, 42 "Stars of Science &Technology" honored by the Department of the General Logistics of the PLA, 29 clinician scientists, 22 chairs of different branches of the Chinese Medical Association and 59 chairs of different branches of the PLA Committee of Military Medicine.

Mu Shanchu, professor, outstanding healthcare expert, chief physician, honorary chairman of the Chinese Society of Gerontology and former Vice President of the PLA General Hospital. Prof. Mu Shanchu has been engaged for a long time in studies of cardiology and gerontology and dedicated to healthcare for high-profile leaders of the Party, the State and the Army. He established the first Department of Gerontology of the PLA and began long ago to study common and rare diseases among the elderly.

Huang Zhiqiang, member of the Chinese Academy of Engineering, chief surgeon, professor, director of Institute of General Surgery and Field Surgery, General Hospital of PLA, is one of the founders of hepatobiliary surgery in China.

Sheng Zhiyong, member of the Chinese Academy of Engineering, chief surgeon, professor, honorary director of Burns Institute and Chairman of Specialist Group of 304 Hospital, is one of the pioneers in China in the development of traumatic and burn surgery.

Lu Shibi, member of the Chinese Academy of Engineering, chief surgeon, professor, director of the PLA Orthopedic Institute, has been devoted to the basic and clinical researches in the field of orthopedics and made great achievements in the field of bone, cartilage and nerve tissue engineering.

Wang Shiwen, member of the Chinese Academy of Engineering, chief physician, professor, director of Institute of Geriatric Cardiology of PLA General Hospital, is a well-known specialist and pioneer in geriatric cardiology and geriatric emergency care in China.

Chen Xiangmei, member of the Chinese Academy of Engineering, chief physician, professor, director of the PLA Institute of Nephrology & Key Lab, president of the PLA General Hospital Nephrology Hospital, director of the Chinese Medical Association. She is a famous clinical nephrologist in China, who has worked twice as both the principal investigator of the 973 Programs Aging Project and academic leader of the National Natural Science Foundation Innovative Research Group.

Fu Xiaobing, member of the Chinese Academy of Engineering, researcher and professor, director of the Institute of Basic Sciences of the PLA General Hospital, director of the Wound Healing and Cell Biology Laboratory, the Key Research Laboratory of the Wound Repair and deputy director of the Burn Institute of 304 Hospital, Trauma Center of the Postgraduate Medical School, is a well-known expert in the field of wound healing and tissue repair and regeneration.

Distinguished Club for Supreme Health and Wellness—International Medical Center of the PLAGH.

With the mission of providing VIP health care services for its distinguished clients in a brand-new membership model, the International Medical Center (the IMC) was set up based upon the PLAGH's rich medical and health care experiences and first-class practitioners and facilities. Located in a separate 7-storey building, the IMC occupies over 20,000 square meters with 88 beds and various specialties for outpatient services.

Holistic and Scientific Health Management Services

Individualized health exam and healthcare programs are provided by high-quality specialists. Health Assessment, Diagnosis and Treatment, Rehabilitation and Health Assessment

Comprehensive health assessments and individualized advice for correcting unhealthy lifestyles and behaviors help to reduce risks of diseases and comfort clients.

Health Exam for Disease Prevention

Evidence-based health screening, sub-health assessment and early-diagnosis programs for the benefit of members well meet expectations of clients for disease prevention.

Advanced Holistic Assessment System

Systems for assessing metabolic status, functional, emotional and spiritual states through advanced test equipment by skilled specialists assure trustworthy health evaluation for clients.

Diagnosis and Treatment

Experts of the PLAGH have provided efficient and high-quality health services.

Private Patient Care

Express Plans for Targeted Disease Treatment

Clients will experience a truly one-stop preventive health care with its private out-patient service, health exam and member's room.

If needed, the IMC will arrange priority specialist consultation and treatment for its members at the PLAGH.

Medical Service Guide

An all-round medical service guide by its professional team is available to all clients at any time.

Round-the-Clock Medical Service

Online counseling, appointment service, expert consultation for complicated diseases and consultant designation if needed will be available 24 hours.

14.Shanghai Jiaotong University Medical School Ruijin Hospital

Established in 1907，Ruijing Hospital was originally called Guangci Hospital. It is a general teaching hospital under the Shanghai Jiao Tong University School of Medicine with a land area of 0.12 million square meters, a construction area of over 0.15 million square meters and a landscaped area covering nearly 30% of the total area. At present there are 1774 beds and a staff of over 3300 persons, among whom 507 hold senior titles. The hospital is staffed with a large number of medical experts who are well reputed, including Chen Zhu, member of Chinese Academy of Sciences and currently the Minister of Health of the state, Wang Zhengyi and Chen Saijuan, both members of Chinese Academy of Engineering, and others. The hospital has 34 clinical departments, 7 departments of medical technology; 9 institutes (endocrinology, hematology, traumatology and orthopedics, burns, hypertension, digestive

surgery, neurology, cardiovascular diseases, infectious diseases and respiratory disease); 11 laboratories, among which one is a State key laboratory (Key Laboratory of Medical Genome), 2 key laboratories of the Ministry of Public Health (Key Laboratory of Endocrine and Metabolic Diseases of Ministry of Public Health and Key Laboratory of Human Genome of Ministry of Public Health); 3 clinical medical centers (Shanghai Micro-Traumatic Surgery Clinical Medical Center, Shanghai Endocrine and Metabolic Diseases Clinical Medical Center and Shanghai Hematology Clinical Medical Center); 8 state bases for clinical research of drugs; 3 key disciplines of State Ministry of Education, 6 key disciplines of Shanghai Education Commission and 3 leading disciplines of medicine of Shanghai Municipality.

Since successfully rescuing Qiu Caikang, a steel worker who was almost fatally burned in the 1950s, Ruijin Hospital has always kept its status as the world leader in the field of extensive burns treatment. In the 1970s, it took the lead at home in carrying out heart and liver transplantations and in the 1990s made tremendous progress in the research of leukemia molecular biology and its clinical practice. In the new century, mature techniques in organ transplantations with almost perfect results have made many patients regard this hospital as a revitalizing oasis of life. As a result, the hospital has won the honorable titles of the Advanced Collective of the National Health System (for 6 times), 100 Good Hospitals Nationwide, the National Advanced Collective in the Pursuit of Socialist Civility, National Model of Advanced Ideological and Political Work of the Health System; Civilized Unit of Shanghai Municipality (for 9 times) and many others.

Ruijin Hospital regards its achievements and honor as a motivating force. In order to further meet the market requirements, the hospital has been actively developing high-grade, refined and advanced therapeutic technologies such as micro traumatic operations, arthroscopic operations, cardiovascular intervening therapy, ophthalmologic quasi-molecular laser operations and so on. It has implemented multidisciplinary or cross-disciplinary consultation systems by making full use of the comprehensive therapeutic advantages of the Hospital so as to increasingly raise its therapeutic level and quality of service. In the meantime, the hospital has aimed for the target of becoming a research-orientated hospital, providing better medical care for the public on the basis of extensive clinical practice and intensified scientific research. The 9 research institutes at the municipal level and the State Key Laboratories and Disciplines are working vigorously in the fields of urology, digestive diseases, endocrinology, hypertension, trauma management through traditional Chinese medicine, acute necrotic pancreatitis and reproductive health and so on. At the same time, the hospital continues to encourage and cultivate a humanistic approach, pushing the “Heart-

warming Program" which emphasizes "easing the patients' worry with meticulous care, satisfying the patients' needs with first-class service and raising the patients' spirits with graceful environment", with a view to winning the trust of the patients and the society at large.

Ruijin Hospital is the largest clinical teaching base of the Shanghai Jiao Tong University School of Medicine. Ruijin College of Clinical Medicine offers clinical training for students in the programs of clinical medicine, medical laboratory science, and senior nursing, and runs a Senior Nursing Training Center. Each year it undertakes the teaching work for over 1000 medical students at undergraduate and graduate levels and has become the cradle for training talents for medical circles.

In recent years Ruijin Hospital has won over 300 scientific research projects of all kinds, including major projects of State Natural Science Foundation, key projects from State Science and Technology Commission, including 863 Project and 973 Project, State "8th 5-Year Plan" Project for Tackling Key Problems and "9th 5-Year Plan" Project for Tackling Key Problems, scientific research projects of the Ministry of Public Health, State Education Commission Projects for Overseas Students, scientific research projects at the municipal level and other major projects. The hospital now has 29 stations for master students, 21 stations for Ph.D. students, 12 mobile stations for post-doctoral training, supervised by 150 master tutors and 59 Ph.D. tutors. The scientific and technical talents of the hospital receive extensive financial support from diverse sources, including Fund for State Outstanding Talents, Training Fund of State Education Commission for Cross-century Talents, Shanghai Venus Plan, Shanghai Postvenus Plan, Shanghai Dawn Plan and Plan for 100 Cross-century Excellent Leaders of Disciplines of the Health System of Shanghai. The Hospital has also won a series of prestigious international prizes such as Evens Prize of the U.S. Burns Association, Vikt International Burns Prize of Italy, Cathrine Prize of Cancer of the U.S., Brubah Prize of Cancer of Switzerland, Prix de l'Oise from La League National Contre Cancer (France) and Prix de Simone & Cino del Duca (France), He Liang He Li Fund Technology Prize of Hong Kong and others. In order to quicken the pace to introduce advanced technology and equipment, Ruijin Hospital has actively carried out international exchanges and cooperation, and has formed extensive ties with institutions from such countries as France, the U.S., Britain, Canada, Belgium, Japan, Australia and such regions and organizations as Hong Kong, Taiwan and the World Health Organization, which have led to many cooperative programs in scientific research.

On August 4, 1999, in order to implement our country's new policy of reform in health care and hospital management under the new conditions market and realize the aim of

"providing better services with relatively low costs", Ruijin Hospital took the lead in reorganizing itself and established the Shanghai Ruijin Hospital Group. Using resources and assets from different areas, industries, and institutions at various levels, the hospital has successfully formed a regional medical health center with itself at the core. For four years, Ruijin Hospital and the Group members Luwan Branch, Minhang Hospital and Taizhou Central Hospital have all achieved good social effects and significant economic returns.

On October 25th, 2002, Ruijin Hospital again took a solid step in its effort to explore new ways of promoting scientific research work. By creatively establishing at home the "Institute of Biologic Medicine", the hospital initiated a new pattern of large-scale scientific research, with innovative systems in program selection, personnel recruitment, and evaluation of research results. This research institute relies on the research capacity of Ruijin Hospital as the main force, and takes advantage of the combined strengths of such renowned institutions as Shanghai Life Science Institute of Chinese Academy of Sciences, Health Science Center of Former Shanghai Second Medical University and State South Center of Human Genome. It is the first research and development institution which has a hospital as the mainstay and integrates life science with clinical medicine. It follows the principle of "having only the most suitable professionals working in a program instead of having the fixed personnel", thus ensuring the normal flow of professionals, the positioning of the proper persons at the proper places and the chance for everyone to have a stage on which to show their talent.

15.Zhongshan Hospital Affiliated to Fudan University

Zhongshan Hospital is a major teaching hospital affiliated to the Ministry of Health of China. It was founded in 1937 in commemoration of Dr. Sun Yat-sen, the great pioneer in the Chinese democratic revolution. Affiliated to the State Medical College of Shanghai, it was then the first large hospital run by the Chinese.

Through 76 years of development, Zhongshan Hospital now covers an area of 95,892m^2 and has 356,206m^2 of buildings. The hospital has 1,700 beds serving 84,000 inpatients and 3,111,000 outpatients and emergency in 2013. Among its 3,433 medical staffs are 437 professors and associate professors, 1,219 physicians, 1,340 nurses, 401 technicians, 1 member of the Chinese Academy of Sciences and 2 members of the Chinese Academy of Engineering.

The hospital has all medical divisions, except pediatrics, excelling in the diagnosis and treatment of cardiovascular diseases, liver cancer, renal and pulmonary diseases, etc.18 disciplines have been designated as the National Clinical Key Disciplines (gastroenterology,

clinical lab, anesthesiology, cardiology, endocrinology, thoracic surgery, cardiac surgery, nursing, traditional Chinese medicine, pulmonary medicine, nephrology, general surgery, ICU, oncology, medical imaging, organ transplantation, emergency and neurology) and 2 as the Shanghai clinical centers (cardiovascular diseases and liver cancer).Having their head offices set up in the hospital, the Shanghai Institute of Cardiovascular Diseases, the Liver Cancer Institute of Fudan University, the Shanghai Institute of Radiology, the Shanghai Institute of Rehabilitation with Integrated western and Chinese Traditional Medicine, the Shanghai Institute of Hepatopathy, the Institute of Respiratory Diseases of Fudan University, the Institute of Vascular Surgery of Fudan University, the Institute of General Surgery of Fudan University, the Institute of Endoscopic research of Fudan University and the Nuclear Medicine Institute of Fudan University have become the major research centers of the hospital. The Organ Transplantation Center, Fudan University, is another feature of the hospital. Renal, liver and heart transplantations have already become routine practice. The Shanghai quality control centers for in-hospital infection, ultrasound, respiratory diseases, cardiovascular diseases, cardiology and general surgery are also attached to the hospital. The hospital is also renowned for its strength in abdominal surgery, orthopedics, interventional radiology, ultrasound diagnosing and integrated treatment of western and traditional medicine.

Zhongshan Hospital is undertaking annually some 100 major research projects supported by the Nation, the Ministry of Education, the Ministry of Health and the Municipal Government. Nearly 100 items have been awarded for distinguished achievements in research by the central or local government in recent years. As a cradle for the medical talents, the hospital has 15 stations for Ph.D. students, 21 stations for master students, 1 post-doctoral mobile stations, 15 residency training bases and 19 specialists training bases authorized by the national or local government. Over 50 series of national continuous education courses are held inside the hospital each year.

