Full Length Research Paper

Competency development among Taiwanese healthcare middle manager: A test of the AHP approach

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The major purpose of this study is to obtain weighted values of various managerial competency facets. AHP method which is reliable and has been widely used in medical decision making, identify the difference in the importance of sub-factors, establish a model for selecting middle managers in the medical industry and provide a relatively objective and scientific method for selecting reserve cadres. This study conducts AHP method to develop a managerial competency framework for middle managers in the medical industry. The data collection is from nursing supervisors and top-level executives in medical institutions. Participants are required to make a comparison in importance between two competencies and then comparison results are processed and analyzed. Factors at the first level for selecting middle managers in the medical industry are sorted by importance as follows: personality, plan, manage, professional ability and interpersonal ability, indicating that experts believe that personality and plan are very important to middle managers in the medical industry, most of which are responsible for administrative management. We establish a core competency model for reserve middle-level managers in the medical industry. Reserve cadres can take training courses for administrative management arranged by the Nursing Department and the hospital, in which they can establish their career plans and improve their abilities and the human resource department can also find and train excellent talents.

Key words: Managerial competency, analytic hierarchy process, Taiwanese healthcare industry.

INTRODUCTION

Organizations have paid more attention to human capital. The relevant studies and development of competency have become a major topic in the field of human resources over the past decade (Ulrich et al., 2008; Naris and Ukpere, 2009). Competency must be realized in conjunction with the tasks of an enterprise or organization and can be used to identify qualifications and abilities which can not be separated in performance activities (Belkadiet al., 2007). Lievens et al. (2004) pointed that firms spend $100 million per year on developing, carrying out and modifying competency models (Athey and Orth, 1999; Hagan et al., 2006). In addition, performance is the

foundation of the concept of competency (Boyatzis and Saatcioglu, 2008; Potluri and Zeleke, 2009). Therefore, the major aim of an enterprise is to promote competency (Naris and Ukpere, 2009), improve personal effectiveness, control the turnover rate, or raise skills, thus improving the overall performance of the enterprise. Organizations have noticed the importance of managerial competency development, which will help organizations train capable executives (Wexley and Baldwin, 1986; Belkadi et al., 2007). Both public and private organizations emphasize the analysis and study of managerial competency required of the management.

Medical institutions with strong competitiveness need excellent nursing personnel, and therefore, it is very important for the Human Resources Department to recruit excellent and qualified nursing personnel. At present, a

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few researches are done in the research of screening and selecting nursing personnel. In the personnel screening, the information, service and other industries, the concept of competency put forward by McClelland in 1973 has been widely used. For instance, Loven and Helander (1997) applied this concept to screening operators in the manufacturing industry, Harvey et al. (1999) used it in selecting executives sent to work abroad and Cuschieri et al. (2001) studied the difference in the competency of surgeons. Presently, it is common in medical institutions to use written examination and interview to select middle-executives and personnel selection is mainly based on subjective judgment and past experience, without an objective and scientific method and ignoring complete competency traits of middle-managers. If competencies for various posts are clearly defined based on the requirements of the medical institution, we will make a breakthrough in the selection of middle managers. However, the fact is that a few of work has been done in a systematic way in the study of the competency of middle-managers in medical institutions and therefore, it will be explored in this paper.

The analytic hierarchy process (AHP) can solve a complex problem in a systematic way by dividing the problem into several levels, conducting quantitative judgment, identifying factors needing priority attention at each level and making a comprehensive assessment, thus providing decision makers with sufficient information and controlling the risk in decision making (Saaty, 1980; Liberatore and Nydick, 2008). AHP has been widely used in the multiple criteria decision making in various fields (Liberatore and Nydick, 2008), such as the selection of portfolio (Khaksari et al., 1989), robot optimal investment decision (Goh, 1997), the selection of suppliers (Barbarosoglu and Yazgac, 1997), the assessment of medical implementation plan (Dolan, 1989; Sloane et al., 2002; Liberatore and Nydick, 2008), the planning of health care human resources (Kwak et al., 1997; Weingarten et al., 1997; Hemaida and Kalb, 2001), health care assessment and policies (Hannan et al., 1981; Chang, 2006), the assessment of medical institutions' performance (Ahsan and Bartema, 2004; Dey et al., 2004; Hariharan et al., 2004), etc. The continuous application of AHP to medical care and medical decision making has proven that this decision making method is applicable to many fields (Liberatore and Nydick, 2008). Liberatore and Nydick (2008) have reviewed and analyzed a large amount of relevant literature since 1997 and confirmed that AHP is applicable to solving problems in medical care and medical decision making.

