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Review article: Competency models of IT specialists and managers in the healthcare sector

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Abstract

Meritocracy and the use of efficient human resources is nowadays considered one of the basic principles and causes of the success of organizations in moving towards dynamism and transformation. Empowered and motivated human resources are the most valuable assets of organizations and can compensate for the possible shortage of other resources if used with appropriate combination and valuated, maintained or transferred based on competency. The purpose of the present study is to investigate the competency models of IT specialists in the healthcare sector. It tries to provide a better understanding of the competency models of IT specialists in the healthcare sector. It uses fundamental analysis and describes competency concepts, competency models, and competency models in the field of IT. It also gives some explanations on methods for developing competency models and competency tools. Finally, it presents a summary of the study on the competency model in the healthcare sector.

Keywords: Competency, Competency models, It specialists, Health.

Introduction

The IT industry has been around for about 50 years. This industry has been facing constant changes and transformations. Those employed in the IT industry in the past were not necessarily professional and were more likely to provide technical solutions. Many studies have been conducted in this area to change this insight, such as a study entitled "Professional Knowledge in the Information Technology Program", which was carried out in 2005 with the academic-industry partnership to identify and build competency and capability in most IT specialists and other senior officials. Therefore, it can be said that as technology moves forward, IT specialists lose their role as technology specialists and turn to business strategy specialists, communication establishers and financial managers, who rely on a series of other skills. The challenge here is that IT specialists must achieve new competencies. Businesses with rapidly changing environments and technologies require skillful specialists who can learn, communicate effectively, act flexibly and adapt themselves to environmental changes. However, this involves focusing on the coordination of organizational goals and values that human resources can create for organizations (Rodriguez, 2002; Sanchez & Levine, 2009).

Many studies on competency modeling have identified the special competencies required for success in a variety of professions, such as the healthcare sector, management, and engineering. Competency models act as a reference platform for workforce competency management (Suhairom et al., 2014). These models are valuable in that they can determine the competencies of a person in a profession or industry and develop a person's complete evaluation or comprehensive approach (Mansfield, 2005; Patel, Bright, Gregory, and Gowing, 2002), and this information can be used by specialists successfully in a variety of areas (Suhairom et al., 2014). According to Boyatzis (2008), the competency model is a model for helping management in the selection and recruitment process. The Competency Model provides an essential guide for employees about how they should behave and what they should do. Finally, using a competency model, management can understand which employee characteristics are associated with excellent performance (Suhairom et al., 2014).

According to Boyatzis (2008), the competency model helps management in the selection and recruitment process. It provides an essential guideline for employees about how they should behave and what they should do. Finally, using a competency model, management can understand which employee characteristics are associated with excellent performance (Suhairom et al., 2014).

This study, aiming to investigate the competency models of IT specialists in the healthcare sector, first reviewed articles and studies and showed that the competency model was not provided in the IT sector of health as well as in its regulation part which is responsible for strategies, policymaking, and macromanagement of this sector. Moreover, the models presented in the competency about the competency of other organizations and domains have only focused on the managers' competency model and provided no competency model for IT specialists in the healthcare sector. This paper first reviews the theoretical background of competency models in detail and then offers a model for the competency of IT specialists in the healthcare sector.

Theoretical background

Concept and definitions of competency

The term "competency" was first introduced by White (1959) to describe personality traits related to superior performance and high motivation. Assuming a relationship between cognitive competency and motivational action tendencies, White (1959) defined competency as "an effective interaction of the individual with the environment", and argued that there was a "competency motive" in addition to competency that was called the "realized capacity". The early Romans also provided a list of competencies to introduce the features of a "good Roman soldier". However, competency-based approaches were introduced in the corporate environment in 1970 and then developed and used rapidly (Draganidis & Mentzas, 2006). The concept of competency is at the heart of human resource management and provides a basis for the integration of the key activities of human resources. As a result, it develops a comprehensive approach to the management of individuals in organizations (Lucia & Lepsinger, 1999). The term “competency” was originally proposed by McClelland (1973), a psychologist at Harvard University, who questioned the IQ tests that were commonly used to select students in the higher education system of that time. He pointed out that more attention should be paid to competency because it measures the practical efficiency. Then competency was used in organizational management and researchers began to argue that competency affected job performance.

McClelland became famous for presenting the idea of "competency" to human resource literature. In his efforts to evaluate the US intelligence agency, he improved the selection procedures. He found in a study that competencies such as interpersonal sensitivity, positive intercultural considerations, and management skills are different between ordinary and distinguished intelligence agents. McClelland (1973) followed this approach and developed certain tests for competency prediction as an alternative to intelligence and personal trait approaches to performance appraisal. He defined competency as a feature identifying human performance (Dubois et al., 2004).

McLagan (1980) then defined competency as a set of knowledge, skills, and abilities to achieve the main outcomes of work. Knowles (1970) presented a general definition of competency to include the necessary knowledge, individual value, skills, and attitudes for a particular task. Hager and Gonczi (1980) pointed out that competency should include three factors, namely knowledge, skills, and attitude, all of which interact with one another and occur in a particular way simultaneously. Competency can help managers and staff to find key abilities in high-performance employees and determine their highly efficient performance in knowledge, skills, or behavior (Spencer and Spencer, 1993). In short, this study defines competency as a term that evaluates knowledge, skills, behaviors, and other key features of work. Additionally, competency can help a person achieve high efficiency in his or her job.