Zhongshan Hospital is well installed with advanced equipment including PET-CT, digital subtraction angiographer, linear accelerator, multiline spiral CT, 3.0T magnetic resonance scanner, single photon emission computed topographer, digital radiographer, high energy ultrasound treatment apparatus, shock wave lithotripsy apparatus, duplex scanner, electro-gastroscope, intensive care system, teleconsultation system and tele education system. The hospital has achieved network administration.

Zhongshan Hospital is striving to become a symbolized hospital in Shanghai. Under the leadership of the Party, the hospital always places the patients' need as the top priority and

sets “Prudent, Practicality, Unity and Offering” as the discipline, dedicated to providing the highest standards of clinical care for all kinds of patients.

16.Tongji Hospital

Proximate to the Yellow Crane Tower on the bank of the Yangtze River lies a hospital renowned far and near – Tongji Hospital, Tongji Medical College, Huazhong University of Science & Technology.

In 1900, Tongji Hospital was founded by Mr. Erich Paulun, a German doctor, in Shanghai. After 110 years of construction and development, it has grown into an innovative modern hospital integrating medical care, teaching and research. With a complete array of disciplines, a distinguished gathering of experts and an ample force of teachers, and with exquisite medical techniques, state-of-the-art diagnostic and therapeutic equipment, outstanding research capabilities and sophisticated scientific management, it has leaped to the front row of China’s hospitals.

The 110-year Tongji, a medical talent galaxy. A great number of experts and scholars are reputed at home and abroad, including 2 national academicians, 255 tutors of doctorate candidates, 94 holders of special government allowances from China’s State Council, 2 chief scientists of the national “973” research projects, 4 Yangtze-scholars of China’s Ministry of Education, 8 holders of the national funds for outstanding youth, 12 middle-aged and young experts with prominent contributions selected by China’s Ministry of Public Health, and 11 excellent new-century talents selected by China’s Ministry of Education. 29 academicians are specially appointed professors of the hospital.

The hospital comprises 62 clinical and paramedical departments, among which 8 are national key disciplines and 30 national key specialties. Department of Gynaecology and Obstetrics is awarded as National Clinical Medicine Research Center of Gynaecology and Obstetrics Disease. Department of Rehabilitation is designated a training and research center of WHO. The medical orientation of the hospital is: building 1 center – Central China’s center of medical and health care; establishing 3 bases – base for treating critical cases, base for surgical treatment, and base for the care of high-level intellectuals and officials; and playing a 4-fold role – as a center, as a model, as a guide, and as a radiant of medical service.

The main indices of the hospital’s medical workload have been breaking Hubei’s medical records. The number of outpatient and emergency cases takes the lead in Hubei Province for more than 10 successive years.

Arduous labor in spring, rich fruit in autumn. The hospital's rigorous approach to scholarly pursuit has nurtured 12 members of China's Academies of Sciences and Engineering, 3 Ministers or Vice-ministers of Public Health, and innumerable pillars of the medical circles. Senior academician Qiu Fazu, a medical sage of our time, is their illustrious representative, and Qiu' s style is extolled as an imperishable monument.

The hospital's attainments in scientific research are acclaimed "the Tongji Phenomenon" in the medical world. According to the statistics released by Institute of Scientific and Technical Information of China, the total sum of SCI paper citation of Tongji from 2008 to 2017 reached the 2nd among all the medical organizations in China. We have obtained over 100 funds from National Natural Science Foundation of China for the consecutive seven years.

Sky-high aspiration, yet down-to-earth perspiration. In 2000, the hospital was the 1st in China to set the goal of building an internationally top-class hospital. Its innovation in the economic administration system featuring whole cost accounting and performance management was commended by Central Government leaders and Ministry of Public Health, and soon extended to hospitals throughout China. Its innovation in the administration system featuring the overall responsibility of the department director was covered on the front page of the "Health News". Its cultural construction featuring the core values has developed a distinctively glamorous culture.

East, west, mutual mergence is best. International collaboration is the hospital's distinct feature in this era of globalization. It has established close cooperative relationships with the medical circles of more than 10 countries such as Germany, USA, Japan, France and Russia. Long-term cooperation agreements have been signed with 6 medical institutions of Germany, USA, Russia and other countries.

In 2012, Tongji became the first Asian country to obtain KTQ qualification of Germany. It has won numerous honors, being listed among holders of National Labor Day Certificates of Merit, China's Best Units of Spiritual Civilization, China's Top 10 Units of Professional Ethics Construction, Advanced Institutions of China's Public Health System, etc.

17.The Second Affiliated Hospital Zhejiang University School of Medicine

The Second Affiliated Hospital of Zhejiang University School of Medicine (SAHZU) is a non-for-profit tertiary care public hospital founded in 1869 by the British Church Missionary Society with a mission of "Spreading Benevolence and Saving People".

It now has the Jiefang Road Campus and the Riverside Campus with a total bed capacity of 3200 beds. SAHZU also has 10 affiliated hospitals and has collaborated with over 100

health care institutions and 31 community clinics across the country. Annually, SAHZU serves approximately 4 million outpatient and emergency visits and performs about 130,000 surgeries.

SAHZU has been rated as one of the top 100 hospitals in China. In 2013, the Jiefang Campus of SAHZU was accredited by Joint Commission International (JCI) as an Academic Medical Center Hospital and passed the recertification in 2016. Meanwhile, it homes College of American Pathologists accredited clinical laboratory since 2013. Nationally, SAHZU ranks top 20 in 13 out of the 27 medical specialties recognized by Ministry of Health of China, including general surgery, neurosurgery, ophthalmology, cardiology, burn, dermatology, emergency medicine, neurology, orthopedics, allergy, oncology, pulmonary medicine and nursing. Many specialties are standing at the top in Zhejiang Province.

For hundreds of years, the Second Hospital Zhejiang University School of Medicine (SAHZU) cares for people's health by relieving patients from pain, by providing comfort, and by bringing patients hope all the time. This is the reason why SAHZU probes into the science of medicine, perfecting its nursing care and enhancing the hospital's management capabilities from generation to generation. After all, patient care is at the core of SAHZU's mission, vision and values.

Over 3.9 million patients come to SAHZU annually for help when they are sick and vulnerable. They believe in SAHZU's compassionate care, cutting-edge technologies, and state-of-the art equipment. To reciprocate its patients' trust, SAHZU treats its patients as its own family and beloved ones. SAHZU aims to be a destination hospital where every patient feels right at home.

Although the path to attain SAHZU's aspiration may be met with barriers and impediments, SAHZU pledges not to relinquish and desist as it trusts hope and new life start at SAHZU.

Ever since The Second Affiliated Hospital Zhejiang University School of Medicine (SAHZU) opened in 1869, which was an Opium Rehabilitation Center managed by a missionary doctor from British Church Missionary Society named Meadows. Several years later, the Opium Rehabilitation Center transformed to a comprehensive hospital named Universal Benevolence Hospital, which was called "Guangji" in Chinese. From 1881 to 1926, Dr. David Duncan Main, a British physician, presided the management and development of the hospital. He dedicated his life to serving people in distress and led the hospital to be the best hospital in Far East at that time. Through all the years, Dr. Main's spirit of challenge has been faithfully practiced as the hospital continues to open new chapters.

In 1885, Universal Benevolence Medical School, affiliated to the hospital, was established as one of the earliest medical educational institutions in China. Since founded, it had cultivated a great number of medical and nursing students. These excellent medical graduates took part into Universal Benevolence Hospital's development and provided their services across the country.

With the blossom of the Second Industrial Revolution, Universal Benevolence Hospital equipped generators, water tower, X-ray machine and other equipment as well in 1910s. At the same time, Songmuchang Branch of Universal Benevolence Hospital was established for phthisis patients.

During the Anti-Japanese War, Universal Benevolence Hospital treated thousands of the wounded and was once occupied by Japan and renamed as Tongren Hospital. After the victory of Anti-Japanese War, the hospital was taken over by C.M.S until the early days of New China. In 1952, the People's Government of Zhejiang Province took over the hospital officially and renamed it as the Second Affiliated Hospital, Zhejiang Medical College; In 1960, the hospital was renamed as the Second Affiliated Hospital Affiliated to Zhejiang Medical University.

At the time of 1980s, the hospital set up the first Emergency Intensive Care Unit and was awarded one of the first Provincial Civilization Hospitals and one of the first hospitals in China which was accredited as a Class A hospital in the tertiary health care system.

In 1998, The Hospital was ranked in the top 100 hospitals in China. In the same year, the hospital was merged into Zhejiang University and renamed as the Second Affiliated Hospital Zhejiang University School of Medicine.

In 2010, UCLA-SAHZU Joint Academic Center for Diagnosis established, which has become China's biggest telemedicine center.

In 2013, SAHZU Riverside Campus put into operation with a capacity of 1200 beds. In addition, the Hospital succeeded in Joint Commission International Academic Medical Center Hospital Accreditation (Jiefang Campus), College of American Pathologist Accreditation and WHO SIDCER-FERCAP Accreditation.

In 2016, the Jiefang Campus re-certified by JCI.

18.The Second Xiangya Hospital

The Second Xiangya Hospital, founded in 1958, is an affiliated hospital to Central South University, which has the most complete disciplines in China and is the largest Class A hospital in Hunan province. It has long enjoyed great fame in south China. According to

Fudan University's Ranking of Hospitals in China, the Hospital ranks 13 comprehensive strength and 15 in specialist areas. The Hospital has now 3,500 beds, 40 clinical departments medical laboratories, 127 ward areas; 4,985 employees, including 722 experts with senior technical titles, scholars of the "Thousand Talents Program" and Changjiang Scholars Program, 2 National Outstanding YouTalents,7 middle-aged and young experts who have made outstanding contributions to the National Health Commission, 62 experts who receive special allowance from the State Council, and 42 Famous Xiangya Doctors.

Its employees have undertaken 39 positions in international academic institutions, and 30 positions in integration academic magazines, and 9 chairman or vice chairman positions in secondary committees of the Chinese Medi

Association and the Chinese Medical Doctor Association. The Hospital has 23 key national clinical departments, in which psychiatry, endocrinology and metabolisms cardiovascular surgery, dermatology, geriatrics, clinical pharmacy and transplantation of organ rank top places the country. The Hospital is a support unit for the national emergency medical rescue team, and has participated almost all major emergency medical rescue operations in the country in recent years.

The Hospital has over 2,200 undergraduates, postgraduates and doctoral students; 6 first level doctoral program of clinical medicine, 31 secondary doctoral programs, and 110 doctoral supervisors. It has national pilot centers experimental teaching, national specialty majors, national teaching teams and national prominent teachers, national outstanding courses and shared courses. The Hospital has won 6 special awards in National Competitor of Clinical Skills for College Students. It also has 2 national clinical medicine research centers, 1 state province jo laboratory, 6 national key disciplines, 17 key provincial and ministerial level laboratories and research centers has won 10 State Science and Technology Awards, and in the recent five years, it has undertaken 420 national projects, including 12 key research projects, 6 of the "973" and "863" projects, 18 national support plans, special programs of national science and technology and key international cooperation programs. Technological influent in endocrinology and meta blogs, psychiatry, rheumatology, autoimmune diseases, nephrology, dermo logy ran top ten in the country.

Psychophysiology and Neuropathology

This discipline group has initiated and founded the classifying system and diagnostic criteria for neuropsychiatric disorders, and has established comprehensive therapeutic intervention mode with Chinese characteristics. It has carried out large sample research for major neuropsychiatric disorders. It has formed new theories and technologies in early

warning, early intervention, precise and individualized diagnosis and treatment. It has developed new medicine and wearable devices that can provide protection and treatment for such diseases. 12 professors have undertaken chairman or vice-chairman positions of secondary academic groups of the Chinese Medical Association or the Chinese Medical Doctor Association. It has also compiled, as chief editor, 4th to 8th editions of Psychiatry, a Thirteenth-Five-Year Period textbook of the National Health Commission. The textbook has become one of the most influential books in the field.

Metabolic Endocrinology

This discipline group is one of the two national clinical medical research centers for metabolic diseases. It has initiated and founded the immune phenotyping method system for diabetes, and has developed a diagnosis and treatment guidance for 1-type diabetes, a diagnosis and treatment guidance for surgical operation of 2-type diabetes and obesity. It has carried out research on cogenesis, clinical prevention, diagnosis and treatment of diabetes, metabolism syndromes, hereditary endocrine and metabolic diseases. It has developed technology in early warning, precise diagnosis and individualized treatment. It has established a key diabetes immunology laboratory of the Ministry of Education and a key metabolic osteopathy laboratory in the province. It has a work station for academicians and experts in Hunan province. It has 2 “Thousand Talents Program” scholars and 1 Changjiang scholar.

Heart and Vascular Diseases

This discipline group has led clinical research on intensive lipid-lowering of Chinese ACS, and completed survey on the current status of coronary heart disease blood lipids with the largest sample in China. It has established the first clinical gene diagnosis and treatment center for heart and vascular diseases. It has first proposed and applied the “double chimney” technology to treat aortic dissection. It keeps the best record for survival period and quality after combined heart and lung transplantation. It has proposed the new concepts of minimally invasive aesthetics and perforator flap with special form, which enables China to lead the area. It has carried out top surgeries in China in MIDCAB, TAVR, hybrid operation for aortic aneurysm, interventional occlusion of periprosthetic leakage, David operations, etc. It has carried out systematic research on Chinese cardiogram and vector cardiogram, and has determined standards for different age groups. It strives to promote the completion, precision and intelligentization of diagnosis and treatment technology for difficult and severe diseases, including congestive heart failure, coronary diseases, valvular heart disease and complex congenital heart diseases, and build high-level platforms for clinical diagnosis and treatment of such diseases, efficient scientific innovation and productive personnel training. It has

compiled Internal Medicine, an outstanding textbook of the Ministry of Education. It is also a vice-chairman unit of the International Union of Angiology.

