

The Role of “ICT-Based Health Care” in Enhancing the Effectiveness of Health Care Systems Case Study. Hashemite Kingdom of Jordan

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Abstract: *This research deals with the relationship between “ICT-Based Health Care” applications and enhance the effectiveness of health care systems through the three-dimensional components of the “ICT-Based Health Care” applications to achieve the expected benefits from the adoption of such applications in the context of a case study is in health care institutions in the Hashemite Kingdom of Jordan.*

()This article supported by Zarqa University*

1. INTRODUCTION

The health sector is one of the largest sectors in terms of public spending in the OECD countries, and these expenses are expected to increase in the future. It has been allocated an increasing share of GDP in the OECD countries to provide health care, on average, the total spending on health care represents (about 9.5%) of GDP by the year (2010) , where we note a rise of just over (5%) in the year (1970), and about 7% in the year (1990).

In Japan, on the other hand the share of spending allocated to health has increased substantially in recent years, so got to (9.5%) (ie, from 7.6% in 2000), and this share is now equal to the average spending in the OECD countries. While we find that the rate of increase in health care spending has slowed in the period between (2003-2008), but the growth of health spending still exceeds the rate of economic growth in all OECD countries in the past almost 15 years .

There is growing evidence that “ICT-Based Health Care” necessary to support the development of new and innovative models of care delivery, as indicated by the results of studies also to the potential reduction in medical errors, in particular, as a crucial advantage (. (OECD 2010a, 2010b In addition to these health-related goals, acknowledges most governments in the OECD countries that “ICT-Based Health Care” represents new and important for opportunities economic growth. Studies estimated the value of the global market for “ICT-Based Health Care” products by about 96 billion U.S. dollars and this amount is increasing steadily (. (Boston Consulting Group 2008).

In Europe alone, for example, this segment includes a number of large companies based in Europe, as well as 5,000 small enterprises and medium-sized enterprises operating in various sub-sectors of e-health , and e-health is one of six of the most leading the most promising markets in the European Union ((Commission of the European Communities 2007) . So the adoption of “ICT-Based Health Care” is, therefore, expected to increase the demand for skilled workers and developers to implement, and support the use of this technology.

This study examines the role that could information and communication technology (ICT) contribute to enhancing the effectiveness of health care systems. This study included four parts, the first part dealt with the research methodology .The second part explains aspects by which they can enhancing the effectiveness of health care systems through the adoption of “ICT-Based Health Care”. The third part focused on the analysis of the results of the study and test hypotheses. The last part show the most important conclusions and recommendations

2. RESEARCH METHODOLOGY

The methodology of the study is based on five aspects: the problem of the study, its objectives and its importance, study model and hypotheses, method of data collection and analysis, the. Following is an explanation of these aspects:

2.1. Research Problem

Policy makers in all countries of the world facing more than ever increasing demands to make the health system more responsive to the patients they serve, and to improve the quality of care, and to address disparities in health and access to that care. There is a broad consensus among them that the health care systems today are not able to provide quality health care as they desire of patients and providers and cost countries cannot afford. Therefore, there is an urgent need to improve care and increase efficiency at the same time .

However, and despite promises enormous, but the daily use of information and communication technology in the field of health care has involved many difficulties. The effort that has been made in all countries of the world during more than two decades, this trend reflects the image of government investment large and notable successes, and also reflects the delay in the application and deficit and failures (. (OECD 2010a). This result highlights the large gap between what is possible and where are we now, with little knowledge about how to full and proper employment of the information and communication technology to improve the health and wellness of the population.

From the above, the understanding of the challenges facing the credit and the effective use of information and communication technology (ICT) in health systems, along with the broader economic effects implications, is critical to achieve the potential benefits of the adoption of applications.