For all enterprises including those in the medical industry, the effective use and management of human resources is a topic of great urgency. The establishment of competency model can help us form clear knowledge of knowledge, skills, capacity, personal characteristics needed by each post and recruit excellent talents (Pillay, 2009; Zopiatis, 2010). Since middle managers play a

crucial role in a medical team, how to select reserve cadres with great capacity from medical care personnel has become a very important topic (Lussier, 2006; Hellriegel et al, 2006; Pillay, 2009). So, the major purpose of this study is to obtain weighted values of various managerial competency facets and criteria by using the AHP method which is reliable and has been widely used in medical decision making, identify the difference in the importance of sub-factors, establish a model for selecting middle managers in the medical industry and provide a relatively objective and scientific method for selecting reserve cadres. For practice, the personnel selected will be more suitable for the post and easier to be trained into excellent middle managers, leading to the growth and development of the whole Department.

LITERATURE REVIEW

In this section, competency, managerial competency, and AHP will be described.

Competency

The concept of competency was argued by McClelland (1973), who believes that the performance can be predictted with competency, which will not be influenced by race, gender or social economy and can be used to differentiate outstanding performance from ordinary performance. Competency involves individual characteristics (Spencer and Spencer, 1993), such as sensibility, creativity and intuition which are not easy to be observed and contains the organic ability of "learn and learn again" (Ralelin and Cooledge, 1995). Competency can help individual finish his/her tasks or reach the anticipated productivity (Reynold, 1994). Therefore, competency is a general concept and a model for measuring knowledge, skills, ability, behavior and other characteristics. It is closely related to work performance (Mansfield, 1996; Wu and Lee, 2007; Potluri and Zeleke, 2009). Competency can be measured with an acceptable criterion and can be enhanced through education and training (Parry, 1998; Wu and Lee, 2006).

"Competency" has the following six characteristics based on relevant studies: First, competency must be embodied by extrinsic behavior. For instance, if an individual possesses achievement-oriented competency, he/she must have extrinsic behavior embodying his/her achievement motivation. Such behavior may be that this person makes strategic goals for himself/herself and works actively to realize them or that this person works hard to surpass his/her present goals. The confirmation of the present and future abilities of the employee shall be included (Kochanski and Ruse, 1996). Second, competency brings about outstanding performance: the behavior of an individual with achievement motivation.

For instance, if a business manager develops a new market which brings about great profits, it can be called as competency; if not, it can not be called as competency (Spencer and Spencer, 1993; Boyatzis, 1982; Reynold, 1993). Third, different enterprises need different competencies. If the enterprise is in an environment with fierce competition, a strong achievement motivation will be a very important competency. However, if the enterprise has already gotten a firm foothold and is operating at optimal and balanced state, an excessively strong achievement motivation will damage the balance and affect adversely the performance. The competency model of an enterprise is closely related to the environment faced by this enterprise and may not be applicable to other enterprises (Boyatzis, 1982). Fourth, competencies needed vary with the post. Top-level executives need strong general ability, middle executives need strong communicative ability, and grass roots managers need strong technical ability (Katz, 1955; Guglieliemino, 1979). Fifth, competency will develop through education and training. Competency is not innate, and it can be improved through training and practice (Ralelin and Cooledge, 1995). However, researches show that the acquisition of competencies is quite time-consuming (Milkovich and Boudreau, 1997). Finally, competency will change. Boyatzis (1996) found that through direct and indirect access, competency models of 800 executives and professionals in the past 27 years and found that all managerial competencies keep changing and the degree of change varies with age, stage, the level of position and environment (Yeung, 1996). In this paper, middle managers in the medical industry were taken as the subjects and key managerial competencies concerning these managers will be explored.