Skin, Kidney and Immunologically Mediated Diseases

This discipline group is a chairman unit of the Chinese Society Dramatology of the Chinese Medical Association. It focuses on research of epigenetics and molecular pathogenesis and precise medical treatment. It has systematically explained the epigenetic pathogenesis of systemic lupus erythematosus. Research achievement on Innovation and Application of Key Technology of SLE Diagnosis and Treatment has won the second award of 2017 National Prize for Progress in Science and Technology. The artificial intelligence aided diagnosis and treatment integrated platform for skin diseases is the first in the country that has been clinically applied. Clinical repair of difficult skin wound has reached international level. The discipline group has 1 “Thousand Talents Program” scholar.

Clinical Oncology

This discipline group has taken the advantage of the hospital’s disciplines to promote MDT, and has established clinical discipline groups in thoracic tumors, gastrointestinal tumors, head and neck tumors, urogenital tumors, hematologic tumors, and hepatobiliary pancreatic tumors. It provides comprehensive treatments of surgical operations, radio chemotherapy, interventional therapy, local ablation, particle implantation and immunotherapy. It has several dozens of high-end diagnostic equipment, including Force CT, 3.0T MRI, Siemens Biography PET-CT, SPECT, and low dose CT. It has a key Hunan laboratory for research of tumor model and individualized diagnosis and treatment, and has carried out CT and B-ultrasound aided biopsy of tumor tissue, NGS two generation sequencing and tumor maker detection, to promote individualized treatment mode for malignancy. The hospital has advanced treatment equipment, including high-energy line, treatment planning system, CT-SIM, after loading treatment system, high power microwave whole-body hyperthermia machine, argon-helium knife treatment system, hyperthermia perfusion chemotherapy machine, radiofrequency ablation, Leonardo's Robot, and IBM Watson for Oncology, etc. The tumor center is a pilot center for standardized lung cancer diagnosis and treatment in Hunan, and an outstanding pilot center for malignancy MDT. The discipline group has participated in nearly 30 drug clinical trials in and outside China.

Aging and Geriatrics

This discipline group focuses on the metabolic endocrine system and its early influence on the aging and dedifferentiation of major tissues and organs of the human body (such as blood vessels, bones and joints, skeletal muscles, brain, kidney and hematological system);

determines the relevant molecules for aging and dedifferentiation of organs, and the characteristics of such changes of cells and functions; explains its function and regulation mechanism in old age diseases; strengthens understanding about emergence and development of aging diseases, carries out research on early stage markers and new detection technologies, and develops copings strategies.

Minimally Invasive Technique

Minimally invasive surgeries, based on cavity mirrors, endoscopes, robots and VATS, have taken the place of traditional open surgeries. Minimally invasive techniques have been widely applied in treating tumors, inflammation and metabolic diseases. Most tumors can be precisely classified through endoscopes or interventional puncture, and then be treated appropriately. Simultaneous laparoscopic weight reduction surgery and coronary artery bypass grafting of the gastro omental artery are used to treat coronary artery stenosis and obesity; ERCP is widely adopted to accelerate ERAS. 95 percent of urinary surgeries are minimally invasive surgeries. The discipline group has an endoscopic endoscopy training and simulation center with complete facilities and standard teaching resources. It has promoted related research on path mechanism of diseases including hepatobiliary diseases, clinical diagnosis and treatment and individualized treatment of gastrointestinal cancer, metabolic surgical mechanism, and ERCP quick recovery, development of surgical operation equipment, early warning of gastrointestinal cancer, and new theories and technologies about individualized treatment.

Emergency Rescue

Since its founding 60 years ago, the emergency rescue experts of the Second Xiangya Hospital have always responded to the call of the Party and the people (for example, during the Wenchuan and Ya'an earthquakes, Jianli ship sink, Tianjin port explosion, and military reviews and rehearsals). As the civil-military inosculation hospital of Hunan Provincial Medical Treatment and Rescue Mobilization Center, the training and rehearsal base has been completed, the mobile rescue platform has been improved, and the humanistic and social functions of medicine have been integrated. The rescue team has built its own rescue systems with its unique characteristics. The features include: military-local integration, man-machine integration, training and practice integration, and integration of theories and practice of psychological rescue of the psychiatry, a key national discipline. The discipline group has accomplished a series of major rescue missions, established simulating courses, and carried out wide cooperation with medical rescue organizations, including Israel, Maryland and Pittsburg.

Transplantation of Organs

The discipline group takes a leading position in transplantation of major organs and is one of the largest transplantation centers in the world. It is the only one authorized institution for transplantation of 6 solid organs: heart, lung, liver, kidney, pancreas and the small intestine. The hospital's organ donation after a citizen's death (DD) has set up a model for the country. It is Hunan's only training base for liver and kidney transplantation doctors. It is also a leader of Hunan's organ transplantation clinical research center. Each year, it collects over 8,000 biological samples for organ transplantation. It has developed research fields in organ function protection, prevention and treatment of rejection, infection prevention and control, individualized treatment, immune tolerance, and big data base construction. Currently, the hospital has carried out the largest number of kidney transplantations and DD kidney transplantations, and ranks the fourth in liver transplantation in the country. Its new clinical technologies and operation modes have solved problems that have caused trouble for over a century. It has, for the first time in the world, solved the transplantation of kidney provided by newly born baby with an innovative surgical operation mode. It has invented the "Low temperature circulating cooling device in minimally invasive kidney transplantation". It has carried out the first LRRT through artificial blood vessel bypass for hereditary protein S deficiency and extensive deep vein atresia patient. It has carried out the first transplantation of double kidneys provided by a newly-born baby through building an outflow tract at the far end of the main artery. It has carried out the first DD adult-provided double kidneys transplantation; the second multiple organ transplantation in the world; and keeps an Asian record for the survival periods of combined heart and lung transplantation and combined liver and pancreas transplantation.

19.Shanghai Jiaotong University School of Medicine

SJTUSM was formally approved under the "211 Project" as a state key university for full development in November, 1997. In July, 2005, Shanghai Jiaotong University and Shanghai Second Medical University merged to form the new Shanghai Jiaotong University, jointly supported by Shanghai Municipal Government and the Ministry of Education. In November, 2010, SJTUSM became one of the first ten universities jointly supported by the Ministry of Health and the Ministry of Education. The rich historic background of over one hundred years and heroic journey of more than 50 years have eventually brought about a research-oriented medical school with all-round development in medical education, clinical services, and scientific research, as well as other social services, a medical school with outstanding features

and distinct advantages, a strong faculty, and remarkable academic achievements. In the new round of evaluating disciplines in degree and graduate programs organized by the Ministry of Education in 2009, clinical medicine of SJTUSM ranked first nationally, and the comprehensive strength of various disciplines belonged to the first echelon of the nation's medical schools.

Education is a matter of fundamental importance for generations to come, and good teachers constitute the base of first-class education. SJTUSM has always attached great importance to the building of an excellent and well-qualified faculty, and attracted talents of various kinds and created conditions for them to stay on by such flexible arrangements as allowing experts and scholars to hold positions both in SJTUSM another institutions, work in SJTUSM for a specified period of time of a year, lead or conduct SJTUSM research projects through "remote-control", pursue targets of their own choice while maintaining a close tie with SJTUSM, etc. In recent years, SJTUSM has continuously pushed forward the strategy of enhancing the strength of the school through the building of a strong faculty, focused on the national strategy of attracting genuine talents and improving academic environment, intensified the introduction of outstanding domestic and overseas talents, and made further efforts to gather outstanding talents at different levels. At present, SJTUSM boasts faculty composed of academicians, experts listed in "the Training Program of Thousand Prospective Leaders" established by the Central Organization Department, chief scientists heading national-level “973 Projects”, forum professors under “Changjiang Scholar Program" sponsored by the Ministry of Education, and winners of grants from the National Outstanding Youth Foundation.

In the more than 50 years since its founding, SJTUSM has greatly expanded its scale, from the 2undergraduate programs and 3 3-year vocational programs in its early days to the current 8-year program of clinical medicine (courses taught in French), 8-year program of clinical medicine, and 7-year program of oral medicine, as well as 7 undergraduate programs. At the same time, by following the basic principle of putting students at the core of all our work, and constantly revising the teaching concepts and creating new teaching models, the quality of teaching has also improved greatly, producing fruitful achievements. Over the years, in the practice of medical education, SJTUSM has formed its tradition and style characterized by emphasizing the close combination of basic knowledge and clinical practice so as to achieve the goal of cultivating students with all-round development and creative ability. SJTUSM has under its administration 7 affiliated general hospitals, 5 affiliated special hospitals, and 16 teaching centers for clinical practice, with the total number of officially

approved beds reaching 13,249, constituting one of the richest resources for clinical training among all medical schools in the country.

SJTUSM offers an excellent environment for academic development and enjoys superiority in many disciplines and areas. Currently SJTUSM has 16 state key disciplines and promotional disciplines, 3 state key laboratories and engineering centers, 6 key laboratories and engineering centers under the Ministry of Education, 4 key laboratories under the Ministry of Public Health, 3 WHO cooperative centers, and a number of key disciplines under the "211 Project." SJTUSM has produced remarkable results in scientific research and has all along been a leader in the number of research programs received, the amount of funding granted, and the number of key projects undertaken among medical schools at home. In the period of the 11th Five-Year Plan alone, SJTUSM received 17 national awards, including State Second-class Awards of Natural Science, State Second-class Awards for Science and Technology Advancement, and State Second-class Awards for Technological Inventions. As the greatest honor for SJTUSM, the former President of SSMU and Academician Wang Zhenyi won the State Supreme Science and Technology Award for the year of 2010. SJTUSM has been active in carrying out international academic exchanges. In recent years, guided by the strategy of building an internationalized school, SJTUSM has accelerated the pace of actively broadening exchange scope and expanding cooperative fields, showing ever greater influence internationally.

SJTUSM has a beautiful campus full of vigor and vitality, the newly-constructed well-equipped teaching center and research building with as well as the elegant French-style buildings of the former Aurora University interspersing the luxuriant surroundings. A new 65.6-acre campus in Minhang District is also under planning. Following the fine tradition of exploring medical sciences to the limits through diligence and dedication, SJTUSM will, as always, exert its utmost for the development of the nation's medical education.

20.Jiangsu Province Hospital (The First Affiliated Hospital with Nanjing Medical University)

Jiangsu Province Hospital is also named as The First Affiliated Hospital with Nanjing Medical University, Jiangsu Clinical Medicine Research Institution or the Red Cross Hospital of Jiangsu. It has a history of 80 years and is the former Clinic Affiliated with Jiangsu Medical College established in 1936.

At present, the hospital is the best and biggest comprehensive hospital in Jiangsu, taking charge of four central roles for the whole province: medical treatment, medical teaching,

scientific research, and hospital ethics activities. The hospital now occupies an area of about 410,000m^2, with 270,000m^2 construction area. The amount of fixed capital of the hospital is about 2 billion RMB. Till now there are 3,000 beds in the hospital, with more than 5,000 employees.

The Department of Cardiology is a National Key Discipline. The GI Medicine, Gynecology, Clinical Laboratory Medicine, Clinical Nursing, Cardiovascular Department, Hematology Department, Endocrinology Department, Occupational Disease Department, Respiratory Medicine, General Surgery, Urology Department, Liver Transplantation Laboratory, Rehabilitation Department, Organ Transplantation Department, Geriatrics Department, Emergency Department, Pathology Department and Obstetrical Department of the hospital are the 18 Key Clinical Specialties of the national level. There are 5 provincial clinical research centers in the hospital and the Clinical Medicine is the leading discipline among the colleges and universities in Jiangsu. The two key provincial disciplines are Special Medicine and Nursing, and the Internal Medicine is the provincial cultivating discipline for the Key National Level Program. There are 4 Clinical Medical Centers and 13 key medical disciplines (laboratories) have been chosen as the Provincial Program, which works to foster the level healthcare by improving Science and Technology. In the provincial level,5 medical treatment centers and 8 special disease treatment centers, 27 key disciplines and 17 medical quality control centers in the hospital are in the column. According to the Comprehensive Ranking List of China's Best Hospitals released by the Hospital Management Institute of Fudan University, Jiangsu Province Hospital ranked the 27th. While on the List of China's Best Specialties, the Rehabilitation Department has stayed on the top in the nation-wide, and 10 other specialties have also been nominated.

Professor Wang Xuehao of the Liver Transplantation Center is The Academician of Chinese Academy of Science. And Professor Li Jian'an of the Rehabilitation Department is the Foreign Academician of the National Academy of Sciences in USA. Among the hospital's team of talents, many have been selected as the national leading talents, including one Yangzijiang River scholar, six National Young or Middle-aged Experts with outstanding contributions. Two experts in the hospital have been accepted by the National New Century Talents Project. Two experts have been granted the Funds of National Outstanding Young Scientists Program, and three have been granted the Excellent Young Scientist Program of the National Science Foundation of China. Till now, 53 experts from the hospital receive the special allowance of the government. In the provincial level, seven talents and one team in the hospital have been selected into Jiangsu High-level Innovative Entrepreneurs Program.

Sixteen experts have been chosen as second level candidates for Jiangsu 333 Project, while 10 leading talents and 32 key talents are selected into Jiangsu Provincial Program, which works to foster the level healthcare by improving Science and Technology. In this hospital, there are two Jiangsu

Distinguished Medical Experts, 27 Provincial Young or Middle-aged Experts with outstanding contributions, and 25 candidates for Jiangsu Qinglan Project. In the category of professional positions appointed, seven experts in this hospital hold the positions of vice-chairman or above in the Specialized Branch of Chinese Medical Association, and 65 experts as chairman or vice-chair in the Provincial level. Internationally, the chairman of International Society of Physical and Rehabilitation Medicine Association, Member of the Executive Committee of International College of Surgeons, and the Vice President of Hearing International are all come from this hospital.

