Inferring on the Factors that Influence the Use of Telemedicine in Developing Countries: Toward Developing Countries Telemedicine Framework

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Abstract

This study focuses on the factors that influence the use of telemedicine technology in Iraq by reviewing and analyzing the relevant factors in telemedicine implementation in developing countries. A combination of social exchange theory and diffusion of innovation theory is used to measure power and innovation factors in constructing a robust telemedicine framework. Thirteen factors are selected in this study on the basis of the literature review of telemedicine implementation in developing countries. This work provides important insights into the strategies on implementing telemedicine in Iraq by learning from the experiences of other developing countries.

Keywords: Telemedicine; Influence Factors; Developing countries.

1. Introduction

The aim of this research is to examine the feasibility and acceptance level of telemedicine framework in Iraq to reach that objective the research needs to study and analyse the factors that affect the implementation of telemedicine toward building a framework that includes the influencing factors in adopting telemedicine in Iraq.

The healthcare systems sustainability plays a central role of staying concern. Telemedicine systems have been confirmed to work, in addition to be considered as a viable option in upcoming healthcare delivery, making it possible for healthcare organizations to deliver care in additional comprehensive and economic way. Therefore, telemedicine is stated to be prepared for wider adoption. A study in Australia determined a number of factors that make telemedicine solutions not sustainable and vulnerable by utilizing a qualitative approach (Wade, Eliott, Karnon, & Elshaug, 2010). The reasons for failure comprise of: (1) lack of assistance and support from the diverse parties engaged; (2) insufficient funding with regard to sustainability; (3) lack of interest for the part of several relying and personnel on one person; in addition to (4) issues in approaching the planned goals. Additionally, the study came to the conclusion with two supporting factors, which are essential: (1) appropriate coordination and cooperation among the staff of telemedicine; and (2) a great IT infrastructure that fits the organization needs. A hypothetical system is a calculated model of how to conjecture or consistently build a relationship among numerous components that have been acknowledged as vital to the subject matter (Sekaran & Bougie, 2010). From a hypothetical structure, the testability of hypotheses can be set, and the genuineness of the defined hypotheses can be examined. Telemedicine elements involve two sets of distinguished theories, namely, social exchange theory and diffusion of innovation. Based on these theories, the persuasive variables of telemedicine are privacy, attitude to telemedicine, culture, benefits, connectivity, compatibility, IT capability, data warehouse (DW) concept, top management support, approach, cost, upper-level leadership, and technical support. This study highlights the DW stage as one of the variables that strongly affect telemedicine because DW creates an opportunity that guarantees the accessibility of data and facilitates the right for data entry. The data warehouse can also provide patients and physicians with reliable data that have similar programming and data framework equipment besides it can then enhance data protection by decreasing interference during data transfer.

This study proposes a conceptual framework on the factors which can be influenced the use of telemedicine in Iraq. Four attributes that affect telemedicine adoption are identified. These attributes are (i) individual, (ii) organizational, (iii) technological, and (iv) environmental characteristics (Buabbas, 2013; Ghani & Jaber, 2015)(Ali Buabbas, 2013).

1.1. Individual Characteristics

Individual characteristics are attributes that influence the method for telemedicine (Buabbas, 2013). Other qualities that influence telemedicine are privacy, culture, attitude to telemedicine, and benefits (Ali Buabbas, 2013; Coughlan, Eatock, & Eldabi, 2006; Jing & Pengzhu, 2009) .

An investigation of the benefits of telemedicine was conducted with the help of doctors and healthcare administrators in a local healthcare institution in Quebec, Canada (Pathni, Satpathy, & Kailash, 2009). Results showed that a few specialists have given careful consideration of the issues identified for the key players who shall use the technology. The readiness of doctors toward telemedicine use and their acceptance as potential clients (Pathni et al., 2009; (y. G. Mohammed, 2006) are influenced by individual factors and social protection and privacy issues.
This study focuses on the following variable:

a) Privacy
b) Culture
c) Attitude toward telemedicine
d) Benefit

1.2. Technical Characteristics

Innovative attributes indicate the use of internal and external innovations to secure coordination and cooperation among patients and doctors (Busse et al., 2002; Mohd, Kuljis, Papazafeiropoulou, & Stergioulas, 2007). These attributes emphasize that data imparting and innovation are related to each other, with data offering considered as an IT anticipator (Gil-Garcia, Guler, Pardo, & Burke, 2010). Innovation generates an opportunity to create a safe environment inside every office and allows to measure the security of data offering. IT is also a viable and effective instrument for an organization to improve inter-agency cooperation (Ziaee Bigdeli, Kamal, & de Cesare, 2013). Data quality is one of the variables that affecting telemedicine project(Gil-Garcia et al., 2010; Ziaee Bigdeli et al., 2013).
Similarity and unpredictability are significant factors in mechanical connection of technical support. An information distribution center is considered a data innovative framework (Jiang, Xu, Xu, & Cai, 2011; Martinez et al., 2011) and is consequently included in this connection. This study focuses on the following accompanying elements:

a) Connectivity
b) IT capacity
c) Compatibility
d) DW concept

IT capacity alludes to the capability to successfully apply IT to telemedicine projects. Similarity implies the interoperability of IT on both ends (patient and physician). These components are indispensable for the telemedicine framework (Carranza et al., 2010; Martinez et al., 2011).