Managerial competency

Managerial competency refers to necessary knowledge and skills required of an executive to perform his/her duties (Quinn et al., 1990). In this study, managerial competency is defined as "the behavior of an executive in doing his/her managerial work and to achieve a certain level of work performance, which shows his/her motivation, personal characteristics, skills, self-image, social role, knowledge, experience and responsibilities" (Boyatzis, 1982; Quinn et al., 1990).

In general, Katz (1955) indicated that an excellent executive must possess the following three kinds of managerial skills: technical skill, human skill and conceptual skill (Zopiatis, 2010). Technical skill refers to the expertise of an executive in a certain subject and consists of knowledge, skills, analytical ability and proficiency in using instruments concerning this subject. For grass roots managers, technical skill is a skill of great importance and top-level executives just need some general knowledge. Human skill refers to the ability to effectively establish interpersonal relationship, the

coordinating ability and the team spirit. A person with strong interpersonal skills can know what others are thinking from what they say and do, communicate with others effectively, help to establish an environment in which subordinates can express their ideas freely, encourage subordinates to get themselves actively involved in the work of the team, know clearly the demands of subordinates and consider others' ideas when doing things. International skill is very important to executives, especially milled-managers. Conceptual skill means the abilities of an executive to consider and handle problems from the angle of the enterprise as a whole, form clear understanding of complex relationships in an organization and various affecting factors, control the interactions between the organization and the outside world and identify various important factors in the environment and take measures timely which are good to the whole organization. Facing intricate and complex problems, an executive must effectively analyze the problems and weigh advantages and disadvantages of each solution, which depends on the conceptual skill of the executive to a large extent. Therefore, this kind of skill is crucial to executives at all levels. For top-level executives, they must consider a large number of complicated factors before making decisions and decisions made by them involve all aspects of the enterprise and therefore, an enterprise must pay enough attention to selecting and training top-level executives.

Sandwith (1993) conducted his research from the angle of training managerial ability, and put forward that an executive shall have managerial abilities in fives aspects (Zopiatis, 2010). Besides, both Sandwith and Katz believed that managerial abilities needed vary with the level of position, and therefore, managerial ability trainings for different levels of position shall have different priorities. According to the competency domain model put forward by Sandwith, managerial abilities consist of: first, conceptual, that is, having clear knowledge of relationships among subordinates and their tasks, senses of worth and personal plans, etc.; second, leadership, that is, setting a good example for subordinates, encouraging and training subordinates and helping form team spirit, etc.; third, interpersonal, that is, skills such as listening, participating, expressing opinions and summarizing, etc.; fourth, administrative, that is, making policies, designing working procedures, planning human resources, analyzing budgets, costs and benefits and conducting financial management such as managing accounting reports; fifth, technical, that is, product standards and knowledge, working procedures and methods and marketing plans, etc.

The common way to develop an individual's competencies is to analyze and quantify his/her skills, knowledge, behavior and personal characteristics and then establish a set of measures for competency development (Chen and Naquin, 2006). In this study, Fang et al (2008) summarized, by analyzing literature and consulting experts and based on empirical results of factor analysis, five

competencies required of middle managers in the medical industry:

(1) Managerial competency, including interpersonal relationship, executing ability, ability of training subordinates and responding ability; (2) Planning competency, including analytical, planning and innovating abilities, (3) Interpersonal competency, including interpersonal relationship, ability to satisfy customers and team spirit; (4) Technical competency, including internal knowledge, technical ability and managerial skills; (5) Personal characteristics: including self-management, working attitude and initiative (Appendix). In this study, AHP was conducted to sort sub-factors in each competency by importance, hoping that our research results can serve as a reference for the establishment of the model for selecting middle-level nursing supervisors and provide a relatively objective and scientific method for selecting reserve cadres, so that people selected will be more competent and can be trained into excellent middle managers and lead the department to develop in the future.

Analysis hierarchy process (AHP)

AHP is a kind of multi-criteria decision making technique. In complex multi-criteria decision making, AHP is usually used to deal with a decision making problem with several assessment criteria and in an uncertain situation and can systematize a complex problem by resolving the problem into several levels, conducting quantitative judgment, identifying factors needing priority attention and then making a comprehensive assessment, so that decision makers can have enough information and control the risk in decision making (Saaty, 1980).