With the hospital as the supporting institute, Jiangsu Provincial Clinical Medicine Research Institute is established here, with 5 research laboratories such as cardiopulmonary diseases, Oncology, Organ Transplantation and Immunology, Allergy and Allergic Diseases, and Liver Surgery. Besides that, the Stem Cell and Organ Regeneration Center, the Human Tissue Library and other Public Platforms are set in this Institute. In terms of laboratories, the Clinical Reproductive Medicine Laboratory and the Living Liver Transplantation Laboratory are the Key Laboratory in the National Level. In the hospital's National Clinical Drug Trial Institution, 28 specialties and 1 Phase I Clinical Trial Research Lab have respectively passed the authentication of WHO/SIDCER and AAHRPP.

According to the Ranking List of Scientific and Technological Influence, released by Institute of Medical Information, Chinese Academy of Medical Sciences, this hospital holds the 18th place among all the hospitals in China. Concerning the ranking of Disciplines, its Cardiology, Urology and Allergy rank the 5th, while Gynecology, General Surgery, and Hematology rank the 10th.

As the largest clinical teaching base of Nanjing Medical University, the First Clinical Medical School is set in this hospital, with 7 medical specialties and 47 teaching and research sections. The Clinical Medicine and Rehabilitation Medicine have been chosen as Nurturing Centers of characteristic specialties in the level of national higher education, while the Medical Imaging, Medical Laboratory, and Clinical Medicine are the outstanding specialties in the provincial level. In terms of authorized units of medical degree, the Clinical Medicine, Special Medicine and Nursing are the three first level disciplines for PhD and MD, and the former two specialties which have centers for post-doctoral studies. As the supporting

institute of Jiangsu Clinical Medicine Education Research Institution, the hospital is the National Demonstration Base of Residents' Standardized Training. Among the 26 professional bases, 11 have been selected as the training bases for special skills. In specific, the two training bases for General Surgery and Urology specialists have passed the united acceleration held by the Royal College of Surgeons of Edinburgh and the College of Surgeons of Hong Kong. The Endoscopic Diagnosis & Treatment Training Base and the course of Surgical Procedures on Colorectum have been accelerated by British Royal College of Surgeons. While in general, the Clinical Skills Training Base has passed the acceleration of life support course system by American Heart Association.

The hospital is active in foreign exchanges and it has established friendly and cooperative relationship with hospitals, departments and laboratories in USA, Japan, Korea, Canada, Australia, Italy and so on.

The hospital holds development as its top priority, and carries through the philosophy of innovating, coordinating, greening, opening and sharing. It implements the strategy with regard to the hospital of developing via Tech-Edu, strengthening via talent, entrenching via brand harmonizing via culture and prospering via union. The hospital will highlight social benefit, uphold their spirit concerning "Ethics-Tech Highest Patient First", maintain the beginner's mind involving "People-Oriented, Society Return" and concentrate on the four central tasks embracing medical treatment, teaching, scientific research and hospital ethics in order to strive for the high-level construction of national-level clinical medical center.

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Chapter 4: Results

Job evaluation is an essential process in any organization, since it is extremely important to verify that the employees fit the position they hold and possess the necessary skills to perform the functions assigned to them, which correspond to the organizational objectives. It also serves to make decisions and take measures to address the identified gaps (e.g., training actions) in order to improve employee performance or to foster career motivation and development (e.g., promotions, pay) (McNabb & Whitfield, 2001). In view of this situation, the development of a job evaluation model for public hospitals in China is extremely pertinent.

Thus, firstly, (point 4.1) the psychometric properties of the instruments used will be analyzed, to guarantee the degree of their scientificity and the robustness of the constructs evaluated by them. In section 4.2, the descriptive and differential statistics of the studied variables will be presented through the appropriate statistical procedures for this purpose and we will evaluate the degree of association between the variables that intervene in the investigation, analyzing not only their magnitude but also their direction. Finally, (point 4.3), we will use regression analysis to test the hypotheses initially formulated.

4.1 Validity and reliability of measure

The validity of the construct was studied through the analysis of main components with *Varimax* rotation. The *Kaiser-Meyer-Olkin* indicator (KMO_{JDS} = 0.94; KMO_{KSAO} = 0.97; KMO_{CTS} = 0.94; KMO_{UWES} = 0.88) and the *Bartlett* sphere city test revealed no identity problems in the data and the correlations between the items are sufficiently suitable for all instruments. The percentage of variance explained for the components extracted from each instrument was considered satisfactory (JDS = 81.62%, KSAO = 74.17%, CTS = 60.22%, UWES = 81.97%) (Table 4-1).

In order to understand the internal structure of the measurements and to identify the dimensions associated with them, the model was tested through a confirmatory factorial analysis. For this purpose, we used the indexes of adjustment suggested by the literature (e.g., Hoyle & Panter, 1995; MacCallum and Austin, 2000; Smith & McMillan, 2001), namely: Chi-square (χ^2), Comparative Fit Index (CFI), Normed Fit Index (NFI) and Root Mean Squared Error of Approximation (RMSEA) (Table 4-2).

Table 4-1 Exploratory factor analysis results

Scale item	Loading	α
JDS		0.75
Skill variety		
1. My work position requires a variety of competencies.	0.808	
7. My work position gives me chance of doing innumerable different things.	0.761	
11.My work position allows me to manage a great variety of work.	0.625	
Task identity		0.78
12. My work position is organized in a way that I can finish a work I start.	0.854	
14. My work position is organized in a way that allows me to finish works or projects from start to finish.	0.663	
3. My work position is organized in a way that allows me to frequently have the opportunity to follow works or projects from start to finish.	0.608	
Task significance		0.70
9. My work position is very significant or important taking in consideration the hospital reality.	0.834	
15. My work position is a work place where several people may be affected depending on the way my job goes.	0.821	
5. My work position is relatively important in this hospital.	0.558	
Autonomy		0.84
10. My work position gives the chance to think and act independently.	0.805	
2. My work position lets me labor alone and do my own work.	0.632	

6. My work position gives me chance to be independent and free in the way I do my job.	0.625	
Feedback		0.74
4. My work position provides feedback about the quality of my work.	0.820	
13. I always have the feeling that I know I am performing well or bad in my work.	0.755	
8. My work position allows me to know up to which point I am doing things right.	0.645	
KSAO		0.92
Detect and resolve problems and conflicts		
4. I manage disputes and conflicts.	0.877	
3. I cope with personal problems of staff.	0.862	
6. I manage disputes and conflicts in unit.	0.857	
7. I manage grievance situations.	0.851	
2. I cope with concerns or complaints of staff.	0.733	
8. I handle document lateness or errors.	0.718	
5. I listen to and discuss complaints and problems of staff.	0.667	
1. I analyze problems or complaints of staff.	0.587	
Participative influence		0.91
13. I determine strategies to improve production.	0.782	
16. I keep track of how well staff follows schedules.	0.668	
10. I involve staff in decision making.	0.644	
14. I keep staff advised of problems or progress.	0.630	
15. I explain work to staff.	0.627	
12. I maintain interest in staff's personal and professional expectations.	0.593	
11. I take employee job satisfaction into account.	0.554	
9. I encourage staff participation in work issues.	0.553	
Understand rules and regulations and other written material		0.90
22. I write letters, memos, etc., for my signature.	0.856	
23. I maintain standards for my behavior and appearance.	0.843	
24. I monitor unit's following of plans and policies.	0.767	
18. I am familiarizing self with staff's collective agreement.	0.630	
19. I approve leave, based on collective agreement.	0.627	

21. I make sure staff handles sensitive material.	0.574	
20. I review and edit correspondence prepared by staff.	0.567	
17. I read and circulate correspondence.	0.511	
Monitor and control and improve staff performance		0.90
25. I write performance appraisals.	0.840	
26. I analyze production stats to find problems.	0.709	
31. I discuss performance goals with staff.	0.698	
32. I review and revise assignments due to priorities.	0.686	
30. I coach staff on the job.	0.670	
29. I identify work production problems in unit.	0.658	
28. I keep track of and evaluate staff performance.	0.604	
27. I perform spot checks of day-to-day duties.	0.602	
Schedule and prioritize		0.87
35. I schedule my work and set my priorities.	0.751	
33. I set priorities and deadlines.	0.707	
34. I provide advice and guidance to staff regarding priorities.	0.668	
Develop staff		0.92
39. I explain policy and program decisions.	0.789	
38. I provide advice on performance and personal development.	0.772	
37. I assess potential for more responsibility and training.	0.723	
36. I determine training and development needs of staff.	0.621	
CTS		0.89
Leadership and management		
3. Residents know how to handle their personal financial situation and what they can expect in the future.	0.725	
2. Residents know how to negotiate on personal ambitions (working part-time, PhD project).	0.685	
4. Residents know how to negotiate on their salary and their working conditions.	0.681	
7. Residents know how to handle feedback from their supervisors.	0.587	
8. Residents are capable of giving feedback to their colleagues.	0.574	
5. Residents are adept at estimating time requirements for daily tasks and time management and as a result, they are capable of finishing their job requirements on time	0.525	
6. Residents are capable of setting priorities between providing patient care and practice requirements, such as administrative	0.525	

tasks.		
1. Residents are well aware of how to create career opportunities.	0.513	
Operational management		0.84
23. Residents take into account, when allocating health care resources, that they are finite (waiting lists).	0.733	
24. Residents take the costs of healthcare resources into account when allocating them.	0.721	
22. Residents allocate healthcare resources (additional research and treatments) based on evidence-based medicine, guideline, or protocol.	0.696	
25. Residents are actively involved in preventive healthcare (*e.g.*, giving advice on lifestyle).	0.632	
Organization and finance		0.90
10. Residents know how their specialty's department is organized and financed.	0.755	
15. Residents know which rights and duties they have to fulfil being a doctor (*e.g.*, health law).	0.745	
16. Residents know what has to be reported in a medical file to avoid legal problems.	0.738	
13. Residents know how to manage their ward effectively.	0.694	
9. Residents know how the healthcare system is organized and financed.	0.673	
11. Residents know what will be expected of them when they become a specialist (leadership, administrative tasks, meetings and finance).	0.666	
12. Residents know how to function in their position as a leader for other medical personnel (nurses etc.).	0.619	
18. Residents know how to deal with medical mistakes made by others.	0.618	
21. Residents are adequately prepared for the future to make decisions on the employment of potential colleagues.	0.551	
19. Residents stand up for their patient, when they feel that the amount of care he/she receives is not enough, even when they have to challenge their supervisor.	0.498	
20. Residents know how to lead or participate in a committee or meeting.	0.472	
14. Residents know how to deal with conflicts at their workplace.	0.449	
17. Residents know how to deal with medical mistakes they made themselves.	0.408	
Professional ethics and health law		0.80
26. Residents participate actively in evaluating and improvising systematic quality processes (*e.g.*, improving patient safety).	0.602	
27. Residents know how to use information technology in patient care appropriately (*e.g.*, work with electronic medical file and online databases).	0.581	
29. Residents know when they are eligible for (additional) medical training.	0.563	
28. Residents know where they can find medical resources (books, internet and databases) to keep up their medical	0.553	

knowledge.		
30. Residents know how to reimburse and code their work (coding and billing).	0.458	
UWES		
Absorption		0.75
6. I feel happy when I am working intensely.	0.884	
9. I get carried away when I'm working.	0.829	
8. I am immersed in my work.	0.814	
Vigor		0.85
5. When I get up in the morning, I feel like going to work.	0.847	
1. At my work, I feel bursting with energy.	0.795	
2. At my job, I feel strong and vigorous.	0.689	
Dedication		0.83
7. I am proud of the work that I do.	0.814	
3. I am enthusiastic about my job.	0.752	
4. My job inspires me.	0.601	

Table 4-2 Adjustment indices for factorial models

Adjustment indices	Criteria	Level of adequacy	Measurement
χ^2/df Chi-square / degrees of freedom	≤ 5.00	Excellent	Evaluates magnitude of discrepancy between sample and matrices of adequacy covariance (Smith & McMillan, 2001).
NFI *Normed Fit Index*	> 0.90 > 0.95	Satisfactory Excellent	Compares tested model with restricted null model, where observed variables are assumed to be independent. It has the disadvantage of being affected by the size of the sample (Bentler, 1990).
CFI *Comparative Fit Index*	> 0.90 > 0.95	Satisfactory Excellent	Alternative to NFI, being more accurate in small size samples (Smith & McMillan, 2001).
RMSEA *Root Mean Square Error of Approximation*	< 0.08 < 0.05	Satisfactory Excellent	Estimates the amount of error approximation by degrees of freedom across sample size (Kline, 1998)

4.2 Descriptive statistics and correlation of key variables

In the second phase, we proceed to characterization of the studied variables in function of the sociodemographic characteristics. For this purpose, we used tests to compare means considering the various ways in which the constructs were operationalized. These tests allow to analyze not only the average values of the variables in question, but also to understand how these values are manifested as a function of the independent variables considered.

We started by analyzing the descriptive statistics of the variables under study, and it was verified that Autonomy is the characteristic of the function with higher average values (M = 5.53; SD = 1.01), which suggests that it is the dimension more valued by the participants (Table 4-4).

Regarding KSAO, it is possible to verify that the highest average value (M = 5.25; SD = 0.97) belongs to the dimension Understand rules and regulations and other written material; In

the CTS belongs to Leadership and management (M = 2.26; SD = 0.54); and in the UWES belongs to the Dedication (M = 4.70; SD = 1.01).

