

A Comparison of Competencies of Senior Middle and Operational IT Managers in the Healthcare Sector

Mohammad Taghi Taghavifard^a, Mohammad Javad Jalili^b, Mirali Seyednaghavi^c, Iman Raeesi Vanani^d, ^a Associate Professor of Industrial Management, Allameh Tabataba'i University, Tehran, Iran, ^b PhD Candidate in IT Management, Allameh Tabataba'i University, Tehran, Iran, ^c PhD in Governmental Management, Associate Professor, Allameh Tabataba'i University, Tehran, Iran, ^d Assistant Professor of Industrial Management, Allameh Tabataba'i University, Tehran, Iran, Email: ^adr.taghavifard@gmail.com, ^bmjavad_jalili@yahoo.com, ^casnagavi@yahoo.com, ^dimanraeesi@atu.ac.ir

This study is developed to highlight the role of meritocracy in the Information Technology sector of healthcare field. This is a qualitative research in which we have tried to identify the important indicators of senior, middle, and operational managers' competency at healthcare sector, besides importance of meritocracy in Information Technology sector of healthcare field, through interviewing experts and scholars. Ultimately, this study identified 98 key competencies for senior, middle and operational managers in the healthcare sector.

Key words: *Competencies, Human resources, Information Technology, Healthcare sector.*

Introduction

The approach to deal with human resources in organizations has become human capital rather than human resources. This change in attitude has brought new paradigms with itself. Any active company or organization has, explicitly or implicitly, a competitive strategy. Businesses with ever increasing and changing environments and technologies, require highly specialized and skilled forces, and the high ability to learn and communicate, as well as flexibility and the ability to adapt to changing environments. Of course, this can only be achieved through focusing on creating a coordination between organizational goals and values that forces can provide for organizations. On other hand, in today's literature, we know

that the success of businesses and organizations depends on intangible assets. Researchers believe that parameters other than a company's book value and physical capital influence determining market value, which they consider to be intellectual capital, and it is in here that the discussion of human resources competencies (skills, training, experience, etc.) gain importance (Pourabedi et al., 2016).

Changes seen in the last few decades were widespread enough to make fundamental alterations on an organizations' business environment. In such a rapidly changing environment, growing focus on customer and their demands, and real-time response to their problems and issues, has made managers a vital source of employee leadership towards success. Hence, training competent managers that are reliable in advancing organizations in accordance with global developments, is a necessary issue. With advent of ICT at 1980's and its widespread use in business, especially in 1990's, the need for business managers as well as managers who were somehow involved with this technology (and all of them, gradually, at some point) became more apparent than before. Many studies have been conducted to identify ICT competency aspects of managers and to provide models for developing these competencies (Majidi Zolbanin, 2011; Morovati R, et al 2018).

Nowadays, human capital quality, especially in specialized occupations, is one of the most important competitive advantages for organizations. Therefore, selecting qualified employees is one of the most important human resource management tasks. Systematic and structured performance of this requires the consideration of different aspects that make up the complexity of a subject and transforms the employee selection into a multi-criteria decision-making problem. In addition, determining appropriate criteria for choosing the right person is one of the most important stages of the process, which has not been acknowledged enough (Heidari Dehouei et al., 2017).

Nowadays, major executives' impact on earnings, profits, success, and the effectiveness of organizations has become clear. In today's world, significant changes have been made in the corporate environment, from which organizations are also affected. Meanwhile, a manager's role as an important, vital source for solving problems in the organization and has been increased more than ever (Ghlich Lei, 2016).

In fact, competencies bring many benefits to the organizations; including management and organizations' effectiveness, emphasis on individuals' capacities (instead of their jobs) as a way of gaining competitive advantage, and strengthening team behavior for organizations. Competency studies have led most of the excellence craving organizations to take advantage of competency-based management practices (Eva Semertzaki, 2017; Guzmán, S.A et al, 2018; Suleri J, Cavagnaro E. 2016).

Many organizations who make the mistake of appointing the wrong managers exist, due to the lack of a comprehensive model of managers' competency to appoint or promote them, which has led to a weak and inadequate manager (Heidari Dehouei et al., 2017).

With the new wave of information technology staffing, it is time for IT communities to find competencies needed by IT staff in the new millennium (Ho and Frampton, 2010). Managers in different levels of information technology, besides general management, also need a range of specialized skills. In this regard, the Employment and Training Administration - United States Department of Labour (2012), issued a Comprehensive Model of Information Technology Competency in September 2012, in which provided following skills and competencies for IT managers. Principles of database technology; wireless and mobile communications networks, software development and management, digital media, network management and security, network security risk, etc.. Furthermore, Fraser-Arnott (2017), also believes that the one key competency and skill required for IT managers is technical knowledge about organizational knowledge management. In Iran, there is little research on competencies and characteristics of IT personnel.