A review of competency and competency models

Markus et al. (2005) categorized competency definitions in three distinct approaches: educational standards, behavioral sets, and organizational competencies. Competency was defined in the educational approach based on the outcomes of knowledge, skills, and attitudes or expectations (of work) (Fletcher, 2001). In other words, competency was defined with the minimum level of action, behavior, or outputs and different skill levels through statements (Burke et al., 1974). The psychological approach argued that competencies defined as motivations and personality traits (behavioral sets) are the best indicators of success (McClelland, 1973). Competencies are viewed as "the main bodies of knowledge, motivations, features, personal images, and social roles and skills that are typically related to effective performance in work" (McClelland and Boyatzis, 1980). The organizational or commercial approach is based on Hamel and Prahalad's definitions of "core competencies" and "abilities" as the output of organizational education (Hamel and Prahalad, 1989) and proposed the need to define higher levels of future-oriented organizational competency (Sparrow, 1995).

Marrelli et al. (2005) described competency by its components including knowledge, skill, ability, and personality characteristics (KSAP) (Hoge et al., 2005; Marrelli et al., 2005). Knowledge includes the information, facts, and principles needed to complete a task successfully (Mirabile, 1997) and achieved through learning and experiment. Skill is a mental or physical capacity to perform tasks with a specific output, while ability extends skill to perform work in a wide range of possible outcomes (Marrelli, 1998). Individual characteristics such as attitudes, values, and attributes include emotional and personality components. The scope of knowledge and skill of interrelated tasks, such as filling out a form, deals with more abstract matters, such as facilitating a team meeting (Lucia and Lepsinger, 1999).

Competency models refer to a set of functional and behavioral capabilities required to perform a particular task. They promote organizational values and core competencies by acquiring preferred behaviors (Markus et al., 2005). Models organize competencies into a hierarchy of unique indicators and criteria. The number of groups in a model depends on the complexity of work as well as the organizational culture and values (Ho and Frampton, 2010). This is usually the result of a competency model of role that has eight to sixteen competencies (Shippmann et al., 2000). Mansfield (1996) supports 10-20 characteristics or skills, each with a definition and a list of specific behaviors, showing what effective work should be done and how effective results should be achieved. Spencer and Spencer (1993) suggest avoiding the unevaluated lists of competencies. They suggest five to nine competencies as a good rule, referring to Miller’s (1956), "7 plus or minus 2," because this level of competencies is naturally manifested by the limitations of human information processing. Bartram (2005) supports this by comparing eight major competencies together with five major factors, which is the eight-factor solution for better performance prediction.

McLaughlin et al. (2012) claim that the Iceberg Model (Spencer & Spencer, 1993) is one of the models used to show competencies. Characteristics of competency are divided into

five categories: motives, traits, self-concept, knowledge and skill. The model's name shows the hidden nature of the underlying motives and attributes, which is very difficult to develop. Ho and Frampton (2010) present a model for identifying the competencies of IT architecture based on the Iceberg Model in Figure 1.

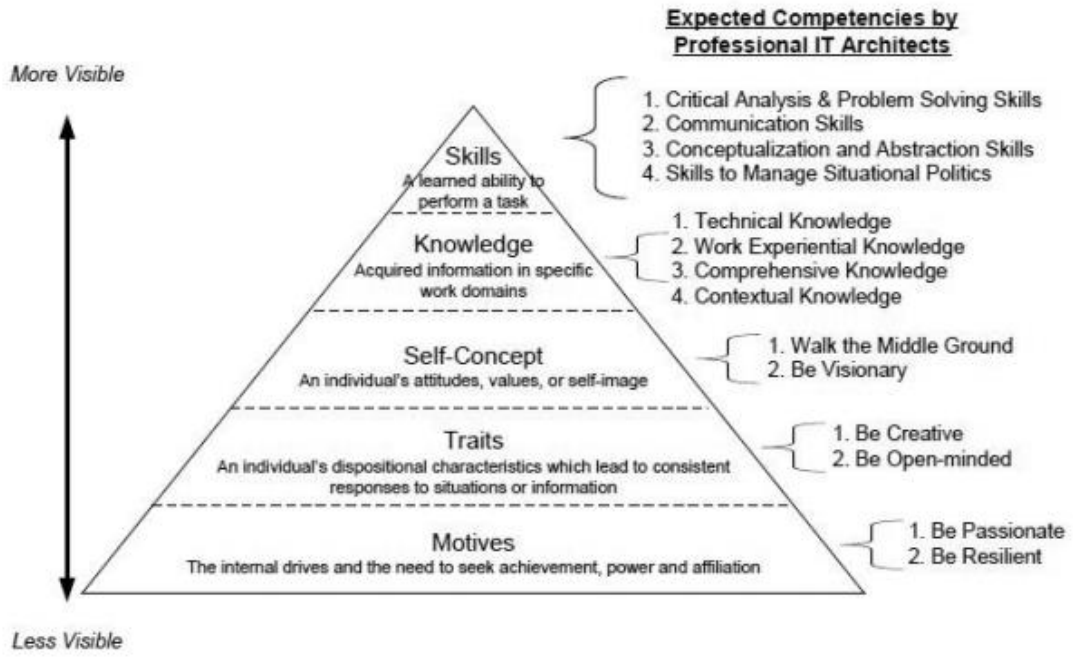


Figure 1). Competencies of IT architecture based on the Iceberg Model (Ho and Frampton, 2010)