Table 4-3 Measures of goodness of fit

JDS	
Chi-Square	226.512
Degrees of Freedom	72
Chi-Square/Degrees of Freedom	3.146
Comparative Fit Index [CFI]	0.93
Normed Fit Index [NFI]	0.92
Root Mean Square Error of Approximation [RMSEA]	0.079
KSAO	
Chi-Square	2388.948
Degrees of Freedom	681
Chi-Square/Degrees of Freedom	3.508
Comparative Fit Index [CFI]	0.91
Normed Fit Index [NFI]	0.89
Root Mean Square Error of Approximation [RMSEA]	0.080
CTS	
Chi-Square	899.108
Degrees of Freedom	394
Chi-Square/Degrees of Freedom	2.282
Comparative Fit Index [CFI]	0.93
Normed Fit Index [NFI]	0.90
Root Mean Square Error of Approximation [RMSEA]	0.089
UWES	
Chi-Square	30.816
Degrees of Freedom	18
Chi-Square/Degrees of Freedom	1.712
Comparative Fit Index [CFI]	0.89
Normed Fit Index [NFI]	0.89
Root Mean Square Error of Approximation [RMSEA]	0.090

Table 4-4 Descriptive statistics

	Min	Max	M	SD
JDS				
Skill variety	2	7	5.20	0.94
Task identity	2	7	5.37	0.97
Task significance	2	7	5.14	0.88
Autonomy	2	7	5.53	1.01
Feedback	2	7	5.20	0.85
KSAO				
Detect and resolve problems and conflicts	1	7	4.20	1.16
Participative influence	1	7	4.81	1.03
Understand rules and regulations and other written material	2	7	5.25	0.97
Monitor and control and improve staff performance	1	7	4.85	1.00
Schedule and prioritize	1	7	5.09	1.14
Develop staff	1	7	4.17	1.32
CTS				
Leadership and management	1	4	2.26	0.54
Organization and finance	1	3	2.05	0.51
Operational management	1	4	2.14	0.63
Professional ethics and health law	1	4	2.23	0.55
UWES				
Vigor	0	6	4.26	1.01
Dedication	0	6	4.70	1.01
Absorption	0	6	4.59	0.95

Note: Min = Minimum; Max = Maximum; M = Mean; SD = Standard deviation

Figure 4-1 Results of the last performance evaluation

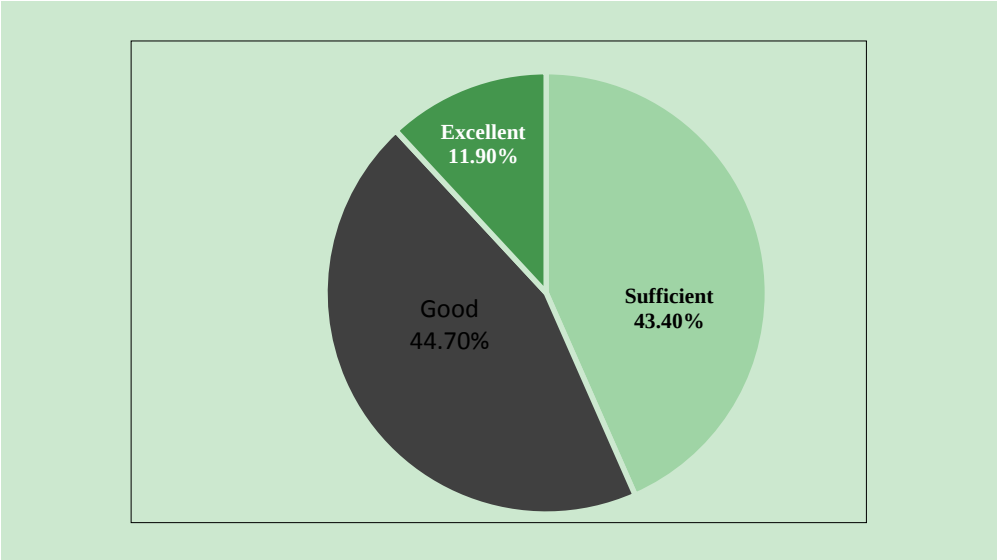
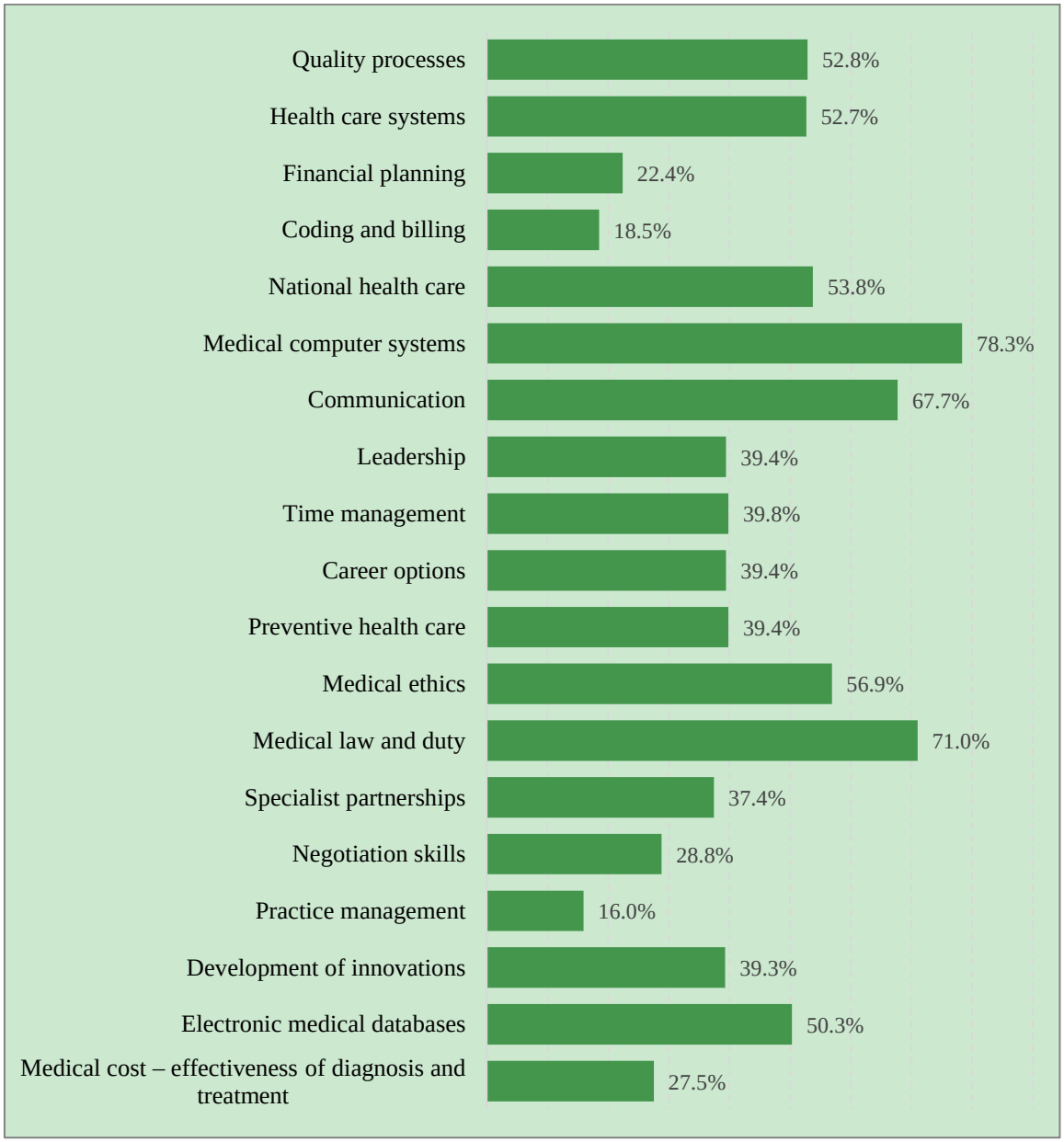


Figure 4-2 Training needs (areas)



Looking at Figure it is possible to verify that the majority of participants reported that they have got Good (44.7%) in the last performance evaluation (Figure 4-1). It should also be noted that 75.5% of them have not missed any day due to health problems in the last six months, and 16.5% have missed a day or more without justification.

When questioned about the need for training, 99.6% mentioned that yes, mainly in the area of Medical computer systems (78.3%) and Medical law and duty (71.0%) (Figure 4-2).

Regarding the method, most of the participants reported that Lectures (61.3%) and Case-based training (57.9%) are the most appropriate; 81.8% also stated that the training should be given by the Hospital manager when working as a specialist (63.2%).

With regard to the number of training hours per year, 41.6% mentioned more than 201 hours per year (M = 200.87; SD = 98.07).

Next, we sought to analyze the association between the variables involved in the investigation, and it was verified that there is a significant correlation between all the dimensions evaluated, the highest one being that derived from the relation between Task identity and Autonomy (r = 0.861, p< 0.001) both belonging to JDS (Table 4-5).

The high correlations between the variables suggest that they join for a common objective and can therefore be a single construct called Job evaluation, which allows the organization to make the best use of its human resources. This procedure benefits both the organization and the employee, because, on the one hand, the organization needs to know how its employees perform their functions, to know their strengths and weaknesses; on the other hand, employees have to take notice of the organization's perception about themselves in order to correct possible mistakes and feel motivated to perform their duties.

4.3 Hypothesis testing

According to the literature mentioned in the theoretical body we tried to test the impact of job characteristics, knowledge, skills, competencies, training and engagement on job evaluation. In this way, four hypotheses were formulated. We will analyze these hypotheses one by one.

To test the first hypothesis [Hypothesis 1: The job characteristics (competencies variety, task identity, task significance, autonomy and feedback) influence the job evaluation], a multiple regression analysis using the Enter method was carried out, which in addition to the coefficient of determination (R^2) gives us the coefficients β (value of the relative contribution of each independent variable for the prediction of the dependent variable) that reveals the impact that the different independent variables have on the prediction of the dependent variables (Hair et al., 2009) (Table 4-6).

The results obtained allow us to conclude that the linear model is statistically significant [$F_{(5,540)}$ = 17.060, p< 0.001] and that 12.8% of the Job evaluation variation (Adjusted R square = 0.128) is explained by the Job characteristics.

Table 4-5 Association between variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Skill variety (1)	-																
Task identity (2)	0.834**	-															
Task significance(3)	0.808**	0.839**	-														
Autonomy (4)	0.817**	0.861**	0.830**	-													
Feedback (5)	0.802**	0.834**	0.799**	0.793**	-												
Detect and resolve problems and conflicts (6)	0.541**	0.476**	0.506**	0.377**	0.545**	-											
Participative influence (7)	0.659**	0.652**	0.644**	0.582**	0.627**	0.710**	-										
Understand rules and regulations (8)	0.677**	0.720**	0.683**	0.714**	0.668**	0.460**	0.783**	-									
Staff performance (9)	0.699**	0.692**	0.693**	0.624**	0.672**	0.680**	0.823**	0.825**	-								
Schedule and prioritize (10)	0.667**	0.702**	0.683**	0.661**	0.672**	0.574**	0.704**	0.766**	0.819**	-							
Develop staff (11)	0.476**	0.444**	0.453**	0.329**	0.501**	0.781**	0.611**	0.459**	0.695**	0.611**	-						
Leadership and management (12)	-0.626**	-0.596**	-0.600**	-0.515**	-0.551**	-0.676**	-0.615**	-0.536**	-0.670**	-0.618**	-0.649**	-					
Organization and finance (13)	-0.674**	-0.697**	-0.654**	-0.611**	-0.584**	-0.484**	-0.624**	-0.673**	-0.674**	-0.645**	-0.465**	0.764**	-				
Operational management (14)	-0.569**	-0.553**	-0.516**	-0.499**	-0.507**	-0.495**	-0.523**	-0.530**	-0.580**	-0.590**	-0.508**	0.689**	0.727**	-			
Professional ethics (15)	-0.524**	-0.531**	-0.507**	-0.443**	-0.508**	-0.614**	-0.562**	-0.484**	-0.603**	-0.558**	-0.605**	0.726**	0.702**	0.711**	-		
Vigor (16)	0.509**	0.517**	0.539**	0.469**	0.472**	0.509**	0.605**	0.591**	0.644**	0.614**	0.500**	-0.592**	-0.604**	-0.533**	-0.583**	-	
Dedication (17)	0.550**	0.606**	0.611**	0.617**	0.527**	0.352**	0.531**	0.643**	0.599**	0.625**	0.341**	-0.502**	-0.594**	-0.507**	-0.493**	0.726**	-
Absorption (18)	0.551**	0.592**	0.611**	0.598**	0.544**	0.397**	0.573**	0.692**	0.657**	0.644**	0.402**	-0.536**	-0.616**	-0.508**	-0.515**	0.781**	0.823**

Note: **$p< 0$.

Table 4-6 Impact of job characteristics on job evaluation

Explanatory variables	**Job evaluation**
Constant	1.548**
Skill variety	0.357**
Task identity	0.055
Task significance	0.101
Autonomy	0.473**
Feedback	0.233*
Adjusted R square	0.128
$F_{(5,540)}$	17.060

Note: *p<0.05 **p<0.001

It was also possible to verify that Autonomy (B = 0.473) is the JDS variable with the greatest effect on Job evaluation, and it is verified that the higher the Autonomy given to employees, the more positive their perception of Job evaluation. Skill variety and Feedback also have a significant impact on Job evaluation and explain, respectively, 2.9% and 1.5% of the same.

It was also tried to understand if the KSAO moderate the relations between job characteristics and job evaluation (Hypothesis 2). With this purpose, it was built on two composite variables: JDS and KSAO.

The JDS consists of the 15 items that compose it, which in their total reveal a high internal consistency ($\alpha = 0.95$), which suggests that they come together to evaluate a common objective and, therefore, constitute a single designated construct of Characteristics Function. A similar procedure was performed for the KSAO, consisting of the 39 items that constitute them, obtaining a Cronbach alpha index of 0.97, which also suggests a high internal consistency for the construct designated by Knowledge and skills.