AHP can solve unstructured problems concerning economy, society and managerial science. Facing a problem, the decision maker shall first set a general objective, and then develop criteria, sub-criteria and criteria at the bottom level. After this step, pair wise comparison is conducted with a scale of 1 to 9 and then Eigen vectors are worked out as weighted values of criteria and finally the overall priority vector is determined (Kamal, 2001; Lipovetsky and Michael, 2002; Mohammed, 2002). When AHP is used in decision making, the following several steps are involved (Saaty, 1980).

(1) Defining, that is, determining relevant criteria and establishing hierarchy: While dealing with a complex problem, we shall first establish the hierarchy and then analyze influences between different levels from the highest level rather than analyze factors at each level. To establish the hierarchy, we can resort to group participation or expert judgment. There are two methods: the first one is forward planning, which means predicting the future from the present and estimating what will happen in the future; the other one is backward planning,

which means making analysis from the future to the present, thus knowing the gap between the present and the future and making corrections continuously. In this way, a better decision can be made for the reference of the decision maker.

(2) Establishing the pair wise comparison matrix: We need make pair wise comparisons among factors at a certain level with a factor at the higher level as the assessment criterion. For instance, if there are n factors at a level, we need to make n (n - 1)/2 pair wise comparisons. In the pair wise comparison matrix, we need to use values of 1-P and its reciprocal to measure the relative importance of two factors to the assessment criterion at the higher level.

(3) Working out priority vectors and Eigen values of each level and evaluating the consistency of the pair wise comparison matrix: After establishing the pair wise comparison matrix, the Eigen value solution in numerical analysis was adopted to work out Eigen vectors or priority vectors, which represent weight values of factors in each level. The pair wise comparison matrix is a positive reciprocal matrix and it is difficult for decision makers to achieve consistency in pair wise comparison and therefore, the consistency must be examined and the consistency index must be determined, so as to examine whether the pair wise comparison matrix is reasonable. The consistency index is mainly used to check the degree of reasonableness of a decision maker in the process of assessment and whether there is inconsistency or contradiction, so that the decision maker can make corrections timely and avoid wrong decisions. Besides being used for evaluating decisions, the consistency check can also be applied to checking whether the hierarchy is consistent. According to Saaty, the consistency ratio is about 0.1 and it would be best that the consistency ratio is smaller than 0.1.

(4) Obtaining the overall priority vector: First calculate the priority vector of each level, and then establish a priority matrix with priority vectors of all levels so as to obtain the overall priority vector, that is, the priority of the planned plot (or decision scheme and evaluation subject matter at the bottom level against the highest level (focus problem).

(5) Selecting the optimal solution: Process the results of the last step, give more attention to plots with high possibility and less attention to plots with low possibility, and then aggregate various plots and their degrees of attention, so as to select the optimal solution to the problem.

METHOD

Sample and data collection

In this study, we depended on important data providers rather than diversified data providers for acquiring data, and sent 42 questionnaires to nursing supervisors and top-level executives in medical institutions in middle of Taiwan. Among the 42 subjects,

directors of the nursing department account, at 19%, deputy-directors of the nursing department at 14.3%, supervisors of the nursing department at 50% and top-level executives at 16.7%; females account at 90.5%; as for the age, age of 35 to 45, at 45.2%, followed by the age of 46 to 55, at 33.3%. As for the education degree, 71.4 % have post graduate diploma, and 28.6% have graduate diploma about 28.6%.

Measurement

In this study, we used the five major competencies required of middle managers in the medical industry which are summarized by Fang et al. (2008) through empirical study: (1) Manage (interpersonal relationship, executing ability, developing others and flexibility); (2) Plan (analyzing, planning and innovating abilities); (3) Interpersonal ability (interpersonal relationship, ability to satisfy customers, and teamwork); (4) Professional ability (internal knowledge, external knowledge, professional skills and managerial skills); (5) Personality (self-management, working attitude and initiative). The measurement is displayed in Appendix. In this study, a scale of 1 to 10 was used for measurement (1 is not importance, and 9 is extremely important). Participants are required to make a comparison in importance between two competencies and then comparison results are processed and analyzed.