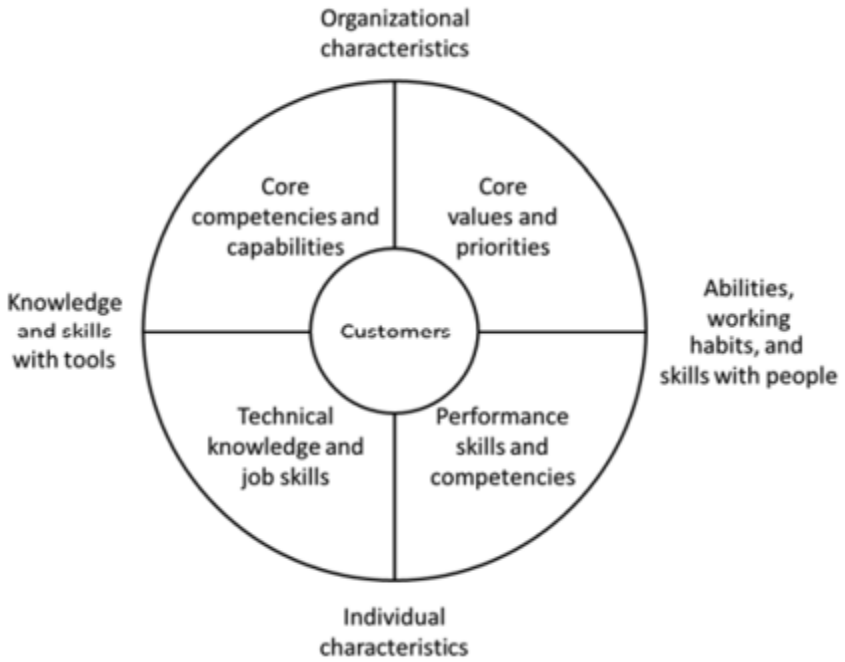


Figure 2, Competency domain, the relationship between organizational and individual characteristics (Green, 1999)

The models designed for educational goals describe technical competencies in terms of skills and knowledge, while behavioral skills and organizational competencies are usually described at a higher level (Markus et al., 2005). Green (1999: 7) suggests that one must use the behavioral language when describing competency, that is, what has been done, what is being done, or

what needs to be done, in order to avoid misunderstandings. For example, for the definition of competency as "superiority", one can avoid confusion or misinterpretation by describing what one says or when one performs in an excellent way. Regardless of the approach, the competency model should provide an operational definition for each competency and its subsets (subordinate competency), along with measurable, observable or standard indicators for evaluating individuals" (Markus et al., 2005). Competency must be measurable and provide ranking items for high, medium, and low performance ranks in order to provide an acceptable competency system (Green, 1999: 17). Marrelli et al. (2005) focus on the need to examine the legal consequences when using competency models for occupational positions, which shows more need for validation.

The competency approach ensures the benefits of performance through the causal or instrumental relationship between competencies and individual job performance (Boyatzis, 1982) and organizational performance (Hamel and Prahalad, 1989). Other expected benefits include improving recruitment and selection methods, improving individual and organizational development, improving performance management, and improving communication in strategic or human resource issues (Sparrow, 1995). Competencies are also context- specific, meaning that some skills are more important to certain occupations than others (Ho and Frampton, 2010). There is always a balance between universality and specificity in the definition of competency (Stuart, 1983). Competency describes itself in the unique combinations of specific and common elements among individuals, and the paradox is the more universally realistic the list of competencies is, the less useful it will be to select a particular option on how to act and behave in a specific position (Burgoyne, 1990). Observations show that competency models are always deficient (Hayes et al., 2000).

From the perspective of industrial and organizational psychology, O'Reilly and Chatman (1986) distinguished between role behaviors needed in jobs and conditional behaviors that are not linked to a specific role. Motowildo et al. (1997) identified two aspects of overall job performance as work performance and contextual performance, which includes socialization, application, and effort necessary to facilitate work performance, ie, the use of technical knowledge and work (Borman et al., 2003). Motowildo et al. (1997) also show that activities engaged in task performance are likely to vary

Figure 3). Competence eye (Caupin et al., 2006)

between roles, while those contrasting in performance are often similar.

Ruuska & Vartiainen (2003) claim that individuals and groups must be able to integrate their competencies in order to achieve their goals. This type of collective competency or team competency (Crawford, 2000; Frame, 2003) emphasizes interaction and communication and is based on a common understanding of project teams (Schein, 1993). Collective competencies are context-dependent because they can be learned only through participation in a group activity (Cook and Yanow, 1993). This interdependence of competencies is partly due to their ambiguous dimensions (Polanyi, 2009), where learning takes place while one is focusing on something else.