In order to corroborate the second hypothesis formulated, a model of moderation was performed through a Multiple Linear Regression (Table 4-7).

The linear model explains 26% (Adjusted R Square = 0.260, $p< 0.001$) of the variance of the job evaluation and the model is statistically significant [$F_{(3,542)} = 64.699$, $p< 0.001$]. The interaction effect is significant ($t = 4.844$, $p< 0.001$), which suggests that there is a moderation effect and that it has a positive effect (B = 0.143) on the Job evaluation, so the higher the Knowledge and participants' skills the better their performance.

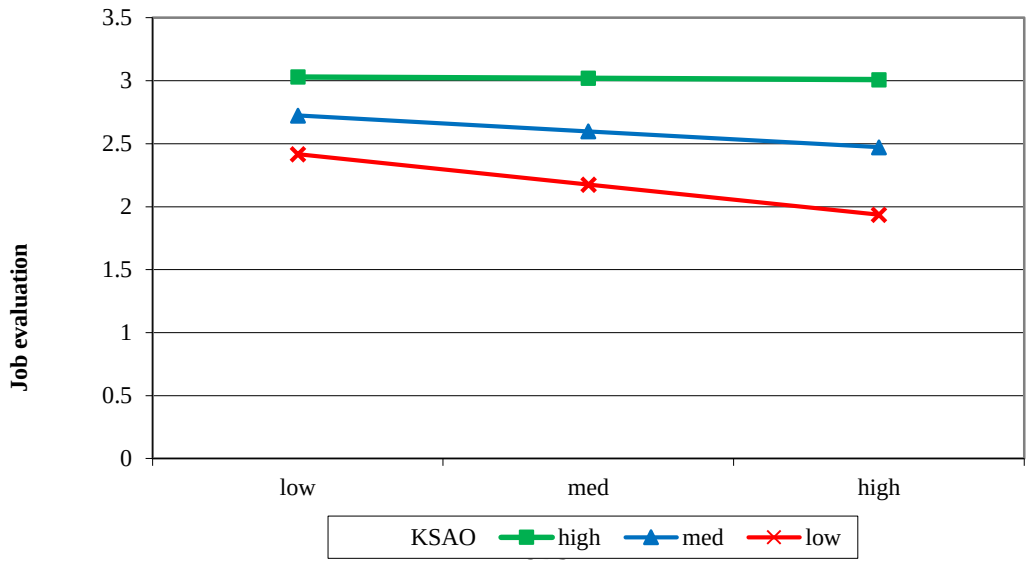
In any of the three levels of KSAO (low, medium, high) there is a negative relationship between the job characteristics (JDS) and the job evaluation, which suggests that the higher the KSAO, the less the effect of Job characteristics on Job evaluation. In other words, how much developed are the skills of employees, less impact the Job characteristics have on the way the job is evaluated (Figure 4-3).

Table 4-7 Moderation of KSAO in relation between JDS and job evaluation

Explanatory variables	**Job evaluation**
Constant	2.598**
JDS	-0.145*
KSAO	0.454**
Interaction effect	0.143**
Adjusted R square	0.260
$F_{(3,542)}$	64.699

Note: *p<0.05 **p<0.001

Figure 4-3 Moderation of KSAO in relation between JDS and job evaluation



It should be noted that although Knowledge and skills influence the relationship between the Job Characteristics and the Job Evaluation, the interaction only explains 3.20% of the variation of the function, while the Characteristics of the function alone explain 16.72%.

We also tried to test the impact of competencies and professional training (Hypothesis 3) on Job evaluation. The results show that the variable with the greatest effect on Job evaluation is Professional ethics and health law (B = - 0.545), which explains 7.4% of its variation.

However, the effect is negative, suggesting that the higher the values in this variable the lower the Job evaluation.

Table 4-8 Impact of competencies and training on job evaluation

Explanatory variables	**Job evaluation**
Constant	4.030*
Leadership and management	-0.461*
Organization and finance	0.414*
Operational management	0.031
Professional ethics and health law	-0.545*
Adjusted R square	0.280
$F_{(4,541)}$	53.873

Note: *p<0.001

Table 4-9 Influence of job engagement in job evaluation

Explanatory Variables	**Job evaluation**
Constant	2.209**
Vigor	0.254**
Dedication	0.071
Absorption	0.060
Adjusted R square	0.066
$F_{(3,542)}$	13.767

Note: *p<0.001

In turn Leadership and management, it also has a significantly negative effect on job evaluation (B = - 0.461), which also suggests that the higher the values in this variable the lower the Job evaluation.

On the other hand, the higher the competencies and professional training in Organization and finance the greater the Job evaluation (Table 4-8).

Finally, we sought to examine the influence of Job engagement in Job evaluation (Hypothesis 4), and it was found that Vigor is the only variable with significant effect on Job evaluation (B = 0.254), explaining 6.4% of its variation. The positive effect suggests that the higher the values in Vigor the higher is the Job evaluation (Table 4-9).

After the analysis of the data it was possible to conclude that Autonomy is the variable of JDS with greater effect in the job evaluation. It was also verified that knowledge and skills

influence the relationship between job characteristics and job Evaluation. We have also seen that skills and vocational training have a significant impact on the evaluation of work, in particular professional ethics and health law. Finally, it was possible to verify that vigor is the only dimension of work engagement with a significant effect in the job evaluation.

Chapter 5: Discussion and Conclusion

Hospitals are placed in constantly changing environments, which encourages the search for new solutions to increase their effectiveness. However, despite all the effort to direct their essential resources to the continuous improvement of processes, for instance, investing in new technologies and equipment, the results often do not match the initial objectives of the investment and thus present low performances (Bontis, Richards, & Serenko, 2011).

The management of health care is a priority concern of environmental and public health, in particular in developing countries. It is arguable that the job evaluation and strategy of high-performance work are conflicting or incompatible. On the one hand, it is expected that the job evaluation presents a higher degree of rigidity and top-down guidance for the structure of remuneration and employment, potentially yielding the conflict with the flexibility and employee involvement inherent in the high-performance approach. On the other hand, the job evaluation can be important to generate a sense of fairness in the workplace and thus promote the highest level of confidence and commitment to the success of high-performance strategy (McNabb & Whitfield, 2001).

According to Bassot (2012), the performance of an individual with identical functions, tasks and responsibilities should be evaluated by the same criteria and should be directly comparable.

It was intended in this study to analyze in which way the job characteristics, KSAO, competencies, training and job engagement influence the job evaluation and consequently the performance of the employees of major public hospitals in China.

Given this, and after the analysis of the data, it was verified that the Autonomy is the JDS variable with greater effect on the Job evaluation. It was also verified that the greater the Autonomy, the Skill variety and the feedback given to the employees, the more negative their perception of Job evaluation.

These results allow us to corroborate Hypothesis 1 and go out to the studies by Katsikea and colleagues (2011) and Schjoedt (2009), which show that high levels of autonomy at work, range of skills and feedback of the results are positively related to professional performance. Oldham and Hackman (2005), in turn, argued that when employees identify with the role they

play and receive feedback about their job performance, they feel more responsible for the results.

These conclusions are also compatible with those of Bontis, Richards, and Serenko (2011) and Huang (2011), who pointed out that autonomy, variety of competencies, task identity and feedback are significant predictors of workers' performance.

Kinicki, McKee-Ryan, Schriesheim, and Carson (2002) added that the presence of feedback mechanisms keeps employees informed of the evolution of their performance, facilitates the regulation of activities and stimulates a sense of responsibility. In the same sense, Bowditch and Buono (2002) pointed out that the greater the autonomy of employees in the development of their tasks, the greater the productivity and the less the absenteeism and turnover, and in general the greater the intrinsic motivation and the better the professional performance. Thus, when the employee schedules his own activities and methods of work, he feels that the organization relies on his potential and has higher levels of performance. In this context, the authors affirmed that successful organizations are those that provide greater autonomy and decision power to their employees, because when they feel responsible for their tasks, they give more of themselves to the organization.

With regard to the second hypothesis initially formulated, namely, the KSAO moderate the relations between job characteristics and job evaluation, it was corroborated from the analysis made. Results that go to several studies (e.g., Le & Winterton, 2005; Goffin & Woycheshin, 2006; Jena & Sahoo, 2012), which suggests that the higher the KSAO, the less the effect of the job characteristics on job evaluation.

According to Dessler (2002), evaluating performance is not an easy task because it involves several purposes, namely:

1. To find the right employees for the tasks in question;
2. To communicate organizational values and objectives;
3. To inform workers so that they seek self-improvement;
4. To guide career progression;
5. To establish performance-based premiums;
6. To guide recruitment and selection strategies in the sense that fundamental criteria are identified for the occupation of a particular job;
7. To validate different human resource management practices with respect to management models;
8. To establish employee retention and reduction policies, as organizations are often faced with difficulties that force them to lay off employees;

9. To provide security from a legal point of view;

10.To position the managers in the organization. The author adds that many companies regard performance evaluation as a mechanism for enhancing their economic growth, valuing and perfecting their own human capital.

In the same line of thought, Byham and Moyer (2005) argued that professional skills are fundamental to acquiring the knowledge necessary to achieve good performance at work. The competencies most associated with individual effectiveness are also operational (social competence, including behaviors and attitudes) and conceptual (meta-competence, including learning to learn). Wood, Veldhoven, Croon, and Menezes (2012) in this turn, demonstrate how much developed are the skills of employees, less impact the Job characteristics have on the way the job is evaluated.

The aim was to also analyze the impact of competencies and professional training on the job evaluation (Hypothesis 3) and found that the dimension with most effect on Job evaluation is Professional Ethics and Health Law. On the other hand, the higher the competencies and professional training in the area of Organization and finance, the greater the Job evaluation.

These results are similar to those found by Berman (1997) that success in the performance of a function is linked to ethical competencies, which apply to all levels of the organization, involving a variety of technical, economic and human factors and should be understood and treated in a coordinated way. The author added that competencies are strong predictors of success in management. In this sense, it is necessary for the organization to develop certain human resource management practices that train and operationalize these competencies, because the organization's results depend not only on the quality of the resources held, but also on the way in which they are administered.

The new macroeconomic realities of the globalized world are changing the labor market, making it increasingly the alignment of the employee with the organizational strategy is fundamental to that he performs his activities with excellence, using his skills and generating meaning for their activity, since each role is essential to the organization. To respond positively to this reality, organizations need professionals who are able to engage in organizational goals and increase change to achieve competitive advantage (Breznik & Lahovnik, 2016).

The competency model is a dynamic construct, which includes skills of an organization, personal and collective skills and their impact on organizational assessment. The notion of

competence lies between knowledge and concrete skills, being inseparable from action, and therefore requires, more and more, the acquisition of new knowledge and continuous training.

According to Meignant (2014), vocational training is now seen as an essential tool for the regular functioning of organizations, since it allows them to prepare and equip their employees with the knowledge and skills necessary to adapt to the contingencies of their surroundings.

Professional training should therefore focus on the occupations of the work world, integrating skills such as effective behaviors, the skills needed to perform tasks, the use of equipment and technology, and the organizational learning of companies and markets (Akinyemi & Abiddin, 2013).

Fejfarová and Urbancová (2015) added that research and practice in the domain of competency management within the organization seek to bring both the individual and the organization itself to better levels of performance, since the objective is to enable individuals to reach higher functional levels. Thus, training has an important role in the consolidation of learning and in the development of the competencies of individuals, constituting itself as a central element to the processes of organizational change.

The formation can, on the one hand, be the basis for adapting human resources to structural changes and changes in working conditions resulting from technological developments and the economic context; and on the other hand, to identify the innovations and changes to be made to ensure the development of the company.

The training should be understood as an integral part of the organization's business plan and as an investment that in the short, medium and long term will generate results. A proper diagnosis of training needs, the use of appropriate forms and types of training and a rigorous assessment are essential conditions for maintaining or streamlining the training activity in organizations as an integral part of successful human resources management (Wallennborn, 2010).

However, there is no single methodology to follow, there are several methodologies for identifying training needs, various training methods and various ways of evaluating training, all using their own tools and differentiated. However, there is a common theme, the methods used at any stage of the training cycle should take into account the strategic objectives of the organizations as well as their purpose in this dynamic, and should be known to the various actors involved in the training (Wexley & Latham, 2002).

Bian (2011) adds all managers with subordinates in charge have the difficult task of leading a group of different people and transform it into a team that produces results and that

should motivate, in an ethical and positive way, the elements to achieve the objectives that the organization proposes. The fact that this is not always an easy task can justify the results obtained in our study, according to which the higher the values in leadership and management the lower is the perception of the employees about job evaluation.

The fourth hypothesis of this study showed that Vigor is the only variable with significant effect on Job evaluation. The positive effect suggests that the higher the values in Vigor, the higher is the Job evaluation. Similar results were found by Schaufeli and Salanova (2007). They demonstrated that Job engagement is a key part of human capital development as it is an essential element in the health and well-being of employees, helps them cope with the demands of work and allows a positive bond with the organization. The authors added that when employees achieve high scores on the scales that evaluate engagement, they tend to have very positive energy, be fully integrated and motivated with the profession they perform and feel competent to solve problems that may arise in a professional level.

Job engagement emerges as a crucial tool in organizations, so its measurement has become a common practice, since engaged workers at work are more productive (Geetha, 2012). Shuck, Reio, and Rocco (2011) added that job engagement promotes competitive advantage and organizational success.

Along the same lines, Bakker, Schaufeli, Leiter, and Taris (2008) pointed out that when employees feel enthusiastic about their work and feel they are an added value for the organization, they show better professional performance, not only at the level of their duties but also at the level of functions external to their obligations. Macey and Schneider (2008) corroborated this idea by demonstrating that employees with high levels of job engagement function as a competitive advantage factor of organizations, since they present a higher level of professional performance. These results can be explained by the fact that vigor corresponds to the demonstration of the high energy levels, big mental resistance and strong desire and persistence facing the daily work tasks an essential characteristic for those who work in a hospital because they are constantly faced with many adversities.