1.3. Organizational Characteristics

Authoritative qualities are the inner components that significantly affect government associations and thus urge the staff to import information to different ages (Baroud, 2008). The top administration of an association, the ideas on cooperation of the association, and the measures of the association are considered the primary components in an authoritative setting (Akbulut, Kelle, Pawlowski, Schneider, & Looney, 2009; Baroud, 2008; Busse et al., 2002). This study focuses on the following accompanying elements:

a) Technical support
b) Top management support
c) Cost

The support of top management has a considerable role in any telemedicine venture. Top administration support is one of the key variables in Iraqi e-government because of the need to convince the staff to participate by imparting data to others (Gagnon et al., 2005).

1.4. Environmental Characteristics

Ecological qualities refer to the effects of nature on the operations of government offices (Xue, Liang, & Boulton, 2008). Scientists underscore the importance of considering the external factors of an organization (Jefee-Bahloul, 2014). Various natural components have been analyzed in telemedicine studies, such as the approach used and upper-management support (Xue et al., 2008). This study focuses on the following accompanying variables:

a) Policy
b) Upper-level leadership

A reliable system, trust, and upper-level leadership are the major elements in the external environment of an organization. Iraqi organizations should include relevant approaches and laws to help motivate the staff in electronically importing data and meeting (Kamal, Weerakkody, & Irani, 2010).

2. Analysis of Telemedicine Barriers in Middle East Countries.

The selection and development of suitable instruments for data collection and analysis are crucial to build a framework. Likewise, examining an organization's readiness for the adoption of a telemedicine framework is essential. It is important to attain a comprehensive comprehending of the environment as well as exploring the factors considered to be the most important for the adoption of telemedicine system. The introduction of telemedicine towards the Middle East is complicated, considering the diverse cultural and social features of the region. The models and theories included in ICT adoption discussed in the earlier chapter are utilized to create a new framework that encompasses essential factors and determinants that are needed to be addressed and examined previous to the telemedicine adoption. Hence, three main aspects of readiness are considered. First of all, telemedicine readiness is assessed based upon the readiness of technology, as well as the organization and the individual. Second of all, evaluating readiness for telemedicine adopting confers two advantages: first, the factors identified as positive could be enhanced, and negative factors which can delay or obstruct the introduction regarding telemedicine could be decreased. Finally, the degree of technical, practical, and administrative changes needed for adopting a telemedicine system could be assessed. The determinants regarding the conceptual framework created for this study are modeled on the system of Kuwait healthcare and on patients well-known overseas for treatment solution.

Therefore, the study will include individual, organizational, and technical (i.e., the infrastructure of ICT) evaluations. The diffusion of technology reveals that the adoption method should pass through a number of stages to obtain the intended choice, from knowledge and awareness to implementation and adoption. (Heinzelmann, Lugn, & Kvedar, 2005). Therefore, the framework recognizes the three factors that are crucial for stakeholders, namely, individual, organization, and the ICT infrastructure. The assessment of the preparedness of individuals and the acceptance of telemedicine are performed based on their perceptions and concerns. An organization's readiness is evaluated by exploring potential future plans for ICT utilization, approaches implemented to reduce the sending cost of patients overseas for training programs and education, and the "fertility of the ground" (i.e., encouraging and suppressing factors). Technological readiness with regard to the ICT structure is determined by the capability and availability of ICT usage and the skill of the department for receiving the ICT structure (i.e., telemedicine).

These factors can be influential in Arabic societies, and thus, their investigation is critical for this study. The role of the organizations' policy makers in the readiness and usage of ICT at the Kuwait Ministry of Health is explored by considering its existing polices. More importantly, appropriate policies for the telemedicine practice for overseas referral patients in the Kuwaiti healthcare system must be established, and an ICT-based strategy must be developed to deliver healthcare services. Finally, the users will decide to either accept or reject the new system.

2.1. Telemedicine in Saudi Arabia

The Kingdom of Saudi Arabia has recognized the vital importance of ICT. Thus, the country has made remarkable progress in different ICT fields including connectivity and access, sector reforms, national IT initiatives, and e-services over the years.

A. Telemedicine readiness

Prior to telemedicine implementation, readiness must be determined to ensure the success of the implementation of telemedicine services in the existing health systems. Evaluating the readiness for healthcare innovation can reduce the risk of failure after its introduction. Organizational readiness is vital for ensuring the long-term success of telemedicine program and services. The readiness for telemedicine is a flexible concept that has been related to the planning and the workplace (Checchi, Sevcik, Loch, & Straub, 2002). This concept is reflected in the beliefs, attitudes, and intentions of an individual with regard to the extent by which changes are necessary, as well as the capacity to successfully introduce changes within the organization. Findings indicate that e-health acceptance among stakeholders in military hospitals is superficial because they lack awareness on the nature of e-government and e-health programs. The apparent and persistent digital divide contributes to this perception. Thus, information literacy activities such as information dissemination, awareness campaigns, and training initiatives should be implemented to supplement the limited knowledge of e-health and other e-government issues of the public, as well as reduce the rate of digital divide among Saudi nationals.

B. Telemedicine initiatives in Saudi Arabia

In 1993, a royal decree established the e-Health Centre project titled "KFSH&RC." The center utilizes fiber optics and international video-conferencing through the Saudi Telecom Company to access medical consultations and to disseminate healthcare educational materials (Rogers, 2002). The use of health telematics in the King Faisal Specialized Hospital, as well as in a cluster of military and private hospitals, has been met with remarkable success. "*One of the most active parties in telemedicine in Saudi Arabia is the Sultan Bin Abdulaziz Al-Saud Foundation, which has established the Sultan Bin Abdulaziz Medical and Educational Telecommunications Program and the MeduNet Program to promote and support telemedicine in the Kingdom and telemedicine cooperation with top medical centers around the world"*. (ESCWA, 2005).