RESULT

This study conducted the competency framework provided by Fang, Chang and Chen (2008), and to construct the competency model for middle managers in Taiwanese medical industry. The framework includes five factors: managerial competency, planning competency, interpersonal competency, technical competency, personal characteristics. The data were collected from the hospitals in the middle Taiwan. The participants are nursing supervisors and top-level executives across functions. The result is described above.

First level

The first level consists of five assessment criteria, including personality, manage, plan, profession and interpersonal and the second level has 18 assessment criteria. In this study, expert choice was used for AHP analysis and inconsistency index was taken as a standard. It will be considered as acceptable if this value is smaller than 0.1. The overall inconsistency in this study is 0.05, indicating that the consistency is acceptable. The results are shown in Table 1 and Figure 1.

The framework is included five factors: managerial competency, planning competency, interpersonal competency, technical competency, personal characteristics. Factors at the first level for selecting middle managers in the medical industry are sorted by importance as follows: personality (0.24), plan (0.21), manage (0.205), professional ability (0.199) and interpersonal ability (0.134), indicating that personality and plan are very important to middle managers in the medical industry, most of which are responsible for administrative management.

Personality and ability to plan are very important to middle managers in the medical industry (Gomez-Mejia, 2007; Yau and Sculli, 1990), most of which are responsible for administrative management personality are innate, difficult to be observed and changed and not easy to be trained and developed, therefore, in the process of selecting reserve cadres, we shall, based on all-round and long-time observations, choose those people with enthusiasm and initiative, meanwhile considering ability to plan and ability to manage, which are relatively easy to be observed, trained and developed.

Second level

The competence model is included: (1) manage (interpersonal relationship, executing ability, developing others and flexibility); (2) plan (analyzing, planning and innovating abilities); (3) interpersonal ability (interpersonal relationship, ability to satisfy customers, and teamwork); (4) professional ability (internal knowledge, external knowledge, professional skills and managerial skills); (5) personality (self-management, working attitude and initiative). We use the relative weight of the assessment criteria at the second level and the weight value of the first-level facet to calculate the relative weight value of each assessment criteria facet in the whole. We found that the most important factor among personality is enthusiasm and initiative (0.136); ability to plan, the most important one is organizing ability (0.075); for ability to manage, it is executing ability (0.058); for profession, it is professional skill (0.07), and teamwork (0.065) is the most important one in interpersonal.

We obtained the relative weight through AHP to understand the most important factor in second level. The result showed that first five major factors for selecting middle-level medical supervisors are enthusiasm and initiative, organizing ability, professional skill, managerial skill and team work.

DISCUSSION

This study conducted the competency framework provided by Fang, Chang and Chen (2008), and to construct the competency model for middle managers in Taiwanese medical industry. The framework is included five factors: managerial competency, planning competency, interpersonal competency, technical competency, personal characteristics. The data were collected from the hospitals in the middle Taiwan. The participants are nursing supervisors and top-level executives across functions. The result showed that factors at the first level for selecting middle managers in the medical industry are sorted by importance as follows: personality (0.24), planning ability (0.221), managing ability (0.205), professional ability (0.199) and interpersonal ability (0.134), indicating that experts believe that personality and plan are very important to middle managers in the

Table 1. Dimensions, indicators and weightings.