Along with the influence of IT in different sectors, hospitals and health centers have also faced many changes in their function. Changes and technology, increasing competition, increasing advertising costs, and the alteration of health services' and customer demands have also greatly transformed healthcare organizational structure and has highlighted the importance of the role of IT managers more than ever before. Therefore, acknowledging the competency of human resources active in the IT sector of healthcare organizations (especially in management levels) is strategic and if such organizations do not pay attention to this, they will suffer negative consequences in the future. With this preface, the present research focuses on answering following questions: "What are the key competencies which senior, middle, and operational IT managers in healthcare sector should have?"

Importance of Acknowledging Competency in IT Sector of Healthcare Field

As noted above, along with the influence of IT in different sectors, hospitals and health centers have also faced many changes in their function. Changes and technology, increasing competition, increasing advertising costs, and the alteration of health services' and customer demands have also greatly transformed the healthcare organizational structure. Therefore, in the current situation, such institutions should have two indexes of flexibility and accountability. One important tool for realizing these indexes is the use of ICT capabilities. Of course, strategic actions success in ICT requires managing complexities, uncertainties, high dependencies, and in some cases, contradictions. It is here that an IT managers role is highlighted and their significance has meaning. Success as an ICT manager needs a complex

matrix of various competencies that is often seen as a major risk, which threatens the success of strategic actions in ICT.

While IT managers are struggling to coordinate their IT departments and other organizational units, many barriers prevent the integrity of an IT department and other organizational units. In advanced countries, managers believe that information technology in their organization can influence flexibility, design efficient processes, have better customer service, innovation potential, and so on; and the importance of information technology and its effective management has become an obvious necessity. For this reason, meritocracy in this area has become a strong and important principle (Mohseni Astani, 2015; Abed AZ, et al 2019).

Theoretical Basis

Competencies are "basic characteristics of an individual, with causal connections to an effective and/or superior performance based on some criteria, in a job or situation." Management researchers started using this concept for first time. Some researchers define competency as knowledge, skills, abilities, or features related to high performance. Others have defined key competencies as knowledge, skills, and abilities of an individual to perform vital tasks. Moreover, another group determined motivations and perceptions of individuals which also affect their ability to successfully perform their tasks. Competencies have been found to be context-specific, meaning that some are more important than others for a particular job (Suh et al., 2012).

Competency Models

Competency models identify functional or behavioural competency essential for an activity in a job. These models come from analysis that distinguishes high-performance individuals from people with a medium or low performance. In these models, competencies are usually organized as a hierarchy, or grouped together with their descriptors in clusters. The real number and category of competency in a model depends on a jobs' nature and complexity and the culture and organizational values. In general, competency models for a uniquely distinct role will be eight to sixteen competencies. Competency models provide an overall approach to assess competency that individuals need for performing an assumed job. Unlike traditional job analysis, competency modelling links the extraction of job profiles with organizational strategy and other non-strategic job requirements. In following, these are used to create a "common language" as a set of human qualities or individual competencies. In following, this information can be used to hire, train, and evaluate the workforce. This can also be used as an outline for great performance. In research, competency models are a more reliable predictor of performance comparing to academic ability and knowledge tests (Sanghi, 2007).

Many professional sectors, including healthcare (Garman et al., 2006), create their own competency models. Obviously, these models are simply not applicable to information technology. However, there are several general models related to IT workforce, such as the Hudson's 5+1 Competency Model, General Boyatzis Model for Competencies, and Iceberg Competency Model.

A European counseling company, Hudson Company, has developed Hudson 5+1 Competency Model. This model has five merit clusters: information management, task management, people management, interpersonal management, and individual management. There is a sixth cluster for knowledge and technical competence specifically for the organization. The Boyatzis model has six clusters: goal and action management, leadership, human resources management, subordinate leadership, focus on others, and specialized knowledge. Boyatzis (1982), has conducted a series of studies to examine importance of social roles, knowledge, and skills in each cluster. Hudson and Boyatzis models do not mention any particular job role, but emphasize managerial skills and social interaction. In fact, the clusters in these models and skills they discover are generally used to prepare a person for becoming a strong manager (Mahdilo Turkmani et al., 2016; Samadi F, Motlagh SS. 2018; Subbotina N, et al 2018).

In contrast, the Iceberg model of competency does not focus on management-level jobs. Spencer and Spencer (1993), considered the set of features expressed by Bouyatzis (1982) to identify five merit features: motivations, characteristics, concept of self, knowledge, and skills. Motives are psychological features forcing a person to act to achieve a desired goal. These internal forces result a need to search for success, strength, and dependence. Characteristics are the individual's traits, leading to consistent reactions to situations or information. The concept of self is how one person acknowledges their position. This is related to their own values and concepts. Knowledge is a set of facts, principles, activities, and theories that form the basis of a given discipline. This is the information required in specific areas of work. Ultimately, skills are the application of knowledge and awareness to perform a particular physical or mental task. Knowledge and skills are fundamentally different. For instance, IT graduates show they have analytical skills through a corporate architecture course or infrastructure conceptualizing of a system. This requires a background knowledge about computer networks and the ability to apply system design principles (Javidmehr et al., 2015).