Robinson et al. (2005) reviewed the literature on engineering design abilities (Leiper and Khan, 1999); (Turley and Bieman, 1995); (Edum-Fotwe and McCaffer, 2000) and identified the key competencies including technical competencies for specific roles; competency showing a high level of motivation; the use of information to solve problems and make decisions; teamwork; management and leadership; communication; project and resource planning and management; innovation; and strategic awareness of large-scale business and customer background. They predicted six competency groups for design engineering: personal attitudes, project management, cognitive strategies, cognitive abilities, technical ability, and communication. Referring to the ethnographic studies of Baird et al. (2000), Robinson et al. (2005) underlined the importance of non-technical skills, such as planning, prioritizing and awareness of other affiliations. While evaluating long-term outcomes, designer engineers are engaged, besides the immediate results, with complex intellectual processes, based on which they prioritize work (Robinson et al., 2005). Hales and Gooch (2004, pp. 66-67) found that only 47% of the design engineering effort was related to the stages in the design process, while the remaining time was related to public activities including "planning, examining/reporting, cost estimation, information recovery, social communication and helping others".

Figure 3 shows the competence eye of the International Project Management (Caupin et al., 2006). These 46 elements connect the project management competency to technical, behavioral, and contextual competencies, which describe 20, 15, and 11 elements, respect

Derro & Williams (2009) described the engineers' behavioral competency systems in NASA or the art of engineering systems with five designs: leadership skills, attitudes and characteristics, communication, problem-solving, system thinking, and technical acumen and added more details to the model (Figure 4).

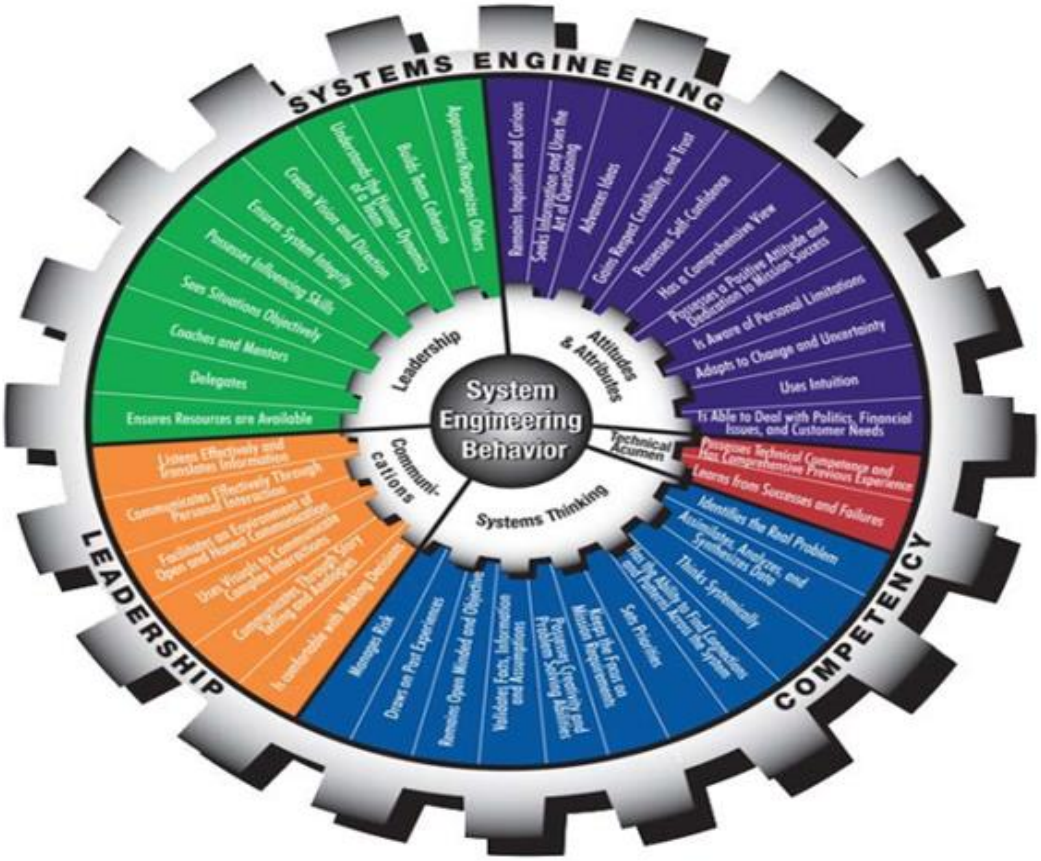


Figure 4) Behavioral competency system considered by NASA (Derro and Williams, 2009)

Ruuska & Vartiainen (2003) identified seven major areas of project competencies, including project management, leadership, communication and interaction, knowledge management, interest groups, technology, processes and procedures, and customer competence.

Competency models in the domain of IT

US Department of Labor's Pyramid Model for the ICT Workforce

The United States Department of Labor's proposed framework for the competency model for the various occupations of different industries is a pyramid framework consisting of three main parts:

1. Core competencies
2. Industry-related competencies
3. Job-related competencies

Each of these parts consists of several layers that include a set of competencies representing the basic skills, knowledge, and abilities required for success in an occupation. If we move from the base of the pyramid to its top, the first three layers comprise competencies that are common to different occupations and industries. These competencies, known as "soft skills," are essential for success in most occupations. Layers 4 and 5, which are in the next section, include competencies related to a particular industry and are common to various occupations in that industry. However, given the various occupations and sub-sections of the ICT industry, the technical competencies of each of the sub-sections will also be different. Therefore, the competencies corresponding to this layer were not included in the general model because the proposed model is a general model designed for the whole ICT industry. The third part of the pyramid is composed of two layers, including managerial competencies and specific needs and responsibilities of a particular occupation or profession, which is in close relation with the O * Net database and is presented in the final layer of the model (United States Department of Labor, 2012).