At the present era, with the development of information and communication technology, the chances of possible uses for this technology in the health sector in the Arab countries in general and in Jordan in particular are enormous. Where there is strong evidence that when the application of information technology and telecommunications effectively in the field of health care, the quality of such care be higher and be more secure, and more responsive to the needs of patients as well as more efficient (ie, be suitable, available, and less extravagance). Accordingly, the problem of the study can be expressed through the following questions:

- Why do we need to use “ICT-Based Health Care”. In the field of health care systems?
- Can “ICT-Based Health Care”. Contribute in enhancing the effectiveness of health care systems?
- What are the areas that “ICT-Based Health Care”. Can contribute in enhancing the effectiveness of health care systems?

2.2. Objectives of the Study

The study seeks to achieve the following objectives:

- Provide a conceptual framework illustrates the benefits that can be achieved from the adoption of “ICT-Based Health Care”.
- Analysis of the nature of the “ICT-Based Health Care” applications effects on enhance the effectiveness of health care systems health institutions that represent the study sample through testing hypotheses.
- Suggest some future studies that contribute to the promotion of conceptual and applications frameworks of “ICT-Based Health Care” and its role in enhancing the effectiveness of health care systems.

2.3. The Importance of the Study

The adoption “ICT-Based Health Care”. Applications has great interest to global health systems in countries (such as England, Germany, South Korean, and others), which faced a significant increase in expenses and become close to collapse. Because of that, the financial savings and achieve savings in expenses when providing health services while maintaining the required level of quality of service, which is expected with the adoption of “ICT-Based Health Care”.

The Role of “ICT-Based Health Care” in Enhancing the Effectiveness of Health Care Systems Case Study. Hashemite Kingdom of Jordan

Applications are a desirable and stressing. In the same direction the report of the national health in the United States indicates that the real purpose of the adoption “ICT-Based Health Care”. Applications are to identify medical problems and accounted for and diagnose failures and dereliction and the statement of the trends and differences in medical services (Nations Health, 1995:7).

This important increase in the Arab world in general and in Jordan in particular, if we understand the weakness of the availability of information necessary to determine the extent of “ICT-Based Health Care”. Applications adoption and nature of this applications, types and entities associated with them and the benefits resulting there from as well as the costs of them and all of which are sufficient justification for attention and then studied. From here, and in spite of this importance, the interest in this subject in the Arab environment is still below the level of ambition, whether at the level of literature, or at the level of field application, the studies on this subject are very scarce that were not rare, hence the academy importance for this study gliding through the mind of a leading research in this area. While applied important for this study embodied through:

Provide a general framework illustrating the relationship between “ICT-Based Health Care” and the effectiveness of health care systems .

-Alert academics and practitioners interested in the areas of medicine, business management and information and communication technology, professional associations, insurance companies, doctors unions, and patients unions and human rights associations, environmental protection and forensic medicine, the courts and other institutions related to the need to strive towards enhancing applications of information and communication technology as a basis for enhancing the effectiveness of health care systems .

Provide an opportunity for researchers to carry out similar studies or efforts to complete this study in the same environment, or in other environments.

2.4. Study Model

This study adopted a model, seen in the figure 1, which indicates the existence of three independent variables (strategic vision, Philosophy that supports, and Commitment applications) through which “ICT-Based Health Care”. applications affect the effectiveness of health care systems (Representing the dependent variable), which consists of five dimensions(an increase of growth and employment opportunities, increase efficiency, reduce costs, improve the distribution of health care, reduce medical errors and improve patient safety and improve the care of chronic diseases). The study assumes the existence of a one-way relationship between the variables of the study.