| Dimension	Weight	Indicator	Weight	Relative weight	Ranking
Personality	0.240	Initiative	0.565	0.136	1
		Working attitude	0.201	0.048	11
		Self-management	0.234	0.056	9
Manage	0.205	Developing others	0.282	0.058	8
		Executive	0.283	0.058	7
		Leadership	0.233	0.048	12
		Flexibility	0.201	0.041	13
Plan	0.221	Organizing	0.338	0.075	2
		Planning	0.263	0.058	6
		Analyzing	0.246	0.054	10
		Innovating	0.153	0.034	14
Professional ability	0.199	Professional skill	0.350	0.070	3
		Managerial skill	0.348	0.069	4
		Internal knowledge	0.156	0.031	17
		External knowledge	0.146	0.029	18
Interpersonal ability	0.134	Teamwork	0.482	0.065	5
		Interpersonal relationship	0.262	0.035	16
		Customer orientation	0.256	0.034	15
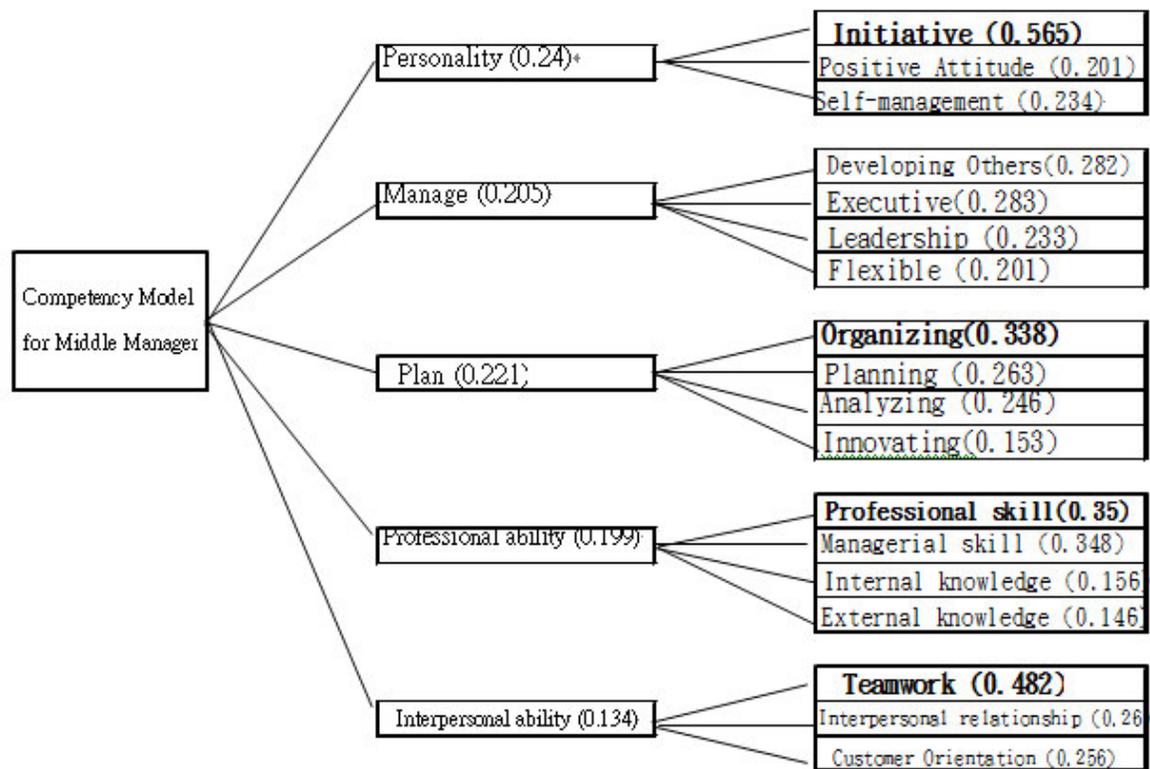
Figure 1. Competency model for middle manager.

medical industry, most of which are responsible for administrative management.

The result showed the most important competency is personality. In Personality-Trait approach, the leaders could have the unique traits, such as ability to manage (Stogdill, 1948) and proactive (Hay, 1990). Raybould and Wilkins (2005) investigate the managerial competency in Hong Kong hotel industry; found that traits are importance for managers. Furthermore, we use the relative weight of the assessment criteria at the second level and the weight value of the first-level facet to calculate the relative weight value of each assessment criteria facet in the whole, finding that the most important factor among personality is enthusiasm and initiative. Pillay (2009) developed 51 items and collected data from 420 nursing managers to construct competency model for nursing managers in South Africa. Pillay found that participants felt most competent in terms of self-management. In this study, self-management is considered as a trait of leaders. The result is consistent with previous studies (Fang et al., 2008; Mathena, 2002; Pillay, 2009) and confirmed the traits are essential for management competences (Meija, 2007; Yau and Sculli, 1990).