According to Bakker (2009), there are four aspects that explain why employees with high levels of job engagement demonstrate higher levels of professional performance, namely:

1. Greater frequency in the manifestation of positive emotions (e.g., happiness);
2. Manifestation of better physical and psychological health;
3. Creation of their own work and personal resources;
4. Transfer of engagement to others.

We also sought to analyze the phenomena studied according to sociodemographic characteristics that were not included in the hypotheses under study.

Regarding gender, it is possible to verify that there are statistically significant differences in all the dimensions evaluated, with the male participants presenting higher mean values. According to Haveman and Beresford (2012), these results may be explained by the fact that women have less power within organizational structures and because they have different professional preferences in relation to men. The authors focused on three cultural schemes to explain their vision:

1. Men perform better in mathematics and science than women;
2. Men belong to labor and women belong to the household;
3. Men are naturally better managers and leaders than women.

Regarding the age, we found that the employees belonging to the older age group presented higher average results in all study dimensions, and these differences were statistically significant. These results are congruent with those found by Thomas, Buboltz and Winkelspecht (2004), who revealed that the higher the age, the better the performance of the employees.

5.1 Theoretical and practical implications

Chen (2009) considered that job evaluation is to use the specific work as the object of evaluation, and also a process that guarantees the relative value of work through responsibility, work intensity, qualification requirement of a given job. This work analyzes the impact of the characteristics of work, KSAO, competencies, training and involvement in work on the job evaluation.

The positive relationship between the various constructs and job performance provides evidence that they are predictors of high professional performance. In this sense, the present research provides results that can be used by human resource managers with the purpose of increasing the engagement and the professional performance of the employees. These professionals must assume the responsibility of intervening at the level of training, because by increasing their professional performance they contribute greatly to the organizational success.

The results suggest that the job characteristics, KSAO, competencies, training and job engagement have a positive impact on the job evaluation, so it is fundamental to foster innovative programs that promote the development of employees, to increase their performance in the work and to achieve competitive advantage.

According Stringer, Didham and Theivananthampillai (2011) when workers align their objectives with organization objectives, they are willing to give their best and have a high performance. Thus, is important that as job characteristics and the work design corresponds to needs and expectations of workers, because only that way the productivity can be increased (Humphrey, Nahrgang, & Morgenson, 2007). However, it is still necessary for the professional to have knowledge, skills, attitudes, interests, values and other personal characteristics that enable it to carry out its tasks efficiently (Breznik & Lahovnik, 2016).

Thus, it is essential to continue investing in training because this is the only way to improve the volume and quality of work and to give new challenges to employees by making them more capable of making full use of their skills and preparing them to adequately meet their needs (Aguinis & Kraiger, 2009). Without training, there is no growth, because the skills and knowledge of the employees have come to be considered the main factors that allow the organizations to maintain or increase the competitive advantage over the competition (Noe, 2008).

Any manager of a hospital has a hard time hiring people who could really fit into the position you offered and when that happens it is not always easy to gauge your job. This research was intended to help fill this gap, based on the construction of a competency-based evaluation model (Ning, Kang, Jiao, Hao, Gao, & Sun, et al. 2014). In this way, it is considered that this research, in practice, can be an important tool to help the large public hospital to resolve its internal impartiality, its main job is to evaluate the value of the work and the contribution to the large public hospital, still help to identify the type of importance that the work will give in that hospital.

Reasonable job evaluation factors could be established through the scientific evaluation of work, which is what we call a "reasonable system of factor distribution." At the same time, during the process of job evaluation and factor classification, we could devise a hierarchical system to incorporate justice and actually take on the role of encouragement (Thompson, Harver, & Eure, 2009). According to the result of the job evaluation, a salary system that can prove the value of staff combined with the salary status of the external labor market could be established at that time; we can take a big step towards successful reform of the distribution system of the major public hospitals in China.

The work developed throughout this thesis is also important to evaluate the daily work. We feel easy to establish human resource management models based on task management, and we could also achieve the best match between person and work or person and person.

Chinese speed is well known these days around the world, large public hospital in China share the same problem, such as: large-scale, abundance of jobs, work management problems are very complicated, obviously representative and great influence. In this case, if this work evaluation template can be used by the Chinese government's public health oversight department, this may help (State Council of the People's Republic of China, 2009).

Thus, at the theoretical level, it is hoped that these results may inspire further research that contributes to a better understanding of these relationships; and at the practical level, it is intended to alert the justified investment by the organizations in the implementation of a performance evaluation model. Taking into account the current competitiveness at the organizational level, it is considered that the analysis of the relationship between these dimensions is crucial to any organization. So, this project is intended to build a new process of performance evaluation in public hospitals in China, based on the competencies identified for each function.

Hospitals are institutions heavily based on routinely established routines and norms, and often this inflexibility does not provide a space for ongoing training that encourages employees to improve work processes, become aware of mistakes, and develop / refine skills to improve professional performance (Tang, Meng, Chen, Bekedam, Evans, & Whitehead, 2008). This research contributes to the work evaluation process being aligned with institutional guidelines and actions resulting from coherent personnel management policies, particularly career plans.

It is also important for the evaluation of the work to be seen as a continuous process that allows the development of the employee, based on skills that need to be improved and is no longer seen as a punitive, unfair and dissatisfying tool.

Hospital institutions have peculiar characteristics because they involve a complex association of people with specific skills and diverse equipment to provide assistance to the population, so understanding and recognizing hospital activity as a business and reconciling the concept with its function directed to society requires a compromise between all interested parties. When people are not committed to the life of the organization, they do not take responsibility, nor can they really be effective (Brightwell & Grant, 2013).

The focus on people management requires that organizations implement actions that align their strategies with the competencies previously defined by the positions to occupy, because this is the only way to achieve excellence. The alignment of the collaborator with the organizational strategy is fundamental so that it executes its activities with excellence, using its competences and generating sense for its activity, since each function performed is

essential for the organization. Skills should be developed and used on a daily basis, adding value to individual activities and contributing to the common good by improving processes involving one or more areas as well as human relations in the work environment. Developing skills and abilities is enabling the best professional performance, through the development of people (He, Cheng, Fu, Tang, Fu, & Fang, et al. 2015).

The construction of the sense of work by each employee is directly linked to job satisfaction, since it generates motivation, feeling of being useful and belonging to the system, contributing effectively to their work. It is verified, therefore, that a collaborator immersed in a work environment that allows him to experience his potential, through clear processes and that favor meritocracy, as well as, that allows the development of his competences and abilities that add value to the daily activities, experiences healthier working conditions (Nichani, Crocker, Fitterman, & Lukela, 2017).

5.2 Limitations and future research

As for limitations of the present study, we report the fact that it is a cross-sectional design study and the causal ordering is subject to debate. Another limitation is the extension of the questionnaires, which may have caused some saturation and monotony in the response and, consequently, some bias of the results. It should also be pointed we have turned to a convenience sample, which carries the disadvantage of making it impossible to make inferences at the population level and the fact the data was collected only in some regions of the country, which leads to limited data being not generalizable to the Chinese population.

It should also be emphasized that in the structural equation models, the four instruments should have been related in order to identify what the multiple indicators have in common.

Being a pioneer project in the scope of people management in China hospitals, it requires the development of new investigations that allow to fill the identified gaps and to follow up the results obtained.

Recognizing that this study does not allow for conclusions or definitive answers, we consider that it can contribute to this reflection on the impact of job characteristics, KSAO, competencies, training and job engagement on the job evaluation. The high agreement found between the results presented here and in many other studies (e.g., Geetha, 2012; Jena & Sahoo, 2012; Basset, 2012; Fejfarová & Urbancová, 2015) suggested that the general lines found here will have some validity.

Thus, it is suggested that the performance evaluation system focuses on the measure and differentiate the performance and effort of each, give the know the opinion of the hierarchical superiors on the performance of each collaborator, with the purpose of assisting in the decision-making on the remuneration and incentives, identify performance individual and collective action to correct them in a joint effort evaluators, and that such action should move from the role to practice, in the sense of producing immediate and positive effects on what satisfaction is and professional performance of civil servants.

It is also considered appropriate to review the evaluation system, the annual definition of objectives, the effective measurement of results achieved, and contribute to the improvement of the performance of evaluated, improving their competencies of the evaluated ones. And it also be important to create a manual of performance evaluation procedures that would simplify all the procedures inherent to the job evaluation.

We also suggest the inclusion of tools that allow the evaluation of managers' perceptions regarding the impact of the training actions they attend in the development of human capital and consequent productivity.

5.3 Conclusion

Any activity sector that promotes the implementation of a performance evaluation system should recognize that it is not born in isolation and requires a thorough knowledge of the organization concerned, for the professional categories that support on the management policies human resources and, lastly, on the goals that all those involved intend to achieve. The health area is no exception, as it is characterized by a great demand for skilled labor, and requires the adoption of human resource management policies and practices capable of responding to this context.

The results obtained allow us to corroborate investigations already carried out in this field, namely those obtained by Katsikea, Theodosiou, Perdis, and Kehagias (2011) according to which the job characteristics are positively related to the professional performance. These results are also in line with the work developed by Jena and Sahoo (2012), whose conclusions confirmed that the higher the knowledge and skills the higher the performance of the collaborators and by Le and Winterton (2005) that the combination knowledge, skills and competencies are key to achieving good professional performance.

Our findings reveal that job characteristics have impact on job evaluation of the hospital workers in this study. It was also possible to verify that Autonomy is the JDS variable with

greater effect on the Job evaluation and how bigger is Autonomy, Skill variety and feedback given to the employees, more positive their perception of Job evaluation. Data analysis also reveals that KSAO moderate the relations between job characteristics and job evaluation and the dimension with most effect on Job evaluation is Professional Ethics and Health Law. On the other hand, the higher the competencies and professional training of Organization and finance and the lower the competencies Professional ethics and health law and Leadership and management, the greater the Job evaluation. Finally, it was verified that the Vigor is the only variable with significant effect on Job evaluation.

The results obtained, in addition, meet the investigations of Akinyemi and Abiddin (2013) showing that the skills acquired through training are strong predictors of performance.

It was also possible to corroborate the one defended by Schaufeli and Bakker (2003), who demonstrated that job engagement is positively related to the professional performance independently of the function.

Although human resource management has used performance evaluation models in their practices with the objective of achieving sustainable competitive advantages for the organization, they are not always well understood and there are some constraints to their implementation, so this work aims to fill these gaps (Fejfarová & Urbancová, 2015).

The high financial investment in training activities in recent years has been intensifying the pressure to demonstrate that training effectively contributes to the development of the professional skills of individuals and consequently to the development of organizations (Salas & Cannon, 2001).

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Appendix 1: Job Diagnostic Survey

The below set of sentences are about job characteristics. Mark them stating to which point you agree or disagree with each one. Use the following scale:

Totally disagree	Disagree mildly	Disagree	Neither agree nor disagree	Mildly agree	Agree	Totally agree
1	**2**	**3**	**4**	**5**	**6**	**7**

My work position:

1. Requires a variety of competencies.	1	2	3	4	5	6	7
2. Let's me labor alone and do my own work.	1	2	3	4	5	6	7
3. Is organized in a way that allows me to frequently have the opportunity to follow works or projects from start to finish.	1	2	3	4	5	6	7
4. Provides feedback about the quality of my work.	1	2	3	4	5	6	7
5. Is relatively important in this hospital.	1	2	3	4	5	6	7
6. Gives me chance to be independent and free in the way I do my job.	1	2	3	4	5	6	7
7. Gives me chance of doing innumerable different things.	1	2	3	4	5	6	7
8. Allows me to know up to which point in doing things right.	1	2	3	4	5	6	7
9. Is very significant or important taking in consideration the hospital reality.	1	2	3	4	5	6	7
10. Gives the chance to think and act independently.	1	2	3	4	5	6	7
11. Allows me to manage a great variety of work.	1	2	3	4	5	6	7
12. Is organized in a way that I can finish a work I start.	1	2	3	4	5	6	7
13. I always have the feeling that I know I am performing well or bad in my work.	1	2	3	4	5	6	7
14. Is organized in a way that allows me to finish works or projects from start to finish. (i.e., possibility to do all the work).	1	2	3	4	5	6	7
15. Is a work place where several people may be affected depending on the way my job goes.	1	2	3	4	5	6	7

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Appendix 2: Knowledge, Skills, Abilities, and Other Personal Characteristics Scale

Please read each sentence carefully and mark them up to which point you agree or disagree with each one. Use the 7 points scale:

Strongly disagree	Moderately disagree	Slightly disagree	Neither agree Nor disagree	Slightly agree	Moderately agree	Strongly agree
1	**2**	**3**	**4**	**5**	**6**	**7**

1. I analyze problems or complaints of staff.	1	2	3	4	5	6	7
2. I cope with concerns or complaints of staff.	1	2	3	4	5	6	7
3. I cope with personal problems of staff.	1	2	3	4	5	6	7
4. I manage disputes and conflicts.	1	2	3	4	5	6	7
5. I listen to and discuss complaints and problems of staff.	1	2	3	4	5	6	7
6. I manage disputes and conflicts in unit.	1	2	3	4	5	6	7
7. I manage grievance situations.	1	2	3	4	5	6	7
8. I handle document lateness or errors, etc.	1	2	3	4	5	6	7
9. I encourage staff participation in work issues.	1	2	3	4	5	6	7
10. I involve staff in decision making.	1	2	3	4	5	6	7
11. I take employee job satisfaction into account.	1	2	3	4	5	6	7
12. I maintain interest in staff's personal and professional expectations.	1	2	3	4	5	6	7
13. I determine strategies to improve production.	1	2	3	4	5	6	7
14. I keep staff advised of problems or progress.	1	2	3	4	5	6	7
15. I explain work to staff.	1	2	3	4	5	6	7
16. I keep track of how well staff follows schedules.	1	2	3	4	5	6	7
17. I read and circulate correspondence, etc.	1	2	3	4	5	6	7
18. I am familiarizing self with staff's collective agreement.	1	2	3	4	5	6	7
19. I approve leave, based on collective agreement.	1	2	3	4	5	6	7
20. I review and edit correspondence prepared by staff.	1	2	3	4	5	6	7
21. I make sure staff handles sensitive material.	1	2	3	4	5	6	7
22. I write letters, memos, etc., for my signature.	1	2	3	4	5	6	7
23. I maintain standards for my behavior and appearance.	1	2	3	4	5	6	7