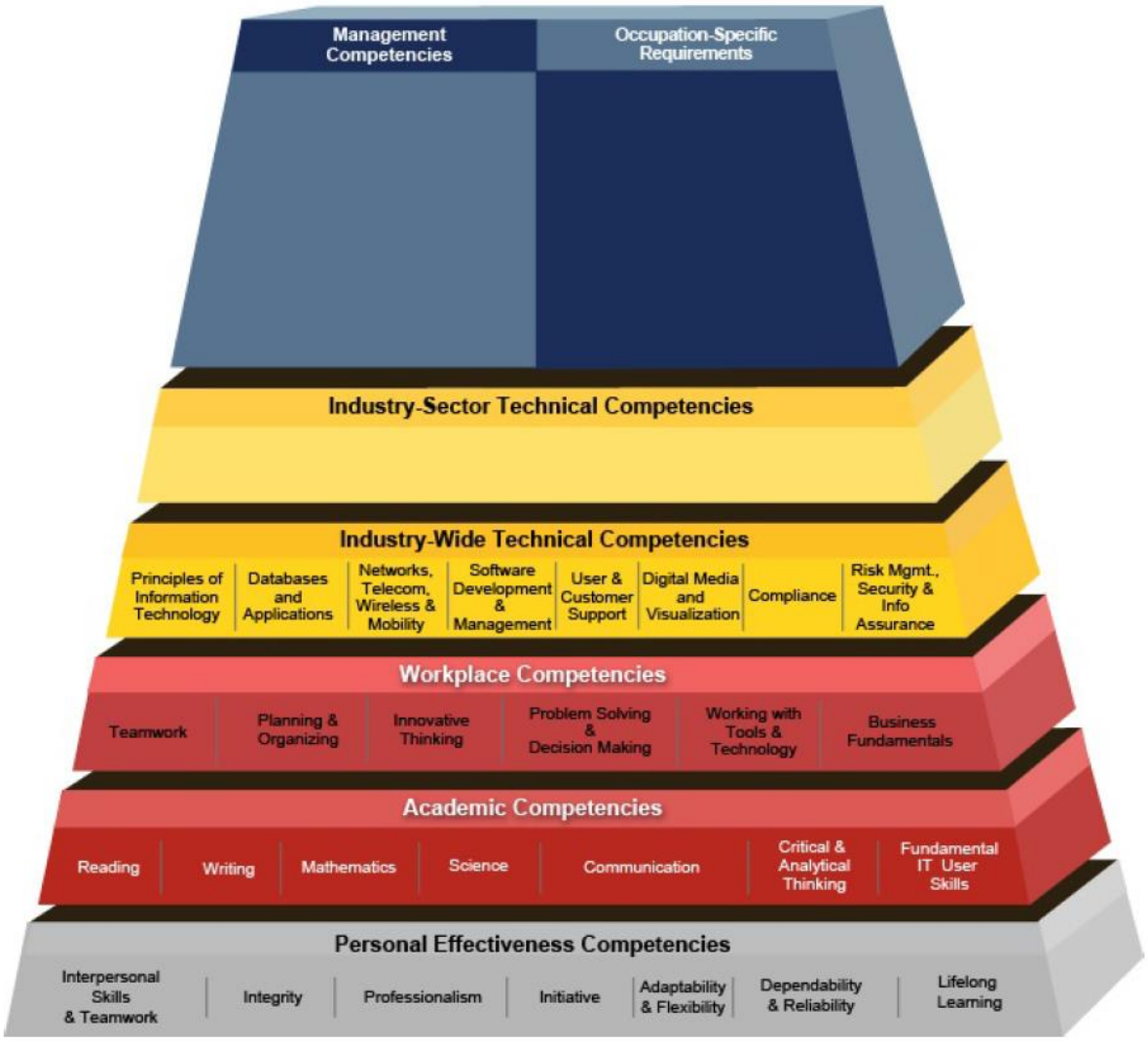


Figure 5) Competency pyramid of the US Ministry of Labor for the ICT occupations

European e-Competence Framework (e-CF)

The European e-CF is a framework within which the ICT-related competencies are categorized and presented in four main dimensions. These dimensions represent the different levels of business requirements and HR planning and are presented as follows:

First dimension: The first dimension classifies all the competencies of the ICT domain in five main areas including Planning, Creation, Execution, Empowerment, and Management.

Second dimension: This dimension includes the competencies associated with the areas defined in the first dimension. In total, 40 competency groups are defined in all ICT areas, presented in the second dimension of the framework.

Third dimension: This dimension considers five different levels of skill and expertise for each of the 40 competencies presented in the previous dimension. These levels of expertise are displayed by symbols 1- e to 5e and defined corresponding to levels 3 to 8 of the European Competence Framework.

Fourth Dimension: This dimension presents practical examples of knowledge and skills related to each of the competencies presented in the second dimension.

Based on the first and second dimensions of this model, we will have:

1. **Planning** includes business strategy information and coordination systems, service level management, business plan development, project or product planning, design architecture, application design, technology monitoring, sustainable development, and innovation.

2. **Creation** includes the development of applications, component integrity, testing, solution adoption, document generation, and system engineering.

3. **Execution** includes user support, change support, service delivery and problem management.