Recently, the Ministry of Health launched a project that aims to build a centralized national electronic health record database that connects hospital information systems in the Kingdom with electronic data and creates a national electronic healthcare system. The project is implemented in one of the major hospitals of the five main regions, with a regional server connected to the Ministry's server and a smart ID card for access, which is currently being designed. The Ministry of Health have likewise directed its efforts on a program that links 25 more hospitals from major cities and vital rural areas to advance telemedicine services and infrastructure, as well as facilitate international connectivity (ESCWA, 2005). Furthermore, the Ministry has initiated connections with its constituent hospitals through a WAN and utilize health information systems in these hospitals (Qurban & Austria, 2008).

The connected sites of the National Telemedicine Network increased from 5 to 20 for remote diagnostics and actual operations, as well as voice and video-conferencing services. The government healthcare providers in Saudi Arabia have intensified their efforts in adopting advanced ICT systems. Nevertheless, the lack of effective coordination affected the establishment of a single national network and repository of health records. Twenty different health information systems are deployed separately, particularly in large regional hospitals in Saudi Arabia.

2.2. Telemedicine in Jordan

A few telemedicine projects have been implemented in Jordan. In 1998, Madaba was implemented, which was a joint venture between the King Hussein Medical Centre and Mayo Clinic in 1990. These efforts, which ran for three months, ceased because of the lack of funding. The project was conducted in Jordan in 2008. The sample included key stakeholders such as doctors, technicians, engineers, decision makers, and patients. Questionnaires and interviews were completed by the respondents and other stakeholders. The results indicated the following major common themes (Alajlani & Clarke, 2013).

A. Funding

Was identified as a major problem in the healthcare system by several people in Jordan. Most of the private clinics and hospitals are successfully funded by owners who regarded these hospitals as investments and business projects; that is, improved services will increase the benefits received. However, problems persist in public hospitals in remote areas, such as in Amman. These public healthcare services require funding and support to introduce systematic improvements. The government allocated a budget to each ministry; however, with the limited budget for healthcare, most of the funding is channeled to the country budget.

B. Training in IT

Training is no less important than funding or infrastructure, particularly to understand the essential telemedicine equipment and its management. Trained nurses and physicians are cognizant of the functions and processes of telemedicine applications as necessary for conducting such training sessions. These sessions are accomplished with a remote doctor, who explains relevant information to a patient who provides the doctor with accurate information, with the goal of arriving at a correct diagnosis.

C. Doctors and Patients Resistance

A significant issue that prevents telemedicine from being accepted in Jordan was raised by several doctors: the patient should be physically present in the same session for the doctor to provide proper diagnosis in order to reduce errors in diagnosis. The study found that a number of patients prefer face to face contact with a doctor and reject telemedicine. Most patients expressed their concerns on the backgrounds of the doctor they will consult (e.g., online consultation). For example, telemedicine might connect them with a doctor from a different background, resulting in misunderstandings due to differences in cultural or religious backgrounds as is the case with female patients. Furthermore, many patients lose confidence in public doctors and paramedics who lack training and knowledge; however, these patients are left with no choice but to visit public hospitals as they are unable to afford treatment in private hospitals. Doctors are aware of these concerns, particularly with patients from remote areas.

2.3. Telemedicine in Syria

The research was conducted in Syria in 2008. A representative sample of key stakeholders including doctors, technicians, engineers, decision makers, and patients who were interviewed, and questionnaires were completed by the key stakeholders and patients. This study identified the following major common themes.

A. Infrastructure

The interviewees emphasized poor technological infrastructure as the major problem in the application of telemedicine in Syria. In Syria, high technology remains at its infancy, with mobile phones and internet being present in the country for a few years only. According to the Global Information Technology Report (2008), Syria has the poorest network infrastructure among the eastern Mediterranean countries, with a low internet penetration (an estimated 7.8% in 2007), high cost of internet access, and lack of internet security. Large international companies with newly opened branches in Syria reported that the poor internet performance and security as one of the major threats to their business. As such, these firms had to establish their internet connection through an internet service provider based in a neighboring country.

Other issues identified in this study include the lack of regulations protecting the privacy and security of e-applications, such as e-transaction, e-documentation, and e-commerce. Consequently, the patients' data will not be protected or secured if they are transmitted online between doctors or hospitals.

B. Funding

Given the poor condition of infrastructure, the application of telemedicine in Syria will incur a considerable cost. The government must allocate an adequate budget to develop and maintain the infrastructure, as well as support the application of telemedicine. Serious efforts should be made towards collaborating with different ministries to accomplish this mission. Nevertheless, the Ministry of Health and the Ministry of Communication are unwilling to fund a project that has uncertain benefits. Hence, the ministry is waiting for the private sector to establish a telemedicine project before making a decision related to a public telemedicine project. However, the private sector is not willing to fund any telemedicine project until the government provides the proper infrastructure and relaxes the process of importing computers and medical devices.

C. Training and Education

(Mandil & Bushnak, 2003) mentioned that Syrian companies encounter difficulties in training employees and finding staff with technological experience. Syria's market is in need of competent labor force in IT, and thus, training the staff involved in telemedicine application is essential. Furthermore, providing training and seminars for doctors and decision makers is highly important, because if they value the benefits of technology in the medical field, they will reap the benefits of the adoption of telemedicine and facilitate its application.