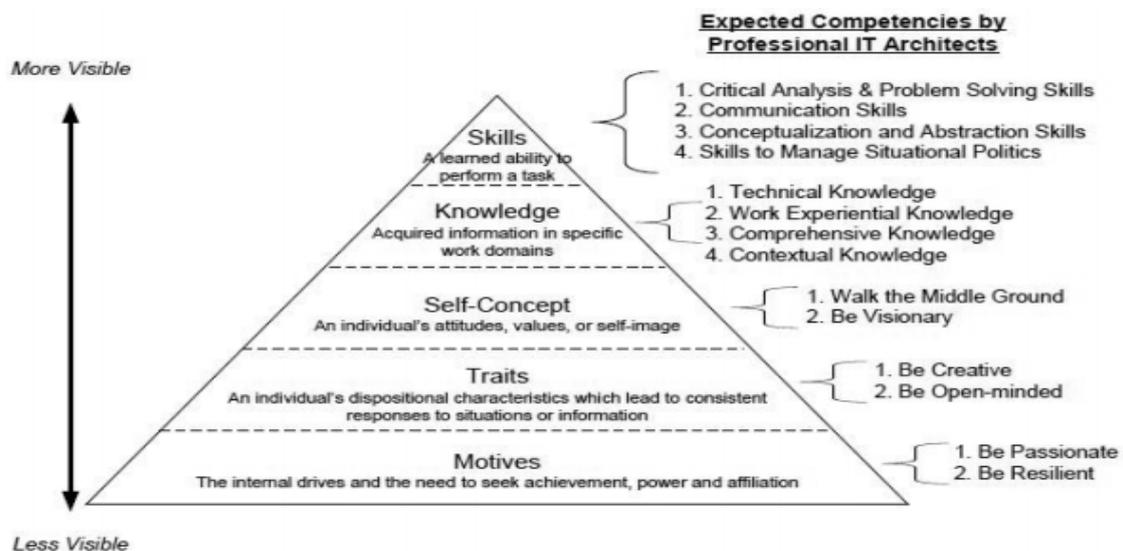
Spencer and Spencer's Iceberg Model (1993), provides a better understanding of various categories of competency. They emphasize that it is often difficult for an organization to find out whether a person has these five merits and that some of the features are hard to gain through education. Therefore, they have used the iceberg parable. Features of the lower part of an iceberg are hidden and harder to develop. Based on the iceberg model, knowledge and

skills are usually perceptible and superficial characteristics of an individual, while characteristics and motivations are deeper and are at the central part of a personality. Features of concept of self are somewhere in the middle. Hidden and evident merits play different roles in a job. Hidden competencies are behavioral competencies that drive the performance of a person in a job, while evident ones usually are technical merits considered necessary by employers.

Competency Models in ICT *Ho and Framton Model (2010)*

In this section, regarding the Iceberg Competency Model, fourteen competencies, fourteen merits are presented as a final set of competencies for decision-makers IT area. Figure (1) shows a summary of these competencies. It is worth mentioning that this model is result of a very detailed qualitative analysis and interview with 14 IT professionals in Australia (Ho and Frampton, 2010).

Figure 1. Iceberg model: Merits of decision makers in IT field (Ho and Frampton, 2010).



A) Skills

The four competencies below are the key skills indicating "awareness" needed for IT decision-makers (Hou and Frampton, 2010):

- **Critical analysis and problem solving skills:** IT decision makers should first be able to divide the problem into its constituent parts and identify its internal relations and hierarchy of ideas. They should be able to critically evaluate issues using relevant concepts and values. Next, IT decision makers should be able to find proper solutions to solve a problem. These solutions are both managerial and technical.

- **Communication skills:** IT managers and decision-makers act as bridges between the different departments of organizations. They should be able to speak in the language of business executives, then, use the language of technical developers.
- **Conceptualization and Abstraction Skills:** One task of IT administrators and decision-makers is to identify the architectural frameworks for standards, practices, activities, and tools consistent with the best practices in the industry.
- **Skills for Managing Situational Policies:** Since an IT managers decision-makers' role is to ensure that purpose of an organization's technology is in line with its business goals, they consider different multifunctional systems and business processes at the level of different organizational units.

B) Knowledge

The following four competencies are identified as the key knowledge requirements for IT managers and decision makers, which represent realities, principles, activities, and theories (Ho and Frampton, 2010):

- **Technical knowledge:** The ever-increasing rise of Service Oriented Architecture (SOA) applications empowers the need for IT administrators and decision-makers, and their knowledge of SOA is essential to ensure efficient the re-applications of software.
- **Knowledge of Business Experience:** Related occupational experience is essential for a successful IT manager and decision maker. In addition, IT managers and decision-makers need credibility, especially technical, and this will only be achieved through experience over time or based on specific technical successes.
- **Comprehensive Knowledge:** Since IT managers and decision makers interact with managers of different units, it is imperative for them to have comprehensive knowledge.
- **Field Knowledge:** Managers and decision makers of high-tech IT must understand the goals and strategies of their business customers.