4. **Empowerment** includes the development of information security strategy, development of the ICT quality strategy, providing training and learning, purchasing, preparing a sales offer, route management, sales management, contract management, human resource development, knowledge and information management, need identification, and digital marketing.

5. **Management** includes prediction, project and document management, risk management, relationship management, process improvement, ICT quality management, business change management, information security management and IT management (EU, 2014)

ITU Model

The International Telecommunication Union (ITU), one of the United Nations specialized agencies, has also announced the list of competencies required for the jobs of this sector. The list includes the core competencies and managerial competencies that are generally referred to as non-technical competencies.

1. Core competencies include communication and information skills, mastery of occupational knowledge and skills, analysis, judgment and problem solving, commitment to quality, productivity skills, customer focus, planning and organizing skills, effective relationships with others, initiative, reliability, learning skills, and flexibility.
2. Managerial competencies include strategic orientation, leadership skills, negotiation skills, individuals' management, project management, skills of managing study groups, councils and meetings (ITU Careers and Recruitment, 2010).

Methods to create competency models

Spencer & Spencer (1993) summarized three steps of analysis and four steps of validation to identify competencies and build a competency model based on behavioral event interviews, surveys, panels, expert systems, and observations. The final competency model should include precise definitions of any competency with scoring rules. The process of defining global competency models begins with the definition of the community that should be described with the competency model and continues with the use of literature resources, previous competency models and experience in model development. These models often require evaluation and development tools to support real-world applications of models. The obvious problem of global competency models is their inability to directly describe each particular occupation (Mansfield, 1996). Marrelli et al. (2005) presented a seven-step process to develop a competency model, summarized in Table 1.

Table 2. Seven stages of the development of the Competency Model, Adapted from (Marrelli et al., 2005)

The reason for the development of the competency model, the analysis and time framework unit, and how to apply this model	Definition of goals
The required resources and how to ensure the co-operation of all stakeholders	Achieve the support of a sponsor
How to manage the participation of committed, compliant and resilient stakeholders during the process	Development and implementation of the communication and education plan
Data collection from multiple groups, focusing on high-performance individuals with strong analytical and verbal abilities, but ensuring that the sample represents the total population. When choosing the data collection method, consider their validity, reliability, efficiency, practicality, and acceptability for stakeholders.	Methodology planning
Defining various jobs, identifying specific competencies, organizing competencies within a framework, and presenting them with descriptions to build a competency model, evaluating the model with specialists of the field, and developing examples for each competency in at least three levels of expertise and skills	Identifying competency and building a competency model
Using competency to select, develop, manage, award and reward the employees.	Applying the competency model
Competency modeling is a continuous process. Schedule future reviews.	Evaluation and updating of the competency model

Sherman et al. (2007) developed the use of the Grounded Theory method (Corbin and Strauss, 1990; Glaser and Strauss, 1967; Strauss and Corbin, 1994) to analyze interviews. Langdon and Marrelli (2002) claimed that every occupational model with six behavioral elements can be described using a work language. Other approaches to identifying competency and building competency models are process-based approaches, output-based approaches, invented or initiated approaches, trend-based approaches, and responsibility-based approaches (Rothwell and Lindholm, 1999).

Development of competency tools

A competency-based evaluation creates challenges for some professions; however, rewards are potentially significant. Creating a really valid competency-based strategy can bring huge profits not only for professions, but also for the whole community. The competency-based evaluation system judges individuals based on some evidence of their specific criteria about competency standards in the profession (Gonczi, Hager, & Athanasou, 1993). According to Nicholsin, Griffin, Gillis, Wu, and Dinning (2012), many research methods have been mentioned for the development of competency-based assessment indicators. Bashook (2005) emphasized the psychometric requirements in competency-based assessment development. The goal of competency-based assessment during training or work is that each assessment can be an accurate indicator of one's knowledge, skills, abilities or performance. Accuracy means that assessment points should be a reliable and valid indicator of a person's performance.

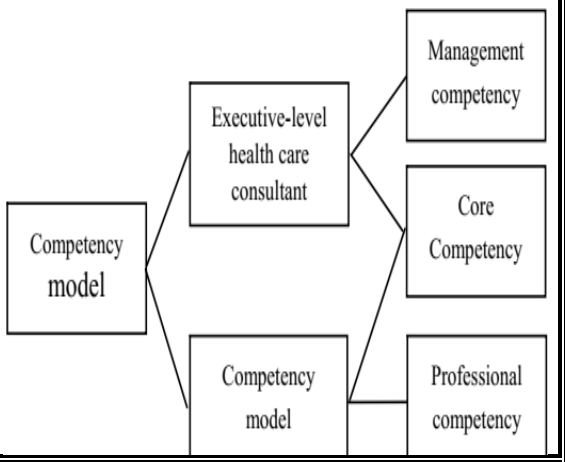
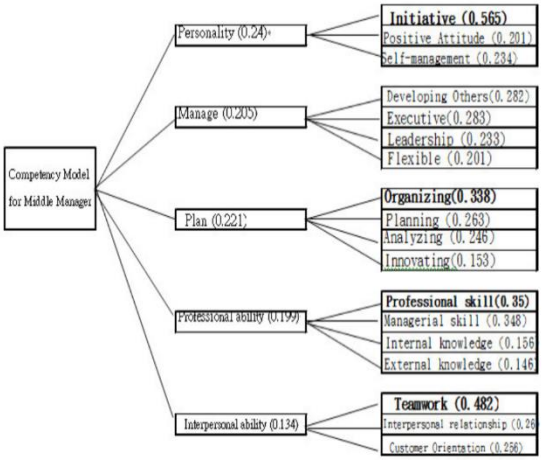
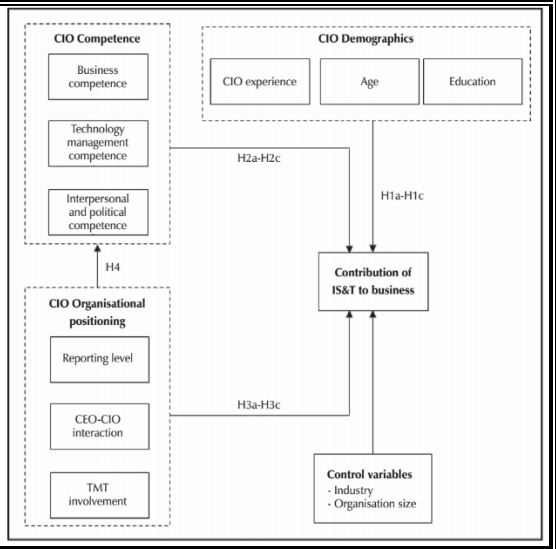
Discussion and conclusion