D. Doctor and Patient Resistance

Almost all interviewees in Syria indicated that social issues including doctor and patient resistance are the main barriers in the use and expansion of telemedicine. Most doctors oppose telemedicine considering the worry on shifting to this new technology and the lack of relevant experience. Patients are used to consulting with a doctor who is physically present in the same room. In particular, older patients may be more set in their ways, with little or no experience of modern technology such as computers. Most patients interviewed in Syria are unfamiliar with telemedicine. After given further explanation, however, a number of them considered telemedicine as a promising tool that could improve healthcare standards. Educating people will help avert resistance and encourage them to accept and promote the adoption of telemedicine and its applications.

2.4. Telemedicine in Palestine

A. Infrastructure

The indication of reduction of technological barriers and technical skills is essential for the adoption of e-health. This is particularly important in telemedicine projects, that telemedicine could be used to provide tertiary services to those isolated from the Gaza Strip and shortages in some health subspecialty. The networks and computers are not available to meet the request of three of the four health centers surveyed in this study. This is very important when considering the adoption of e-health technology in existing Palestinian health system where inadequate ICT infrastructure.

B. Doctors and Patients Resistance

Readiness technological changes is quite high among health professionals in a case study done in Gaza. The data show that possess core, engagement, and structural readiness. They enjoy the presence of the technological infrastructure, the experience of some of the benefits of e-health, and looking to maximize their profits by applying more applications in the future. In the other three cases conducted in Gaza the health professionals present core preparation and commitment, but lack the necessary infrastructure was a fundamental weakness that reduced its general availability.

C. Training and Education

The lack of medical sub-specialties was acknowledged by healthcare professionals across hospitals. The shortage of resources such as diagnostic aids and equipment, as well as trained staff to carry out sophisticated investigations to facilitate accurate and swift diagnosis. In a case study conducted in hospitals in Gaza saw the clinical application of e-health (consultation) offering them an option to solve the health problems of patients locally, to increase their own experience and skills, and to promote patient confidence in the locally provided healthcare services. Literacy and familiarity with technology and its use was present for healthcare professionals

2.5. Telemedicine in Kuwait

A. Infrastructure

The existing technical infrastructure for each dependent health region Health Ministry was satisfactory in relation to the availability of technology, such as computer systems, servers and networks. However, the technical infrastructure assessment reveals that all health regions were deficient in regard to the internet connections. This deficiency could hinder the adoption of a telemedicine system in the health care system of Kuwait. However, the participants confirmed that this deficiency will be resolved shortly after the sign of a contract between the Ministry of Health and the Ministry of Telecommunications to provide all hospitals in health regions with official Internet connection. Eventually, the

technical preparation of the health system in Kuwait based on their ability to manage change as he exercised his work and improve and develop at all levels.

B. Training and Education

The majority of physicians in Kuwait were highly aware about telemedicine solutions, because most of the individuals of the health-related boards have consider from the Canada, Canada, or United States, where the primary source of knowledge could be professional contacts, medical literature, and international conferences. Nevertheless, they asked for appropriate training 135 courses throughout the use associated with telemedicine adoption within the Kuwaiti healthcare systems. Over fifty percent of the overseas affiliate patients were not informed of telemedicine system, even though the majority of the patients have been willing to utilize telemedicine pertaining to the intended purpose.

C. Funding

This study reveals that financing of a telemedicine project is not considered a problem that Kuwait is a rich state, and the government has a policy to provide the best health care services to your company. This finding coincides with the results of other studies that have found that more than a health organization with government support, including funding, the more likely it is that telemedicine is approved and succeed.

The summary of this analysis can be concluded as the following; in Saudi Arabia teleconsultation the author used the grounded theory to find out the factors. While in Syria and Jordan the theory was the drive used to create the conceptual framework, moreover in Kuwait the technology acceptance model was used. It is clear that the design of Telemedicine framework improves the medical practice in developing countries. But the greatest barrier as perceived by healthcare providers for not adopting telemedicine system was the lack of knowledge about the telemedicine and its applications benefits as shown in table 2.2, on the Comparison in Middle Eastern countries.

3. Theoretical Framework

The technology-organization-environment (TOE) framework, which was developed by (Tornatzky & Fleischer, 1990), is chosen and applied as the framework of this study. (Jaber et al. 2014; Kurnia & Johnston 2000). These studies have demonstrated consistent support for TOE's ability to provide a comprehensive perspective on innovation adoption, while facilitating the flexibility to identify and categorize unique factors that may emerge in particular situations (Zhu et al. 2003). Moreover, the primary reason for choosing this framework can be that this particular approach has the possible to address difficulties of this research. On the matter of suitable framework selection, recommends a framework that continues to be adopted and adapted as well as requires further improvement and fine performance in its software for contextual complementing. This study used the framework of TOE to improve its appropriateness in the area of telemedicine. This particular adaption takes into account technological, environmental, organizational,

and individual characteristics. Additionally, social exchange theory, DOI (diffusion of innovation) theory, and prior studies are utilized to investigate the factors which can influence telemedicine within Iraq. These concepts and theories have been employed inside electronic information sharing scientific studies (Asli Yagmur Akbulut 2003; Ziaee et al. 2012). Social exchange theory relates to shared information throughout the public industry. This theory is depending on trust and power. Therefore, factors for example top management support associated with the upper-level leadership tend to be employed. The concentrate of this specific theory is to assist individuals and organizations in deciding whether to reject or to adopt a new innovation as well as to estimate the period of use and acceptance of a new technological innovation. In fact, the theory has become applied to evaluate and clarify a wide range associated with IT adoption, for instance the Internet (Prammanee 2003), database machine (Alexander & Hoffer & 1992), software engineering approaches (Bayer & Melone 1988), and Information technology in general (Moore & Benbasat 1991). The main factors have been implemented from researches carried out in Middle Eastern areas for example Jordan and Kuwait. Each characteristic has several influencing factors. These affecting factors of the present research are culture, privacy, attitude to telemedicine, connectivity, benefit, IT capability, data warehouse concept, compatibility, technical support, cost, upper level leadership, approach, and top management assistance.