C) Concept of Self

Two following merits are relevant to concept of self, which means how a person perceives their role in a job (Ho and Frampton, 2010):

- **Being Moderate:** IT managers and decision makers act as the interface between the IT area and the rest of organization. When there are very different perspectives between two organizational units, IT managers and decision makers should always consider both units to a certain extent.
- **Having an Idea:** A person with a thought believes that he plays an important role in future of an organization, system, or industry and is able to plan on this basis. Because the IT manager is a senior information technology individual in an organization, he must be able

to gain a macro perspective of whole area, and not just details of an issue or field that is currently being addressed. This idea was reflected in the interviews.

- **Characteristics:** The following competencies were considered as characteristics, because they reflect the individual's personality, which leads to coherent patterns of thinking, feeling, and acting (Ho and Frampton, 2010).
- **Creativity:** Many organizations are looking for IT managers and decision-makers with high levels of creativity. IT managers and decision-makers are expected to have creativity.
- **Having an Open-Minded:** When trying to solve a field issue, open-minded IT managers and decision-makers work more efficiently; because they are willing to accept the possibility that managers' suggestions in that context may be better than their own ideas. In addition, IT managers and decision-makers who have an open-mind, have a passion for learning new technologies.

D) Motives

There are two competency identified for motive, which are deriving forces of individuals for better performance (Ho and Frampton, 2010):

- **Being Passionate:** Technology is constantly evolving. Since IT managers and decision makers are designing and analysing complex systems, they must learn new technologies to take advantage of technology changes. Their passion encourages them to face challenges in the workplace.
- **Flexibility and Resistance:** IT managers and decision-makers work with many stakeholders, including leaders and professionals in this field, to gain an overall view of the IT strategy, process, information, and assets in organization. Disagreements between different stakeholders may lead to conflicts and can slow down the progress of the architectural project. This leads to disappointment and anger.

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

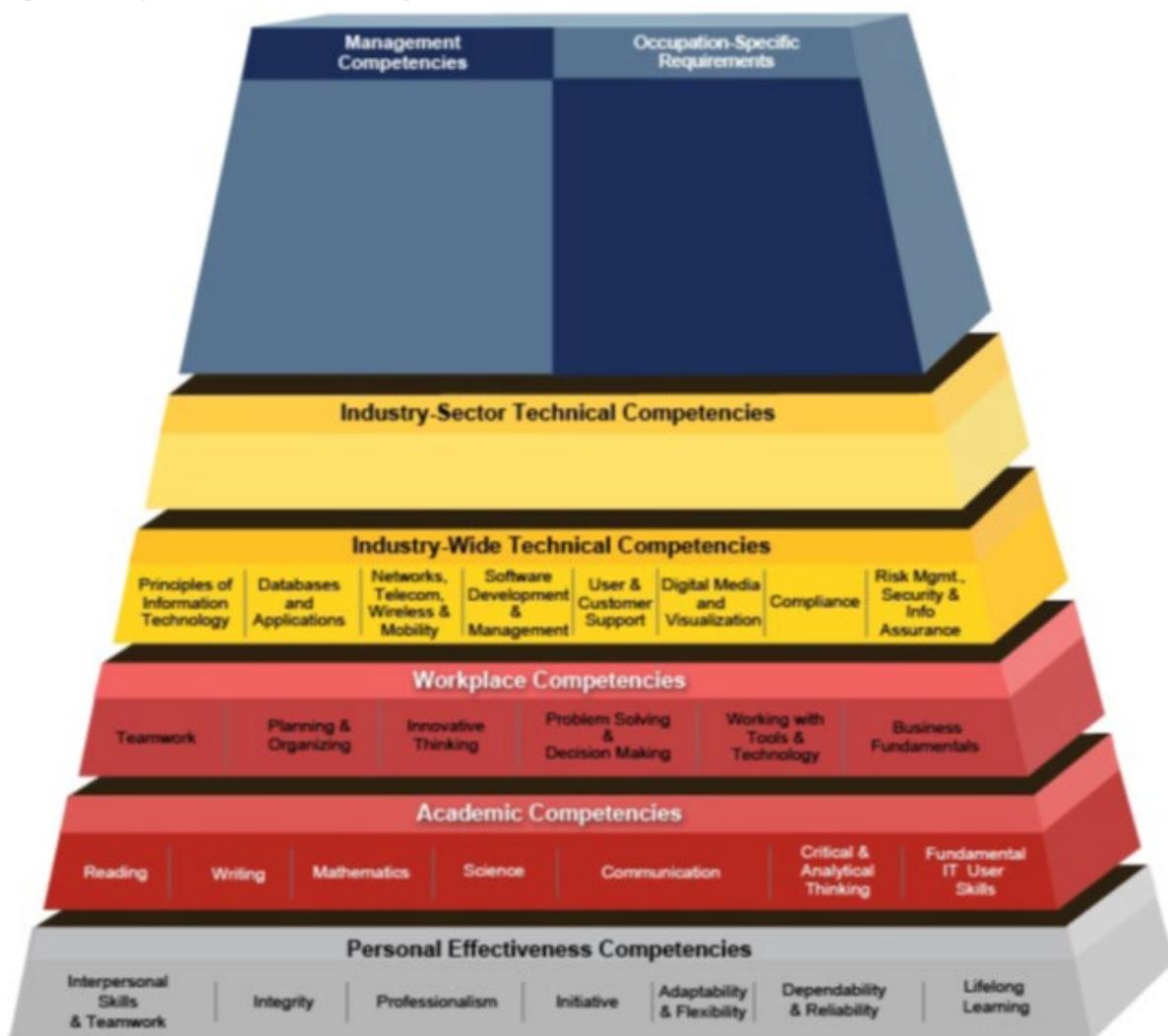
The United States Department of Labor's proposed framework for competency model for different jobs in various industries is a pyramid, consisting three main parts:

- Fundamental competencies
- Industry-related competencies
- Qualifications related to the job

Each of these sections consists of several layers that include a set of competencies that represent basic skills, knowledge, and abilities necessary to succeed in a career. If we move the pyramid base to top, the first three layers comprise of merits that are common in different industries and careers. These competences, known as "soft skills", are essential for entry and success in most careers. Layers 4 and 5, which are in next section, hold special business-related competencies and are common in various businesses in that particular industry. Of

course, given widespread industry and occupations under the ICT category, technical competence of each subcategory would be different. Therefore, according to the fact that the proposed model is general, for whole ICT industry, the competencies corresponding to this layer are not included in general model. The third part of pyramid is composed of two layers, which include a layer of managerial competencies and a layer of the needs and responsibilities of a particular occupation or profession, which is in descriptive contact with O*Net database and is in final layer of the presentation model (United States Department of Labor, 2012).

Figure 1. Pyramid of the US Department of Labor for ICT field careers.



European e-Competence Framework (e-CF)

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

First dimension: The first dimension of this model classifies all competencies of ICT extracted from the business processes in this field in five main areas. These are Planning, Creating, Implementing, Empowering, and Managing.

Second dimension: In this dimension, competencies associated with fields defined in first dimension are given. In all ICT fields, all 40-competency groups are defined, and the second dimension introduces them in general.

Third dimension: In this dimension, for each of the 40 competencies presented in previous section, five levels of skill and expertise are considered. These levels of expertise are displayed by e-1 to e-5, defined by corresponding to levels 3 to 8 of the European Qualifications Framework (EQF).

Fourth Dimension: In this section, there are practical instances of knowledge and skills related to each competency presented in the second dimension.

This, based on first and second dimensions of this model, we will have:

1. *Planning:* Including information systems and business strategy coordination, service level management, business plan development, project or product planning, design architecture, application design, technology monitoring, sustainable development and innovation.
2. *Creation:* Includes application development, component integrity, testing, solution adoption, document generation, and systems' engineering.
3. *Implementation:* Includes user support, change support, service delivery, and problem management.
4. *Empowerment:* Includes developing information security strategy, developing information and communication technology quality strategy, providing training and learning, purchasing, preparing a sale offer, path management, sales management, contract management, human resource development, knowledge and information management, identifying needs, and digital marketing.
5. *Management:* Includes forecasting, project and document management, risk management, relation management, process improvement, ICT quality management, business change management, information security management, and IT management (EU, 2014).

ITU Model

The International Telecommunication Union (ITU), is of United Nation's specialized agencies, has also announced list of competencies required for jobs of this sector. The list includes the most important core and managerial competencies that are generally called non-technical competencies.

1. *Core competencies* includes communication and information skills, possessing carrier knowledge and skills, analysis, judgment and problem solving, commitment to quality, productivity skills, customer-orientation, planning and organizing skills, effective relationships with others, innovation, accountability, learning skills, and flexibility.
2. *Management competencies* includes strategic orientation, concluding leadership skills, influencing and negotiation skills, personnel management, project management, study groups management skills, boards and meetings (ITU Careers and Recruitment, 2010).

Research Background

Vasil Ionscu (2017), published an article titled "Competencies Analysis of Senior Intelligence Officers based on membership history at 2016 in US Federal Reserve CIO". The main purpose of this paper is to provide the competency of Intelligence Officer (CIO), in addition to considering development in the ICT field. Recognizing the role of the chief intelligence officer, comparing to the past, in public and private sectors (without doubt, with the same speed of evolution and with an important advantage for next) is rising, continuously. Analysis is based on the membership status at 2016 in US Federal CIO council and aims to provide a vivid picture of how to pair and match technology knowledge with the commercial role and responsibility of CIO in order to ensure the timeliness and quality of service for the US. As a result, the US system is well regulated for the role of the CIO within federal agencies; albeit, starting with the legal framework and ending with training programs that allowed these managers to know their core competencies as well as their complex tasks.