The modern world has encountered a new problem and management of life and affairs also requires a new way in this century. The small and personal small and medium-sized enterprises have been replaced by large-scale manufacturing and industrial organizations, and the economic system of countries is based on the activities of such large institutions (Berger, 2003). Competency means a combination of motivations, characteristics, self-concepts, attitudes and values, content knowledge, or cognitive behavioral skills; any individual characteristic that can be reliably measured or ordered and used to distinguish between high and medium employees. …

It can be argued that a set of competencies is an educational tool for managers who try to prove more effective. Guangrong and Kaiguang (2012) recommended promoting the strategic participation of competency models in HRM. Let's review the previous studies on competency models in the healthcare sector.

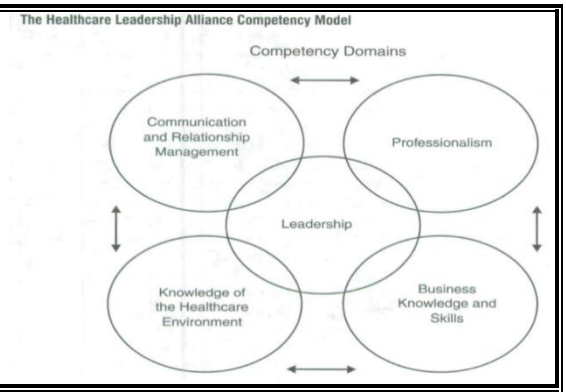
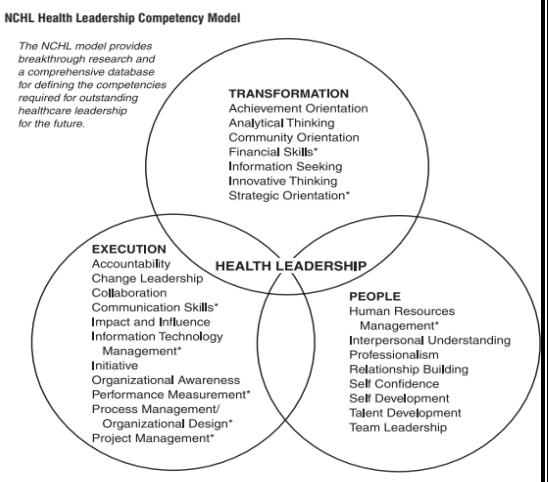
Table 3. Previous studies on competency models in the healthcare sector

Row	Title	Author(s)	Result	Conceptual Model
1	A competency model for general health managers (Case: Iran medical of health and education)	Mahbanooe, Gholipour, Abooyee Ardakan (2016)	The analysis showed that eight dimensions were selected: general knowledge and awareness, intelligence and talent, values and attitudes, personality traits, communication skills, decision-making skills, leadership abilities, and management abilities. The findings suggest that appropriate methods should be identified to determine the appropriate position and competency of each person. Then an appropriate competency model should be developed in line with the organization goal. In addition, such a model should be consistent with the organization's structure, position, and strategy.	

2	The Building of the Competency Model for the Health Care Consultants: An Example Based on a Teaching Hospital in Central Taiwan	Ai-Tzu Li, Yen-Ju Lin, and Yi-Pin Lai (2011)	Results showed that the competency of health care consultants mainly consists of three levels: professional competency, core competency, and management competency. These three levels include four distinct features: individual characteristics, interpersonal relationships, management, and marketing. These four characteristics can be divided into 29 competency indicators. This study shows that executive-level health care consultants need to improve their skills in management and marketing team skills.	
3	Competency development among Taiwanese healthcare middle manager: A test of the AHP approach	Fang, Chang, Chen (2010)	The first-level factors for the selection of middle managers in the medical industry are classified in terms of importance as follows: Personality, Planning, Management, Professional Ability and Interpersonal Ability. Experts believe that personality and planning are very important for middle managers in the medical industry; these managers have more managerial responsibilities at the administrative level.	
4	Chief information officers: An empirical study of competency, organizational positioning and implications for performance	Jason F Cohen; Claire M Dennis(2010)	Results showed that the competency of the IT manager, interpersonal/political competence and technology management competence have a direct impact on the dependent variable. The impact of the IT manager on the organization's position, including structural power and political relationships, was due to the committed IT manager's competencies.	