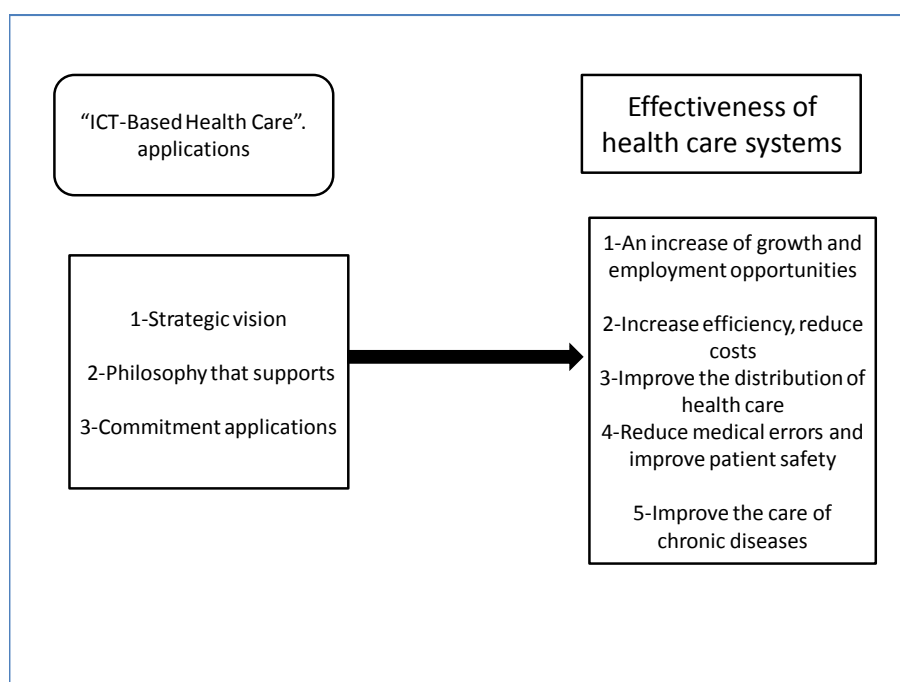


Figure 1. Study Model

2.5. Study Hypothesis

The more appropriate applications of “ICT-Based Health Care” has increased the effectiveness of health care systems.

2.6. Method of Data Collection and Analysis

As well as with exploratory visits, interview and look at the report issued by the Jordanian Ministry of Health, the researcher adoption of a questionnaire for data collection, which included three parts: the first part about the personal data from respondents, second part was devoted to determining the rank of the benefits expected from the “ICT-Based Health Care” application, and the third part devoted to measure the benefits that can be achieved through the “ICT-Based Health Care” application.

The questionnaire included (42) paragraph, table 1 (Appendix 1) shows the distribution of these paragraphs on the variables of the study. Questionnaire was distributed to the study population represented by (Director, Assistant Director, Head of Department), in hospitals and public health centres in the Jordanian’s population (204 respondents), the number of questionnaires recovered (177 questionnaire), the number of full subjected to analysis (162 questionnaire). The analysis was performed by using software (SPSS) through the following statistical methods :

-Cronbach's alpha coefficient: to test the reliability of the data collection tool used to measure the variables of the study .

-Multiple linear regression analysis: To measure the effect of the independent variables on the dependent variable .

- (t-test): testing hypotheses of the study to ensure the statistical significance of the results that have been reached.

3. ENHANCE THE EFFECTIVENESS OF HEALTH CARE SERVICES

The question that arises here is: What can and cannot the “ICT-Based Health Care” presented to health care systems? To answer this question, specialists confirms that the comprehensive use of “ICT-Based Health Care” bring interest to health care systems in many aspects that could be clarified in the following:

3.1. Promote New Sources of Growth and Job Creation

The health and social sectors employs growing and a large number of individuals in (OECD) countries and is expected to be these sectors one of the largest sources of employment growth in the coming years. Employment grew in these sectors increased by 2.8% per year in all (OECD) countries roughly between (1995 and 2009) and this ratio is equal to twice the overall rate of employment growth in other sectors of approximately (1.3%).

Recent economic crisis has affected in the health and social sectors by much less than other sectors of the (OECD) countries’ .Where employment continued increase in the health and social sectors in the years (2008 and 2009), at which time continued the same level of total employment in other sectors or even decline with the entry of these economies in recession. In Ireland, for example, grew jobs in the health and social sectors (3%) during the years (2008-2009), while total employment fell by 8% in other sectors (OECD 2011a) . The experts expected to continue and possibly accelerate in the next few years this trend. The increase in the demand for labor in this area stems to a large extent the phenomenon of an aging population requiring care at home, in nursing care facilities, and patients in internal clinics and outpatient .