4. Formulation of the Hypotheses

This section presents the formulation of some hypotheses in relation to achieving the objectives, this study has divided the factors into four characteristic and it focuses on the following factors:

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4.1. Individual

The attributes of telemedicine affect its adoption (Ali Buabbas, 2013; S. Kim & Song, 2009). These attributes are privacy (S. Kim & Song, 2009; y. G. Mohammed, 2006), cost, and society (Jack et al., 2014; Schlein, De La Cruz, Gopalakrishnan, & Montagu, 2013), which also affect the disposition toward telemedicine (Gadd & Penrod, 2001; Wright et al., 2010).

4.1.1. Patient privacy

The demand to ensure the security and confidentiality of patient records diminishes the preference for and usage of telemedicine technology (Alepis & Lambrinidis, 2013; Olanrewaju, Ali, Khalifa, & Abdmanaf, 2013). Security in telemedicine administration should be improved and made appropriate. This security relies on the level of protection provided to medical service records to avoid abuse and distortion of patient data. In Iraq, the lack of appropriate regulations on data security is a problem in the social insurance sector (Kvedar, Coye, & Everett, 2014) and thus leads to the lackluster use of technology in this area. Therefore, although technology may efficiently store data and ensure their reliable access, doctors remain skeptical on how well it will secure patient information. The latest technology on patient record protection simply serves to fuel doctors' concerns. The security of patient records needs to be guaranteed before doctors can be confident in using telemedicine. This study therefore explores the effect of patient privacy in telemedicine by doctors to utilize it as a part of the Iraqi medicinal service division.

Society is the most insightful source of good decisions and best practices (Brooks, Spargo, Yellowlees, O'Neill, & Shore, 2013). From a well-being perspective, this source encompasses well-being feelings, models for adaptive and maladaptive behavior, and how this source controls decisions and practices related to well-being (Alajlani & Clarke, 2013).

H1: Patient privacy will induce a positive impact on Adopting telemedicine in Iraq.

4.1.2. Culture

The most well-known definition of a progressive society was provided by (Schein, 1996). He described a legitimate society as "(a) an illustration of conferred vital suspicions, (b) created, discovered, or created by a given get-together, (c) figuring out how to consolidate its issues of outside adoption and inside coordination, (d) that has worked fine to be seen every bit authentic and, consequently (e) to be taught to new characters as the (f) change methodology to see, think and feel in association with those subjects." Three levels of society evidence (M. A. Mohammed, Hasson, Shawkat, & Al-khafaji, 2014) are identified, and these are as follows:

Noticeable qualities (relics): This level is that which is visible. It comprises structures and methods and is tough to penetrate.

Grasped qualities: In this level, the perspective of a beginner in a group is formed. The strategies, processes, and routines for understanding are arranged through specific requests.

Fundamental hidden assumptions: These are the significant feelings that determine the structure of society(Ghani, & Jaber, 2016). A definitive society is defined as a progressive society where one is granted an understanding of feelings, qualities, guidelines, and rationalities of capability. (Alajlani & Clarke, 2013; Wallach, 1983) presented an alternative methodology to explore society by grouping society into three classes, namely, (1) bureaucratic, (2) innovative, and (3) supportive.

An exemplary society shows collaboration and cooperation in performing tasks in a specific work field. Social worth and its effect on IT appropriation and usage are critical factors because they affect the preference of doctors to utilize telemedicine as a part of Iraqi medical services (Nurullah, Northcott, & Harvey, 2014; Wallach, 1983). A member of society is convinced to embrace an innovation when the individual goal matches the society's need.

H2: Culture will have a negative impact on Adopting telemedicine in Iraq.

4.1.3. Attitude toward Telemedicine

An examination tool was developed by (Gadd & Penrod, 2001) to evaluate the behavior of doctors in terms of e-well-being used in the setting of telemedicine and electronic medical records. The tool was updated and reevaluated by (Wright et al., 2010) and has since been modified many times and utilized as a part of different surveys. These studies essentially found that doctors are accepting of data systems that improve work execution or patient planning structures, whereas they reject those that negatively affect their work practices. The latter situation adds to the worries related to the protection and security of online data, authenticity, and other related issues (Cvengros, Christensen, Hillis, &

Rosenthal, 2007; Mushtaq, Mohsin, & Zaman, 2013). Previous studies have mixed findings on the effects of client mentality on innovation.

Several studies have found how the state of mind of doctors, as determined from their telemedicine experiences, can be affected by administration efforts (Kleiner, Akers, Burke, & Werner, 2002). The variables that are positively related to mentality are IT apparatuses and related administration, social systems, medical service practices, and occupation and business satisfaction. The behavior of doctors is found to be conversely related to relevant activities, so instrument adjustment is needed. This finding was upheld by (Aalto, Pekuri, & Seppä, 2001), who evaluated doctor disposition toward clinical information systems and health awareness administration as markers of an instrument that surveys IT utilization. Their survey found that the behavior of doctors toward telemedicine use focused on external ecological settings.

H3: attitude to Telemedicine will have a negative impact on Adopting telemedicine in Iraq.

4.1.4. Benefit

At the clinical level, the telemedicine framework can solve numerous issues (Mishra, Singh, & Chand, 2011), such as the following:

Telemedicine facilitates efficient medical management in remote areas, so it helps save time for patients and specialists and allows coordination. Data about patients can be transferred electronically to aid treatment and decision making.