This research found that planning ability is second important in the competence model. Siu (1998) explored the managerial competencies for middle managers in Hong Kong's hotel industry; the result showed that the planning is essential for managers. In Pillay (2009) study, found that planning ability is important for nursing managers. The result of this study are consistent with previous study (Lin et al., 2007; Pillay, 2008; Pillay, 2009) and reassured that planning ability are crucial for senior manager in nursing management (Lin et al., 2007). Furthermore, we used the relative weight of the assessment criteria at the second level and the weight value of the first-level facet to calculate the relative weight value of each assessment criteria facet in the whole, finding that the most important factor among plan, the most important one is organizing ability. It implicated that the managers' competences are important for organization functions of planning, organizing, leading and controlling (Lussier, 2006; Hellriegel et al., 2006; Pillay, 2009).

The managing ability include developing others, executing ability, leading ability and flexible. Umbreit (1992) proposed six competencies for hospitality graduates, pointed that leadership are important. Buergermeister (1983) conceptual management skills are crucial for hospitality managers. The result in this study are consistent with previous study, managing ability are essential for hospital management. Furthermore, we use the relative weight of the assessment criteria at the second level and the weight value of the first-level facet to calculate the relative weight value of each assessment criteria facet in the whole, finding that the most important factor among manage, the most important one is

executing ability. It consisted with Sandwith (1993) and Siu (1998), the ability that ideas are turned in to actions are essential for managers in hospitality industry.

The professional ability is third in the competency model. The results are consistent with previous study (Fang et al., 2008; Pillay, 2009; Duffield, 1994; Pedersen, 1993). However, we use the relative weight of the assessment criteria at the second level and the weight value of the first-level facet to calculate the relative weight value of each assessment criteria facet in the whole, finding that the most important factor among professional ability, the most important one is professional skill. It implicated that the middle managers in medical industry have to be clinically orientated (Lin et al., 2007; Pillay, 2009).

In this study, interpersonal ability is ranked lowest. Due to the role middle managers have to coordinate, communicate or solve problems, Katz (1955) pointed that human skill which interact with others effectively is important for middle managers. Buegermeister (1983) indicated that human relations skills are essential for hospitality managers. Although interpersonal ability is included in the competency model we proposed according to the literature. However, the result showed that the importance of interpersonal ability in competency model for middle manager is the lowest. The result is consistent with Fang et al. (2008) which collected data from Taiwanese medical industry and conducted grey relation analysis. Furthermore, we use the relative weight of the assessment criteria at the second level and the weight value of the first-level facet to calculate the relative weight value of each assessment criteria facet in the whole, finding that the most important factor among interpersonal ability, the most important one is teamwork. It implicated that the middle managers in medical industry have to play the role for coordination, communication or solving problems (Katz, 1955).

In summary, personality are innate, difficult to be observed and changed and not easy to be trained and developed and therefore, in the process of selecting reserve cadres, we shall, based on all-round and long-time observations, choose those people with enthusiasm and initiative, meanwhile considering their planning and managerial competencies, which are relatively easy to be observed, trained and developed.

The result of this research can serve as a reference for the establishment of the model for selecting middle-level nursing supervisors and provide a relatively objective and scientific method for selecting reserve cadres, so that people selected will be more competent and can be trained into excellent middle managers and lead the department to develop in the future.

Conclusion

The concept of competency is applicable to all aspects of

human resource management, including human resource planning, recruitment, training and development, performance appraisal, remuneration and motivation (Dubois and Rothwell, 2004; Kochanski and Ruse, 1996; McEvoy et al., 2005; Rivenbark, 2004; Rodriguez et al., 2002; Brownell, 2006). Presently, the practical use of competency focuses on education and training and it is difficult to apply it to other aspects. The concept of competency can be applied to career planning and development. For instance, an individual can know, from evaluation results, what competencies he/she lacks and take refresher courses or take part in special activities to improve his/her competency and performance. As for the promotion system, the length of service is no longer the basis for promotion and middle-level managers are selected based on their core competencies.

Through the assessment of the core competency system, we can have clear knowledge of a candidate's competencies and characteristics, so as to find the right post for this person. On the other hand, we can conduct weighted scoring based on competencies necessary to a post and select the people suitable for the post. A core competency model could be established for reserve middle-level managers in the medical industry. Reserve cadres can take training courses for administrative management arranged by the nursing department and the hospital, in which they can establish their career plans and improve their abilities and the Human Resource Department can also find and train excellent talents.