With regard to the ways that “ICT-Based Health Care” contributes in the growth of employment, it can be stated follows: It will contribute to the adoption of the applications of this technology in stimulating the demand for jobs that directly support the development of new applications, platforms, and implementation, and maintenance. It will also change the way it works, doctors and nurses, and are likely to contribute to the creation of new job opportunities for health care workers who can use newly available data to identify opportunities to improve performance. Move toward larger accountability for the quality of health services, integrated delivery systems

which facilitated the movement of the increased use of information and communication technology, and stimulate investment in data and analysis, and care management platforms.

Reports indicate that the number of job vacancies in the field of health information technology has increased in the month in the United States about (199%) since the enactment of health information technology to the economy and health Clinical known for short (HITECH), and the number of vacancies growing increasing of (4,850) in February (2009) to (14, 512) in February (2012),

The study conducted on the actual employment found that more than 50,000 of the jobs of “ICT-Based Health Care” have been developed for the period between (2007 and 2011). (Furukawa et al., 2012) According to the U.S. Bureau of Labor Statistics, the employment in the disciplines of medical records and health information is expected to increase by 21% for the period (2010-2020), a rate faster than the average growth rate for all other occupations. (US Bureau of Labor Statistics 2012).

3.2. Enhance Efficiency and Reduce Costs

In addition to its impact on economic growth, adoption of “ICT-Based Health Care” can improve the value in the health sector (OECD 2010b). Specifically, it is expected that the use of ICT-Based Health Care” leads to improve efficiency and cost reduction. And attributed the positive effects in most cases, generally to reduced use of health care services is not necessary. And can contribute to the sharing of information more effectively, such as delivery mail quick reports out of the hospital to the general practitioners and the use of systems enter requisition erasure ratio (CPOE), to reduce the use of laboratory tests and X-rays redundant sometimes by up to 24 percent. (Chaudry et al., 2006)

Where the study (Treister, 1998: 21) found that many hospitals and health institutions adopted applications integrated medical information systems that contributed to the strengthening of state to participate in the information sharing and exchange between the different sections on the basis of real-time and direct (On-Line & Real-Time). On the other hand (Riegelman & Persily, 2001: 1180) study found that the adoption of modern communication technology, especially the Internet applications in medical information systems contributed to the promotion of group discussions in the framework of the so-called "collective decision support systems"

On the other hand, clinical decisions support systems can save money by informing doctors about the relative effectiveness of alternative medical treatments. As well as archiving and communication systems (PACS) can be used for medical images and digital storage and retrieval, display, and distribution, as that leads to reduce the number of X-rays, and improve turnaround time, and achieve cost savings. In British Columbia, where they were to adopt (PACS) on a large scale, according to (87%) of specialists in radiology department that got improvements in the reporting and in enhancing the efficiency of dialogue and consultation, and (93.6%) said they reduced the time it takes to identify radiological examinations (. (OECD 2010), in addition to the positive effects other than expected from the enhanced efficiency in administrative processes, such as billing.

The researchers (DeathsLmortality, 2005) emphasize that the adoption of “ICT-Based Health Care” enhances the performance of hospitals when verify their benefits through the provision of support for the various hospital administrative activities and the integration of its operations especially when linking these systems by (ERP) software and complete the project of administrative processes re-engineering, as well as providing support for the completion of research and studies, especially if we know that the integrated medical records of millions of patients represents a tremendous amount of information that is valuable humanitarian and scientific as great if exploited in a positive way by researchers in the right direction.

OECD report for the year (2010), highlights the existence of substantial savings in administrative costs related to the introduction of electronic claims processing through the new network for the exchange of electronic health information, known in England (NEHEN). It turns out that the processing of claims that cost (5.00) U.S. \$ in labor costs per transaction and paper electronically will cost 15 cents for each transaction after the introduction of ((NEHEN). In the Republic of

South Korea, were completed requirements for the completion of all requests for hospital bills through the electronic data exchange system in a year (2003). (HIRA 2010), and studies indicate that every year, Review Unit and the health Insurance Rating service (HIRA) manages the flow of nearly 1.2 billion cases of requests for hospital bills.