Telemedicine can also be used as a component of being "accessible by the boss obligation." For example, a radiologist can deliver an image from home or manage more than one facility remotely to compensate for any deficiencies or assist physically challenged patients. This feature is beneficial to patients who may find difficulty in traveling, such as rheumatoid patients.

Furthermore, an increased capacity for correspondence among healthcare staff can be achieved with telemedicine; they can interface with different doctors or caregivers for consultations and second opinions. This feature is beneficial because clinicians can better manage future scenarios, and it increases interest too in coordination work through conferencing. From another perspective, telemedicine can influence the funding of patients and healthcare organizations because the travel costs for patient exchanges or doctor consultations will be decreased (Gagnon et al., 2005).

Both small and large organizations have revenue. However, a substantial amount of funding is required for telemedicine to be implemented successfully (Hjelm, 2005). This requirement entails significant acquisition and organization of vital assets, as well as financial support from all stakeholders, such as administrators, doctors, and patients.

H4: benefit will have a positive impact on Adopting telemedicine in Iraq.

4.2. Organization

The hierarchical qualities of telemedicine considerably affect government organizations by encouraging the staff to transfer and communicate data to different organizations (Yang & Maxwell, 2011; Ziaee Bigdeli et al., 2013). This study focuses on the accompanying elements.

4.2.1. Technical Support

The use of information and communication technology (ICT) is fundamental to upgrading a client's access to an organization. ICT devices affect the use of innovation for a variety of purposes (Haig, Sutton, & Whittington, 2006). The use of ICT will enable clients to engage in innovative data communication. ICT helps support services by using the relevant technologies according to people's needs (Ly, Dahl, Carlbring, & Andersson, 2012; Retzlaff-Roberts, Chang, & Rubin, 2004).

Social insurance processes depend on both information and information storage to meet customer needs. Data administration is therefore an important component in this setting (Lenz & Reichert, 2007). Several studies have shown the positive effects of using IT frameworks as a component of health awareness (Bose, 2003). In particular, the prevention of negative events in the pharmaceutical industry has been the focus of recent studies. Research shows that

data management is an essential part of ICT because it makes technology adjustment vital in individual-throughput-related procedures (Petersen, 2009). Specialized assistance in the medical field enables personnel to provide improved medical services and use technology innovation that can assist their work. Scholars infer that specialized assistance leads to preferred responses that enhance the possibility of using telemedicine through networking with other researchers. This situation gives clients an opportunity to raise their competency in partaking in active learning.

In Iraq, the ability to disseminate health information depends on the capacity to log in and access content without any hassle (Kawamoto, Houlihan, Balas, & Lobach, 2005). Therefore, access to quality specialized help, particularly in the midst of the execution of medical procedures, is imperative (Close-Goedjen & Saunders, 2002). As demonstrated by (Ghosh & Scott, 2008), the unavailability of specialized help decreases the utilization or appropriation of technology because medical staff needs to oversee specialized issues rather than focus on more relevant ones. This problem may eventually lead physicians to lose eagerness in using telemedicine. This study evaluates how specialized support can help doctors utilize telemedicine as a part of Iraqi healthcare facilities.

H5: technical support will have a positive impact on adopting telemedicine in Iraq.

4.2.2. Top Management Support

Top management has the responsibility of developing a superior environment in which actors are encouraged to import data to different organizations (Bigdeil, Kamal, & de Cesare, 2013). Studies have shown that without the support of top management, the advancement of government-to-government data communication is usually unsuccessful (Asli Yagmur Akbulut, 2003; Estevez, Fillottrani, & Janowski, 2010; Jing & Pengzhu, 2009). Top management support provides the direction that can help organizations deal with technological challenges. This support is provided through initiative, power, and association to encourage the staff to electronically impart data (Ramon Gil-Garcia, Chengalur-Smith, & Duchessi, 2007). This form of support involves the staff and considers other important factors, such as cost and position (Yang & Maxwell, 2011). Top administration support is one of the vital components for the successful implementation of telemedicine in Iraq (Abdullah & Hassan, 2015). The first step is to encourage personnel to enhance their technological abilities. At the same time, the Iraqi government should practice political governance and solid administration to encourage staff to participate actively in the implementation process. In this regard, the following hypothesis is proposed:

H6: top management support will have a positive adopting telemedicine in Iraq.

4.2.3. Cost

Healthcare insurance consumption has been relentlessly expanding in both developed and developing countries. Sicknesses, such as heart disease and trauma, result in major life changes. Therefore, the transformation of the sickness-centered healthcare industry to a health-centered one is imperative and should be done through the use of healthcare data frameworks (telemedicine, telehealth, and e-health). Decreasing expenses, enhancing the framework of medical service provision, and increasing the satisfaction of patients are important (Swinfen & Swinfen, 2002).

H7: cost will have a negative effect on Adopting telemedicine in Iraq".

4.3. Technology

Agencies require workers to communicate and exchange data with government offices; in this way, the staff is encouraged to share data with other agencies (Akbulut et al., 2009; Asli Yagmur Akbulut, 2003). This study focuses on the following factors:

4.3.1. Connectivity

People and organizations communicate in different ways. These differences stem from the different frameworks used (Mishra et al., 2011). Although no specific research has focused on the effects of the Internet and system integration on the use of IT devices, different service areas essentially utilize the same or standard networks to implement telemedicine (Abera, Mengesha, & Musa, 2014).