5	A study on the managerial competency of a hospital' s basic level nursing directors	Hu (2010)	This study showed that managerial competencies are clearly related to the personality traits of supervisor nurses. Supervisor nurses are more tolerant and more confident in dealing with problems than others. They tend to be very decisive, considering the business attitude. They have more convincing experience than others in terms of administrative skills, communication skills, and recognition skills	-

6	Defining competencies for hospital management; A comparative analysis of the public and private sectors	Pillay (2008)	Hospital managers in both sectors feel that individuals' management and their managerial skills are valuable for the efficient and effective management of hospitals, and they pursue "hard management skills" and skills related to the strategic thinking ability. Hospital managers in the public sector were after future education and more efficient in developing future competency programs.	List of important managerial competency items in hospital management: Competencies 1 Computing skills 2 Management of information systems 3 Medical informatics 4 Motivating staff 5 Managing people and teams 6 Communication skills 7 Managing delivery 8 Managing conflict 9 Marketing of health care organization 10 Management of change 11 Structuring of health services organization 12 Analysis of legal issues 13 Bioethics 14 Financial performance evaluation 15 Budgeting and resource allocation 16 Health economics 17 Human resource management 18 Labour relations 19 Strategic thinking 20 Planning for future needs 21 Analysis of internal and external environment of organizatio 22 Analysis of the wider health system 23 Analysis of government programs 24 Evaluation of health service technology 25 Clinical competence and expertise 26 Ability to conduct clinical audit 27 Health promotion skills 28 Epidemiologic analysis 29 Quality control and improvement in health service organizati 30 Managed health care principles 31 Understanding the district health system 32 Measuring performance of health care organizations 33 Evidence based medicine 34 Learning from experience 35 Time management 36 Balancing work and life issues 37 Integrity and ethical conduct 38 Self awareness 39 Self development

7	Common competencies for all healthcare managers: the healthcare leadership Alliance model	Stefl, Bontempo (2008)	The study discusses the steps that the Healthcare Leadership Alliance pursues. It also lists the guidelines of the Healthcare Leadership Alliance, as well as its application, relationship with experts and scientific communities, strengths, limitations, and potentials.	
8	Development of an interprofessional competency model for healthcare leadership	Calhoun, Dollett, Sinioris, Warden (2008)	This study examines the processes and outcomes related to the development of the Health Leadership Competency Model (HLCM), an evidence-based behavioral approach for assessing leadership skills among professionals, including health management, medicine and nursing, at professional stages. The HLCM was the outcome of extensive scientific research outside of health services. This model includes three key areas with 26 functional and technical competencies. Each competency discusses behavioral predictive indicators or levels for the development and assessment of individuals through activities from the stage of entry to the intermediate and advanced stages.	
9	Identifying Management Competencies for Healthcare Executives: Review of a Series of Delphi Studies	Hudak (2000)	This study identifies some of the managerial competencies of senior healthcare managers. It specifies the skills (technical expertise), knowledge (facts and principles), and (physical, mental or legal) abilities to support the achievement of competencies. Resource leadership and management, including the management of cost dimensions and financial affairs, is considered the top item of managerial competency. General skills, knowledge and abilities related to interpersonal skills, with the lowest score, are related to the dimensions of specific technical skills.	-

Organizations need effective and efficient specialists, especially in the IT sector, in order to achieve their goals of comprehensive growth and development. This need is more urgent in health care organizations that have the mission to maintain, supply and promote health and control and prevent diseases. Competency, as the application of knowledge and interpersonal decision-making and psychomotor skills, can play a role in health and medical environments and help provide safe healthcare.

Considering the various competencies identified in various studies and the various competency models reviewed in this study, we can explain the competency model and framework for IT specialists in the healthcare sector and structure the concept

of competencies of IT specialists into dimensions, components and desirable indicators from the perspective of experts.

The review of the models showed that there are rare special competency models for IT specialists in the healthcare sector and we can derive only generalities about competency from the IT competency models and managers' competency models in the health and medical sector and lead interviews with the experts of this sector to create a model.

A few of the studies on IT managers have focused on individual and managerial competencies and ignored the details of technical and specialized competencies.

The literature review also shows that most of such studies have sufficed with identifying the competencies and disregarded the model's applicability. Therefore, few models in the field of occupational competency, especially in information technology have tried to discover the importance and weight of competency components. It should be noted that, as expressed in the definition of a competency model, competencies should be measurable and assessable.

Considering the need to identify and discover competencies in the background knowledge relating to the specific environment of each business, it is quite evident that no valuable studies have been conducted to recognize the competencies of IT specialists and managers in the health and medical sector. Given the noticeable integration of health technology with information technology that is constantly changing and innovating, it is necessary to perform studies in this regard.

Skills needed by IT specialists are divided into the general and specialized skills of IT, which need to be included in the model. Additionally, the proposed model should contain items about the abilities and skills that an IT specialist needs in order to better perform his or her tasks. The individual competencies of specialists can be considered as well. If IT specialists have managerial positions in this sector, the managerial competencies of the models need particular attention. Finally, the details of the components and indicators of competency will be determined and moderated in interviews with experts so that they can play a better role in achieving organizational goals.

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