Fraser-Arnott (2017) published an article titled, "The Competencies of Intelligence Experts in Emerging Roles." This study aimed to identify the competencies of intelligence experts in US government agencies. The research's results identified five skill categories:

- Collaboration, customer service, and communications.
- Organizational understanding and strategic coordination.
- Program and service delivery and management.
- Background, Information, and technical merit of knowledge management.
- Personal characteristics.

Thudugala et al. (2013) published a study titled, "Essential qualifications for Senior Intelligence Officers in Sri Lanka." Authors conducted their research based on extensive surveys. The research objectives were: (1) the evaluation of necessary competency sets of CIOs in Sri Lanka, and (2) providing an understanding of CIO role to be formulated, in a way

it affects strategy of Sri Lankan government agencies. It is anticipated that the recommendations of this study will help to provide the necessary information for IT managers and senior managers in government agencies, and gives them the necessary capabilities to effectively function as CIO Managers. Authors worked to look at the expected merits of a CIO in three aspects: "knowing how it should be", "knowing what", and "knowing how." They studied the different opinions from executives, CFOs, and other top managers about their expectations of CIO. This study, therefore, was able to explain the importance of these competencies in Sri Lanka, as well as provide recommendations about competencies that CIOs should focus on.

Siddike and Islam (2011) published an article titled, "Assessing Competencies of Information Technology Experts in field of Knowledge Management (KM) in Bangladesh's Intelligence Institutions." This research was conducted to identify the Competencies of Information Technology Experts in the field of Knowledge Management (KM) in Bangladesh's Intelligence Institutions. Results led to the identification of the following competencies: communication skills, facilitation skills, networking skills, negotiation skills, organizational adaptive skills, teamwork skills, coaching skills, and counseling skills.

Protti (2003) published an article titled, "Senior Managers of Information Technology in UK's National Health Plan: Skills and Competencies." The purpose of this research was to introduce key competencies required for senior IT managers involved in the UK National Health Plan. Results were introduction of following key competencies:

- Having technical expertise in information technology.
- Strategic understanding of information technology.
- Change management skills reengineering business processes.
- Leadership and Influencing Skills.
- Communication skills.
- Project management and implementation programs capability.
- The ability to manage human resources.
- financial resources management capability.
- Having experience in healthcare fields related to IT.
- Ability to manage staff members performance.

Heydari Dehoye et al. (2017) published an article titled, "Selection of Information Technology Staffs Based on Competency Model Using Paprika and Gray Arras Hybrid Approach." The systematic and structured performance of this process requires the consideration of different aspects that make the subject complicated and makes the employee selection a multi-criteria decision-making problem. In addition, determining the appropriate criteria for choosing the right person is one of most important stages of the process, which has not been considered sufficiently until now. Hence, in the present study, the competency

model is used for identifying criteria, and the combination of decision making methods of Paprika and Gray Arras, which have been applied to select the best IT expert among five applicants. Results show, according to experts, competence in the method of doing work and competence in the subject of work, were the most important aspects of competence in this field. Finally, a person was selected for a job who, among the applicants, had the highest score in these cases.

Naderi Dsrshouri et al. (2017) published an article titled, "Identifying and Determining Individual Competency Indexes of Information Technology Managers of Information and Communication Technology Organization of Tehran Municipality." The methodology of this research is descriptive-analytical and practical in terms of its type. A questionnaire was used to collect information and data was identified by a factor analysis method. In this regard, 61 individual competency indexes were identified.

Taghavi Farahi et al. (2016) published an article titled, "9 Competency titles of Information Technology Managers in Ministry of Information and Communication Technology." The methodology of this research is descriptive-analytical and is of a practical nature. A questionnaire was used to collect the information. The data was identified by the factor analysis method. In this regard, 28 indexes were classified into two individual and organizational competency factors, of which 25 identifying indexes were categorized into 9 new sub-factors and 3 were excluded from the 28 primary indicators.

Seyyedeh Ghodsi Olyae (2014), conducted a dissertation titled, "Assessing level of competence of Director of Information Technology and Digital Media of Ministry of Culture and Islamic Guidance and determining their weights using multi-criteria decision-making (MCDM) technique." For this purpose, using theoretical studies and the combination of ONET and Lee et al. models, and using a researcher-made questionnaire, in first stage, the validity of competency indicators of IT managers and digital media was measured. Findings indicated that the level of competence indexes of IT and digital media managers of Ministry of Culture and Islamic Guidance is desirable, in other words, competencies of managers in the studied components (knowledge, skills, abilities, and personality traits) and indexes (35 indicators) have a good level.