A network is a combination of connections among associated parts with the aim of achieving a specific objective. In healthcare, doctors team up with one another to deal with and oversee patient-health-related issues. A network framework has specific properties concerning organization, acquisition, data learning, documentation, and administration. These properties are fundamental parts of the framework. Components exchange data accordingly. This process may be a release or a breakthrough that demonstrates data tolerance. Diverse resources are also normally available for connected parts.

(Pappas, 2010) highlighted that integration in healthcare services facilitates the regular coordination of doctors with one another. For such frameworks to succeed, the workspaces of doctors in the frameworks must be connected with the fundamental server.

Similar to other countries that enjoy the experience of using a trustworthy Internet network, Iraq is working to form a robust Internet network that includes remote access areas. To gain from information exchanges, Iraqi health awareness centers need to have an excellent Internet connection to which all healthcare personnel have access. However, a reliable Internet connection remains unavailable at present, which fundamentally affects the opportunity for people to use telemedicine. Telemedicine applications involve voluminous data, so tremendous data are transferred through the network. Healthcare organizations therefore need to set up appropriate ICT facilities with high-speed connectivity for telemedicine application. This study explores the issue of using telemedicine according to the preferences of doctors.

H8: Connectivity positively affects telemedicine use in Iraq.

4.3.2. IT capability

IT capability relates to the use of innovative sources in government organizations to encourage staff to electronically exchange data (Jing & Pengzhu, 2009). IT capability is influenced by technical skills and resources that ought to be accessible in government organizations, so that personnel can help impart data electronically. The absence of IT capability is viewed as a critical hindrance in data management in government organizations (Bigdeil et al., 2013; Jing & Pengzhu, 2009). In short, the sufficiency of IT facilities in an organization is valuable in embracing new innovations; however, different levels of IT capabilities in government offices are usually limited in terms data management (Bigdeil et al., 2013; Close-Goedjen & Saunders, 2002; Jing & Pengzhu, 2009; Yang & Maxwell, 2011).

Nonetheless, offices in low-level government organizations can still use essential IT capabilities, such as telephones and fax machines, or different levels of IT support. Individual IT capability in government organizations is an important component in the acceptance and use of new innovations (Lu, Liu, & Pei, 2011; Ziaee Bigdeli et al., 2013). Having personnel who have insufficient experiences and training affects the set-up cost for any new innovation (Ziaee Bigdeli et al., 2013). The absence of IT capabilities causes resistance to change and thus the inability to enhance these capabilities (Asli Yagmur Akbulut, 2003; Y. Kim, 2013; Ziaee Bigdeli et al., 2013). The IT aptitude of staff and the use of accessible IT facilities strongly affect Iraqi government processes. The absence of a relevant framework and a tremendous gap in IT capabilities among government systems are obvious in the current set-up. Consequently, the following hypothesis is proposed:

H9: IT capability positively affects telemedicine use in Iraq.

4.3.3. Compatibility

Similarity is the extent to which the use of technology is considered true in consideration of the current content and past experiences of the potential user (Vuononvirta et al., 2011). IT similarity is the most basic test today for both government and private sectors. The effective use of telemedicine requires interconnectivity and interoperability within the social insurance framework (Carranza et al., 2010). In the field of teleconsultation, similar issues discourage various telemedicine exchanges, and the need for physical consultations with patients has been removed (Martinez et al., 2011).

Fostering state-of-the-art developments and increasing the usage of technology serve vital medical and social insurance needs, particularly for poorly managed healthcare services, such as those in Iraq. Exploring telemedicine in the Iraqi social insurance sector with regard to specific medical service requirements shows the poor fit between the teleconsultation structure and end-client demands.

(Hassan, Fuad, Mohammed, & Jaber, 2014) identified programming inability, the lack of proper equipment management, and inconsistency in staff abilities as among the major hindrances in this area in Iraq . Therefore, this study considers the effect of similarity on the Iraqi government as a significant factor in telemedicine use.

H10*: Compatibility positively affects telemedicine use in Iraq.*

4.3.4. DW Concept

Information centers clarify telemedicine issues, with DW serving as a tool to promote telemedicine efforts (Ji, Chi, Peng, Sun, & Zhong, 2006). Data management facilitates communication, which involves information administration, measurements, data distribution, client administration, and framework support. Government frameworks depend on information-warehousing systems, which manage tremendous government information, expand data, and assist in decision making (Huang, Dang, Cheng, Peng, & Zhu, 2010). DW facilitates information accessibility for staff and clients. (Jaber, Ghani, Suryana, Mohammed, & Abbas, 2015) stated that a legitimate DW configuration guarantees data quality, which in turn promotes client satisfaction, directs advancement, and reduces the expense associated with support. Information-warehousing devices are used to acquire relevant information, but prior to this, any information quality issues should have already been settled before the data are stored in DW (Ghani, Jaber, & Suryana, 2015). In addition, information-warehousing facilities provide comprehensive data (Ghani et al., 2015). DW incorporates the capability to display information structure and manage data storage. This capability increases the value of data exchange and learning among government offices (Huang et al., 2010).

Government organizations in Iraqi offices utilize separate databases. (M. A. Mohammed et al., n.d.) expressed that Iraqi offices of the same level should have a database to facilitate data exchange and communication. Such a database strengthens government endeavors and consequently enhances other taxpayer-supported organizations (Ghani, Jaber, & Suryana, 2015). (Jaber, Ghani, & Herman, 2014) stated that information warehouses can help upgrade the quality of telemedicine procedures, expand cooperation among relevant personnel, and enhance the use of embedded information. The present study proposes DW to be one of the variables to consider in the use of telemedicine in Iraqi healthcare facilities. The following hypothesis is therefore proposed:

H_{11}*: DW positively affects telemedicine use in Iraq.*

4.4. Environment

Ecological factors also affect the nature of the operations of government offices (Mohd et al., 2007; Velasco et al., 2002). Examples of these factors are current policies and upper-level leadership (Busse et al., 2002; Jing & Pengzhu, 2009). This study concentrates on the accompanying elements.