24. I monitor unit's following of plans and policies.	1	2	3	4	5	6	7
25. I write performance appraisals.	1	2	3	4	5	6	7
26. I analyze production stats to find problems.	1	2	3	4	5	6	7
27. I perform spot checks of day-to-day duties.	1	2	3	4	5	6	7
28. I keep track of and evaluate staff performance.	1	2	3	4	5	6	7
29. I identify work production problems in unit.	1	2	3	4	5	6	7
30. I coach staff on the job.	1	2	3	4	5	6	7
31. I discuss performance goals with staff.	1	2	3	4	5	6	7
32. I review and revise assignments due to priorities.	1	2	3	4	5	6	7
33. I set priorities and deadlines.	1	2	3	4	5	6	7
34. I provide advice and guidance to staff regarding priorities.	1	2	3	4	5	6	7
35. I Schedule my work and set my priorities.	1	2	3	4	5	6	7
36. I determine training and development needs of staff.	1	2	3	4	5	6	7
37. I assess potential for more responsibility and training.	1	2	3	4	5	6	7
38. I provide advice on performance and personal development.	1	2	3	4	5	6	7
39. I explain policy and program decisions.	1	2	3	4	5	6	7

Appendix 3: Competencies and Training Scale

On a scale of one to five, please choose the response you feel to be the most accurate regarding your residents' knowledge or skills on the following topics.

Totally Disagree	Disagree	Neutral	Agree	Totally Agree
1	**2**	**3**	**4**	**5**

1. Residents are well aware of how to create career opportunities.	1	2	3	4	5
2. Residents know how to negotiate on personal ambitions (working part-time, PhD project).	1	2	3	4	5
3. Residents know how to handle their personal financial situation and what they can expect in the future.	1	2	3	4	5
4. Residents know how to negotiate on their salary and their working conditions.	1	2	3	4	5
5. Residents are adept at estimating time requirements for daily tasks and time management and as a result, they are capable of finishing their job requirements on time.	1	2	3	4	5
6. Residents are capable of setting priorities between providing patient care and practice requirements, such as administrative tasks.	1	2	3	4	5
7. Residents know how to handle feedback from their supervisors.	1	2	3	4	5
8. Residents are capable of giving feedback to their colleagues.	1	2	3	4	5
9. Residents know how the healthcare system is organized and financed.	1	2	3	4	5
10. Residents know how their specialty's department is organized and financed.	1	2	3	4	5
11. Residents know what will be expected of them when they become a specialist (leadership, administrative tasks, meetings and finance).	1	2	3	4	5
12. Residents know how to function in their position as a leader for other medical personnel (nurses etc.).	1	2	3	4	5
13. Residents know how to manage their ward effectively.	1	2	3	4	5
14. Residents know how to deal with conflicts at their workplace.	1	2	3	4	5
15. Residents know which rights and duties they have to fulfil being a doctor (e.g., health law).	1	2	3	4	5
16. Residents know what has to be reported in a medical file to avoid legal problems.	1	2	3	4	5

17. Residents know how to deal with medical mistakes they made themselves.	1	2	3	4	5
18. Residents know how to deal with medical mistakes made by others.	1	2	3	4	5
19. Residents stand up for their patient, when they feel that the amount of care he/she receives isn't enough, even when they have to challenge their supervisor.	1	2	3	4	5
20. Residents know how to lead or participate in a committee or meeting.	1	2	3	4	5
21. Residents are adequately prepared for the future to make decisions on the employment of potential colleagues.	1	2	3	4	5
22. Residents allocate healthcare resources (additional research and treatments) based on evidence-based medicine, guideline, or protocol.	1	2	3	4	5
23. Residents take into account, when allocating health care resources, that they are finite (waiting lists).	1	2	3	4	5
24. Residents take the costs of healthcare resources into account when allocating them.	1	2	3	4	5
25. Residents are actively involved in preventive healthcare (for example giving advice on lifestyle).	1	2	3	4	5
26. Residents participate actively in evaluating and improvising systematic quality processes (e.g., improving patient safety).	1	2	3	4	5
27. Residents know how to use information technology in patient care appropriately (e.g., work with electronic medical file and online databases).	1	2	3	4	5
28. Residents know where they can find medical resources (books, internet and databases) to keep up their medical knowledge.	1	2	3	4	5
29. Residents know when they are eligible for (additional) medical training.	1	2	3	4	5
30. Residents know how to reimburse and code their work (coding and billing).	1	2	3	4	5

Appendix 4: Utrecht Work Engagement Scale

The following nine statements are about how you feel at work. Please read each statement carefully and decide if you ever feel this way about your job. If you have never had this feeling, cross the '0' (zero) in the space after the statement; if you have had this feeling, indicate how often you feel it by crossing the number (from 1 to 6) that best describes how frequently you feel that way.

Never	Almost never (a few times a year or less)	Rarely (once a month or less)	Sometimes (a few times a month)	Often (once a week)	Very often (a few times a week)	Always (every day)
0	**1**	**2**	**3**	**4**	**5**	**6**

1. At my work, I feel bursting with energy.	0	1	2	3	4	5	6
2. At my job, I feel strong and vigorous.	0	1	2	3	4	5	6
3. I am enthusiastic about my job.	0	1	2	3	4	5	6
4. My job inspires me.	0	1	2	3	4	5	6
5. When I get up in the morning, I feel like going to work.	0	1	2	3	4	5	6
6. I feel happy when I am working intensely.	0	1	2	3	4	5	6
7. I am proud of the work that I do.	0	1	2	3	4	5	6
8. I am immersed in my work.	0	1	2	3	4	5	6
9. I get carried away when I'm working.	0	1	2	3	4	5	6

Residents need training in medical management: Yes □ No □

Management training will improve the residents' competency as a manager: Yes □ No □

The residents need training/teaching in the following topic(s) (multiple answers possible):

Career options □ Financial planning □ Negotiation skills □

Time management □ Health care systems □ Specialist partnerships □

Leadership □ Medical law and duty □ Communication □

Medical cost – effectiveness of diagnosis and treatment □ Medical ethics □

Medical computer systems □ Electronic medical databases □ Preventive health care □

National health care □ Development of innovations □ Quality processes □

Coding and billing □ Practice management □

Other □ (please specify) _____ The residents don't need training □

Residents should receive training which use the following method (multiple answers possible):

Lectures □ Workshops □ Discussion groups □ Interactive training □

Case-based training □ Web-based course □ Feedback-based training by supervisors □

Residents don't need training □ Other □ (please specify) _____

Residents should receive their management training from the following instructor (multiple answers possible):

Physician □ Extramural expert □ Hospital manager □ They don't need training □

Other □ (please specify) _____

Residents should receive training that lasts _____ hours per year.

Timing of training (multiple answers possible):

During medical school □ Pre-residency period □ During residency □

When working as a specialist □ There is no need for management training □

Appendix 5: Personal Demographic Data Survey Instrument

The following questions are exclusively to characterize the sample and will not identify or compromise you in any way.

Gender: Male □ Female □ **Age:** ____ years

Education qualification: _____ **Job role:** _____

Department: _____

Work experience:

I work in the following specialty (*e.g.*, pediatrics)**:** _____

Years of work experience as a specialist: ____ years

Wage: _____ **Seniority**: _____

Last performance evaluation results: Inadequate □ Sufficient □ Good □ Excellent □

In the last six months, mention:

Number of days absent due to health problems: _____

Number of days absent without justification: _____

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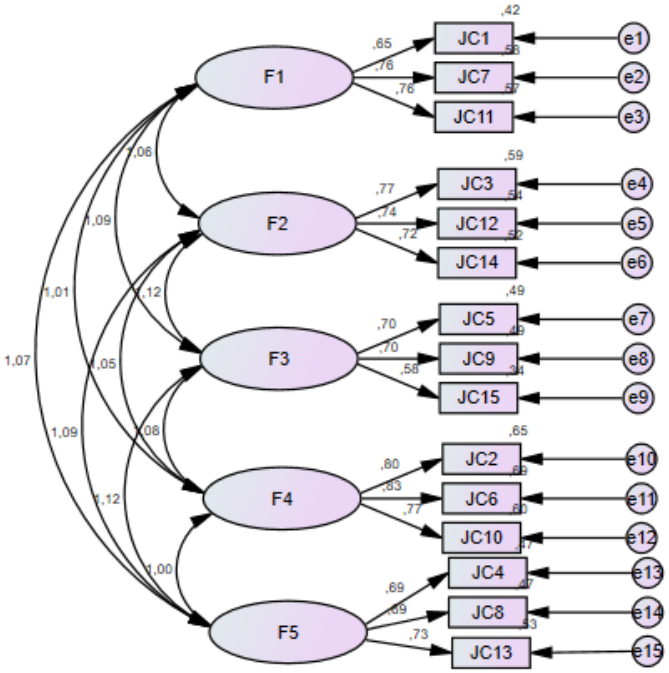
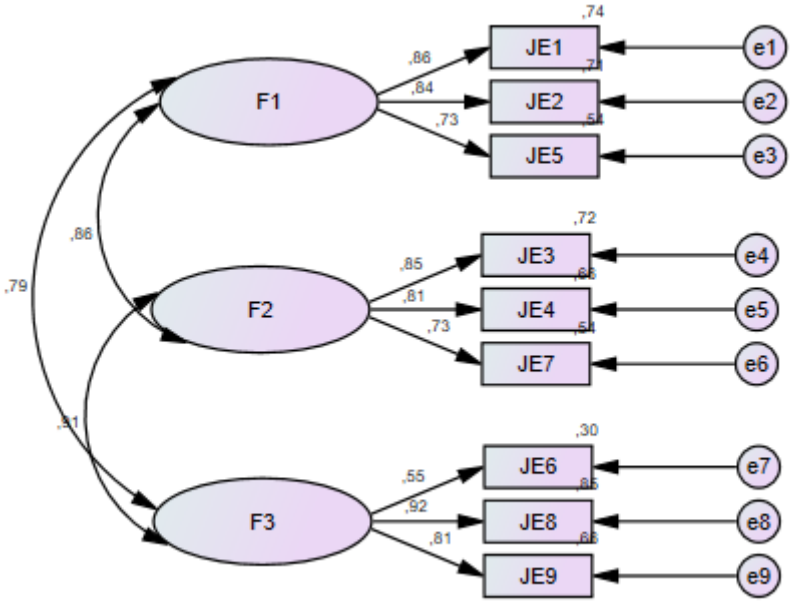
Appendix 6: Confirmatory Factor Analysis

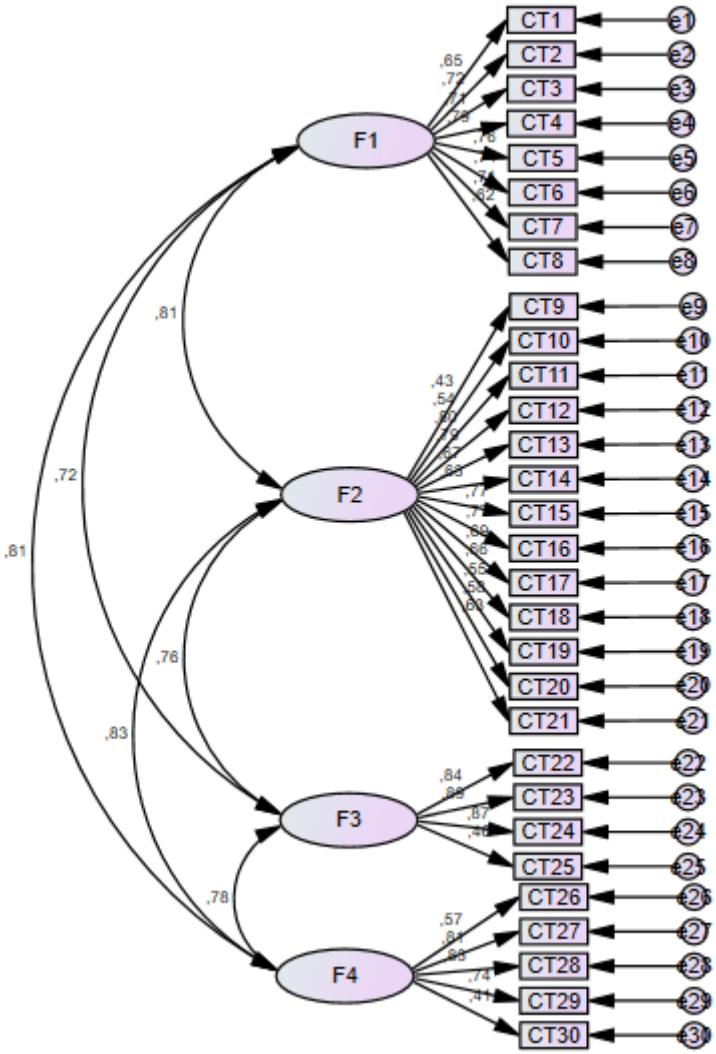
Job Diagnostic Survey



Utrecht Work Engagement Scale



Competencies and Training Scale



Knowledge, Skills, Abilities, and Other Personal Characteristics Scale