Results of the coefficient inventory questionnaire obtained using Shannon entropy technique and EXCEL software showed that, among the components mentioned above, capability had the highest weighting and other components of skills, like personality traits, and knowledge were weighted second highest.

Methodology

This research is practical in terms of purpose and uses a descriptive-exploratory approach. The statistical population of this study consists of a group of experts, including university professors, organizational consultants, and IT managers in healthcare sector, whose common feature was full familiarity with ICT field in Iran. In this research, sampling was carried out based on the judgment method and to an extent that researcher reached theoretical saturation. In this research, the first-hand data collection tool was a semi-structured interview with scholars in which the researcher achieved theoretical saturation after 13 interviews. In table below, statistical distribution of scholars is included in research is presented:

Table 1: Statistical distribution (frequency) of scholars of research according to demographic variables.

Variable	Frequency	
Sex	Female	3
	Male	10
Age	Less than 30	2
	30 to 50	7
	Higher than 50	4
Education	B.Sc.	2
	M.Sc.	5
	Ph.D.	6
Management experience in the field of information technology in the health sector	Less than 10 years	3
	10 to 20 years	8
	More than 20 years	2

Results of Interviews' Analysis and identifying Competencies

A total of 13 interviews were conducted and 98 key indexes for competencies of senior, middle and operational managers in the healthcare sector were identified which are as presented in the following tables.

Table 1: Key competencies of senior IT managers in the healthcare sector.

N	Competency
1	Ability to make effective decisions
2	Strategic vision
3	Dominance in management science
4	Cost and Budget Management
5	Full mastery of organizational structures governing health of country

6	Familiarity with issues and IT and healthcare problems
7	Familiarity with the National Health Network (SHAMS), Electronic Health Record System (SEPAS) (EHR SYSTEM), and Integrated System of Iranian Health Statistics and Information (SINASA)
8	Familiarity with Health Information Systems (HIS), Clinical, Electronic turn, and Queue Management
9	Mastering science of policy making in field of technology
10	Long-term planning and aiming ability
11	Ability to effectively organize human and organizational resources
12	Adequate familiarity with modern IT systems in healthcare sector
13	Ability to communicate with same level and upper-hand organizations
14	Management experience at senior IT levels of the organization
15	Having leadership skills
16	Having a Charismatic Character
17	Familiarity with Crisis Management Science
18	Ability to observe environmental changes, especially in field of information technology
19	Ability to manage, develop, and improve infrastructure and systems of information technology in healthcare sector under international sanctions.
20	Familiarity with the Integrated Information Systems of the Ministry of Health
21	Familiarity with new concepts and application of modern information technology and computer in healthcare sector
22	Familiarity and Application of Information Technology Frameworks and Standards in the Healthcare Section
23	Familiarity with organizational knowledge system and ability to create knowledge transfer cycles
24	Familiarity with rules and regulations of information technology in healthcare sector
25	Having organizational knowledge and familiarity with work processes, rules, standards and specialized terms of healthcare field
26	Managing Outsourcing IT activities and effectively communicating with Private Sector
27	Co-ordination within and outside the organization
28	Enjoy Creative Thinking
29	Utilizing logical, emotional, and organizational intelligence
30	Commitment to ethics
31	Academic education related to Information Technology Management
32	Continuous learning and being up-to-date

Table 2: Key competencies for mid-level IT managers in healthcare sector.

N	Competency
1	Having problem solving skills
2	Ability to monitor good performance
3	Ability to mid-term planning and targeting
4	Ability to implement knowledge management in IT's healthcare sector
5	Interpersonal communication creation skills
6	Skill of team-building among human resources of IT's healthcare sector
7	Ability and skill of accurately taking report from IT managers
8	Accurate reporting skills to senior IT management
9	Adequate familiarity with modern IT systems in healthcare sector
10	Skill of Leadership and Information Technology Experts management Under Their Own set
11	Skill and ability to create motivation and hard-working sprit in IT managers and experts.
12	Suitable personality features for leadership and management
13	Academic education related to Information Technology
14	Work experience in field of IT healthcare
15	Familiarity with IT problems in Healthcare sector
16	Familiarity with Integrated Information Systems of the Ministry of Healthcare
17	Managing Outsourcing IT activities and communicating effectively with supporting Private Sector
18	Familiarity and Application of Information Technology Frameworks and Standards in Healthcare sector
19	Familiarity with organizational knowledge system and ability to create knowledge transfer cycles
20	Familiarity with rules and regulations of information technology in the healthcare sector
21	Co-ordination within and outside the organization
22	Enjoy Creative Thinking
23	Utilizing logical, emotional, and organizational intelligence
24	Commitment to ethics

25	Familiarity with Health Information Systems (HIS), Clinical, Electronic turn, and Queue Management
26	Skills in consulting of buying and installing different parts of IT-related systems
27	Understanding Risk Management and Information Security Management System
28	Ability of change management in IT
29	Having organizational knowledge and familiarity with work processes, rules, standards, and specialized terms of healthcare field
30	Familiarity with National Health Network (SHAMS), Electronic Health Record System (SEPAAS) (EHR SYSTEM), Integrated Health Information System (SINASA)
31	Skill of conducting applied research in field of healthcare information systems
32	Continuous learning and being up-to-date

Table 3: Key competencies for operational IT managers in the healthcare sector.