4.4.1. Current Policies

The use of learning or resource management strategies has been affected by issues associated with technological change (Welch & McCullough, 2013). These strategies involve the utilization of IT facilities that focus on ecological connections favoring technology utilization (North et al., 2014). The use of strategies through incentives that promote innovative change methods may have positive effects on preferences and the adoption decisions of organizations (Kerr & Newell, 2003). In Iraq, the absence of a standard approach to managing innovation affects the way leaders consider telemedicine in the social insurance aspect. An “e-Iraq” includes in its future plans a strategy called “lawful casings,” which gives any person in Iraq the capability to safely exchange his/her data (Kerr & Newell, 2003). The Iraqi government has created a government interoperability framework, which is a standard tool to exchange e-data among government offices (Iraqi government, 2011). Thusly (Iraqi government, 2011) stated that the telemedicine strategy in healthcare services may shift from one function to another. However, few studies have focused on the factors that affect arrangements to use technology by healthcare workers, especially with regard to the selection of medical instruments and the effects of this process. The current work investigates this aspect in the Iraqi social insurance segment and proposes the following hypothesis:

H12: Policy positively affects the use of telemedicine in Iraq.

4.4.2 Upper-level Leadership

Upper-level leadership indicates the capacity of an external authority to influence decisions within an organization (Akbulut et al., 2009; Jing & Pengzhu, 2009). Healthcare facilities apply various means to deal with telemedicine issues. These strategies include support, proposals, encouragement, and sanctions. The Ministry of Health supports clinics by working closely with them, providing important machine supplies at no expense, extending specialized support, and helping them in generating revenue. Nevertheless, upper-level management has the task of setting tenets and measures for data management, such as statewide inventories, information benchmarks, and information definitions. Upper-level leadership also helps sustain telemedicine by providing financial assets and administrative support (Jing & Pengzhu, 2009).

H13: Upper-level leadership positively affects the use of telemedicine in Iraq.

Figure 1. Shows the hypothesis of all factors

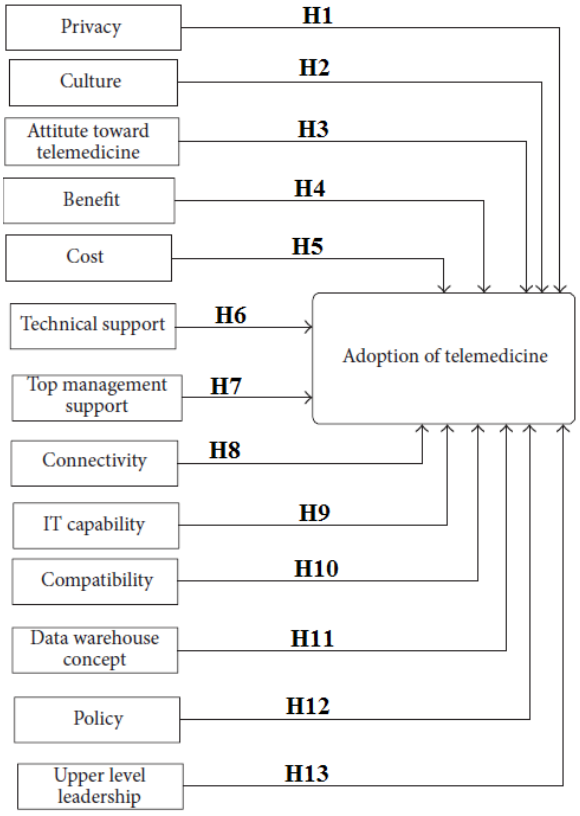

Figure 1. Shows the hypothesis of all factors

5. Conceptual framework

The proposed framework based on the literature in developing countries that have adopted the telemedicine project, such as Kuwait, Jordan, Syria, and Saudi Arabia, is shown in Figure 2. The framework is TOE. Considerable research has mentioned that individual characteristics consist of the remaining factors. Therefore, the technology acceptance model is combined with TOE to develop an integrated framework, as shown in Figure 2.

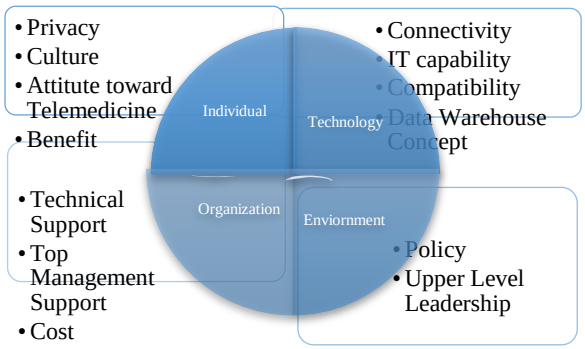

Fig. 2 Conceptual framework for Iraq telemedicine in large hospitals

6. Conclusion

This study highlights an intervention strategy through which telemedicine can serve as a powerful tool for e-healthcare by determining the impact factors and relevant parameters on healthcare services. E-healthcare can then be used by developing countries. This study provides empirical evidence that instrumental assistance helps in telemedicine adoption, and it explains the mechanisms through which the effects of instrumental assistance operate. As such, the stated goals of this study are successfully achieved.

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