There are some limitations to be considered. First, the rating is evaluated by questionnaires to nursing supervisors and top-level executives, there may be errors caused by raters' subjective and influencing the score and rating. Second, the participants in this study are nursing supervisors and top-level executives in medical institutions in middle of Taiwan, the external validity could be limited. Third, self-report scale is employed in this study and the measurements of variables are mainly finished by the individual opinion. However, the individual opinion may be different from the actual situation. The follow-up researchers are suggested to validate the measurement and further conduct the data from more multiple sources to find out the result which can be generalized in different contexts.

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Appendix

Dimension	Item	Description
Interpersonal competencies	Cooperate with others with the aim of achieving win-win. Be capable of solving disputes between departments. Colleagues like to talk with you about their difficulties in work. Be skilled at encouraging others. Be willing to listen to others.	Establish interpersonal relationships necessary to the work, and manage, coordinate and accept various opinions(establish relationship networks, convey clearly information or ideas in a variety of ways, and help others acquire information).
	Consider inside and outside factors while solving problems and making decisions. Consider demands of customers (or patients) while making decisions. Share work achievements with the whole group. Emphasize team success rather than individual performance.	Be customer-oriented in the work (attach great importance to customers and their demands, and work hard to develop and maintain good relationship with customers).
Personal characteristics	Deeds accord with words. Deal with failures and mistakes constructively. Treat others fairly. Be skilled at relieving work pressure and don't let mood affect adversely the work.	To realize personal goals, an individual keeps adjusting or controlling the behavior of himself/herself and improving his/her thinking ability.
	Be patient with customers (or patients) when they have questions. Be able to control emotions when getting angry. Be able to calm down quickly when quarrelling with others.	Honest, having moral integrity, being fair in doing things, and being able to control emotions.
	Hold a positive and active attitude towards the work. Support new ideas actively. Keep learning and developing the self.	Being optimistic and active, developing the self continuously, liking to interact with others, considering a problem in all its aspects, and being energetic.
Planning and managerial competencies	Explain clearly working tasks and responsibilities to employees. Encourage employees to solve problems actively and provide guidance timely. Set objectives for employees, and use such objectives to encourage employees to work hard.	Encourage employees to achieve objectives of the organization, and accomplish a task depending on the strength of the organization.
	Assign a task to an employee at the right time, so that he/she has the opportunity to learn and develop. Give priority to the interests of subordinates, and be selfless.	Help others acquire knowledge and skills necessary to accomplishing tasks or solving problems
	Be flexible in doing things, and be ready to receive new ideas. Identify possible risks in the working environment and make responding plans.	Keep track of changes in the environment, prepare for possible problems or opportunities, and be able to use resources to solve difficulties quickly and effectively.
	Be able to make action plans to achieve objectives of the company. Be able to simplify working procedures. Be able to assign a task to the right person. Maximize the benefits of the organization by innovating or adopting methods which are more efficient.	Be able to make action plans or simplify working procedures by innovating or adopting methods which are more efficient, so as to maximize the benefits of the organization and improve performance or service.

Appendix. Contd.

Group cooperation and executing competencies	Be able to work efficiently even in a state of confusion. Be able to work actively even under great pressure.	Be able to manage time and resources effectively and accomplish tasks efficiently.
	Be able to sum up others' opinions effectively so as to reach the consensus. Be able to correct the way of leadership timely and make full use of the strength of the team. Keep information exchanges between employees and top-level executives, and update information timely. Solve problems with the strength of the team.	Be able to grasp opportunities and take measures timely, and be able to establish cooperative relations between self and others and between organizations, facilitating the realization of objectives of the organization.
Professional ability	Have clear knowledge of how departments in the medical institution operate. Have clear knowledge of medical services and relevant information. The ability to help employees accomplish services. Often review factors leading to success or failure, with the aim of realizing objectives of the organization. The ability of controlling medical quality.	Use and develop medical knowledge, which is the basis of various competencies of a medical supervisor.
	Consider positively and objectively suggestions on solving problems. Make clear and constructive suggestions timely. Often think about the future, and identify improvements. Effectively control time efficiency of the work.	The abilities of using technical knowledge flexibly, and of analyzing and solving problems with professional knowledge, working ability and working experience.