N	Competency
1	Ability and skill of managing small work-teams
2	Ability and skill of the team-work
3	In-company collaboration and coordination
4	Ability to short-term planning and targeting
5	Skill and ability to motivate and create hard-working spirit in their IT staff under their supervision
6	Ability and skill of accurate report-taking from IT staff
7	Accurate reporting skills to mid-level manager of IT
8	Academic education related to IT and computers
9	Work experience in IT operational posts
10	Knowledge and technical dominance in comprehensive health information systems and hospitals (HIS) and familiarity with the Electronic Health Record (EHR)
11	Technical mastery at Integrated Information Systems of Ministry of Healthcare
12	Hardware, Software, and Network knowledge
13	Full familiarity with Internet and the Web
14	Full technical mastery at "National Health Network (SHAMS)"
15	Full technical mastery of "Integrated System of Iranian Health Information and Statistics System (SINASA)"
16	Full technical mastery of electronic Health record system (EHR System)
17	Creativity in improving work processes

18	Familiarity and application of Information Technology Frameworks and Standards in Healthcare sector
19	Understanding the organizational knowledge system and ability to create knowledge transfer cycles
20	Familiarity with rules and regulations of information technology in the healthcare sector
21	Enjoying Creative Thinking
22	Utilizing logical, emotional, and organizational intelligence
23	Commitment to ethics
24	Familiarity with Clinical information systems, Electronic turn, and Queue Management
25	Managing Outsourcing IT activities and communicating effectively with supporting Private Sector
26	Having organizational knowledge and familiarity with work processes, rules, standards, and specialized terms of healthcare field
27	Understanding Data, Information, Knowledge, and Management of all Database Types
28	Risk Management and managing Security of Systems and information and data integration
29	Ability to manage change in information technology field
30	Skills in consulting of buying and installing different parts of IT-related systems
31	Domination on information systems, office and organization automation
32	Skills in training and supporting information system users
33	Continuous learning and being up-to-date
34	Familiarity with Medical device and technology

Conclusion

In this study, initially, we tried to explain the importance and necessity of meritocracy and focusing on human resources' competencies at IT field, in general, emphasizing on the healthcare sector. Then, some of leading international templates for human resources in the IT field were carefully examined. In most important part of this research, results of semi-structured interviews with experts were presented, in which 98 key competencies were identified for senior, middle and operational level managers of IT departments in the healthcare sector of Iran.

32 competency criteria for senior managers, 32 competency criteria for middle managers, and 34 competency criteria for operational managers were extracted.

The results of this study reflected the views of the experts on the competence of IT managers. According to the results, the key competencies of senior, middle and operational managers differ in terms of key indicators, which is one of the objectives of the research and was not considered in previous research.

These competency differences between the different levels of management help greatly to enhance and train IT managers at different levels.

Senior managers are also required to have complete information on their healthcare sector status in terms of costs, revenues, budgets, staff, middle and operational managers, policies, strategies, and IT laws.

The results of the competence of middle IT managers in the health sector indicated that their duties were somewhat similar to those of senior managers. But planning, communication, and coordination are mostly done by middle management.

A review of the competencies of operational managers indicates that these managers must have a sufficient mastery of the technical affair of information technology.

Therefore, it is necessary to train these managers in all aspects of computer and information technology to prepare them for operational tasks in every respect.

It should also be noted that the similarity in some of the competency criteria across the different levels of IT management means that the criteria is similar but the type of knowledge and competence is different. This is due to the difference in the roles of senior, middle and operational managers. This means it is sufficient for a senior manager to be familiar with systems, but middle and operational managers must have complete technical expertise in managing, installing, and configuring systems.

This research convinced authors about the lack of attention given to the competency of senior, middle and operational level IT managers in Iranian healthcare organizations and centres. In doing so, the authors were ensured that one way of improving the electronic healthcare system is by focusing on the competencies of human resources in this field during the process of selecting and appointing staff and managers. Accordingly, future researchers in this field of study are recommended to improve the competencies identified in this study and turn this collection into a mean for evaluating IT managers in the healthcare sector.

Suggestions to future researchers in this field are as follows:



1. Continue the quantitative analysis of the competency model in order to discover the relationships and determine the weights of the competency criteria to use the model to measure and measure competencies.
2. Developing such models of competence for a variety of specialized jobs in manufacturing and service organizations and industries.
3. Using Competency Models for Training and Empowering Managers and Employees and Recruiting the Appropriate people for Jobs and Comparing the Results of Using Models with the Past.

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