In 2010, the number of claims about (1.3) billion. Where all the data is transferred and stored in the system of medical information (HIRA), which features the largest storage capacity in the world, where it can store up to 210 terabytes of information. With the presence of (1,751) employees assigned to the review process, it can medical information system (HIRA) treat more than (40%) of these bills electronically. And is currently planning to increase e-participation in the four years to the next (65%) in order to achieve maximum efficiency and simplify the process. A report of Commonwealth Fund (2007), "Bending the Curve", prepared a vision about the potential for significant savings from the promotion of technologies for health information in the United States is estimated at about 88 billion U.S. dollars over 10 years (Schoen et al., 2007).

In general, the researchers estimate that "ICT-Based Health Care" applications will reduce costs because of the low rate of medical errors, and more efficient use of diagnostic tests, and use drugs more effectively, as well as lower costs of service providers, among other improvements. It is possible to achieve additional savings through coordination to provide the best care among many providers of services and improve the management of care for chronic conditions that would lead to a reduction in the use of time by the providers of services and better health outcomes for both.

3.3. Improve the Distribution of Health Care Services

Electronic health records (EHRs) contributes to improve the distribution of health care services, and then in improving the quality and care response available by enabling access to medical information for patients and facilitate the flow and transfer better across the various parties related to providing health care. The effective use of these electronic health records can also facilitate the assessment of health care and determine the level of quality at the level of practice, clinical research and effective planning for public health, and can be used to provide information necessary for incentive programs, for example programs to pay for performance.

The potential applications of "ICT-Based Health Care" to improve the delivery of health care spans more beyond electronic health records. Health care remotely (Telehealth), for example, are seen increasingly as an important tool to improve the continuity of care and improve access to health services, especially in rural and remote areas where resources and expertise of health care are often rare or even non-existent. This has enabled the introduction of telehealth in Canada access to patients in rural areas.

Recent study commissioned by the Canadian Ministry of Health pointed out that as of the end of the fiscal year (2009-2010), there will be (5,710) of the health care systems in remote (1,175) of rural communities (Praxia / Gartner 2001) . Many of these systems provide service to 21% of the population living in rural or remote areas in Canada. The number of cases of the use of telehealth in Canada in the year (2010) of approximately 260,000, of which more than (70%) to provide clinical consulting.

It should be noted here that health applications via cellular devices (Mobile health applications) provide increasingly unique opportunities and unprecedented to enable patients and to meet the growing needs of older people.

"Health Care Supporters" that focused on the patient's have argued long-time the rule which emphasizes that individuals should be able to take responsibility for their health. Today this rule applies widely to manage chronic diseases such as diabetes and obesity. The basic idea of this rule is that the individuals best hand in judging the quality of health care provided, hence, the chances of success of any kind of health care services depends on the involvement of the patient, and

"ICT-Based Health Care" which are used to support what is termed the "self-management, " (Such as medical records, which are controlled by the person, and cellular applications in access to health care, and social networks)) have an important and growing role in the treatment of the case of "information asymmetry " between health care providers and clients / patients, which allows individuals to participate more actively in decision-making on the basis of better information about their own health care.

3.4. Reduce Medical Errors and Improve Patient Safety

In the field of medicine (Al-Tae, 2010: 48-49) explained two of the concepts of medical errors:

"Mistakes" mean error in intent or purpose, and "Slips" mean error in the completion of the intention or the intention to achieve. Accordingly (Shekelle and Goldzweig 2009; OECD 2010a.) classified medical errors to three types of common medical errors, namely:

- Errors arising from the lack of attention on the part of both the physician and the patient,
- Errors of judgment or planning (errors based on the rules),
- Errors resulting from lack of knowledge.

Regardless of the differing concepts and also the different type of error, the medical errors is the subject of much attention from the relevant authorities, especially management of hospitals and health centers, patients and their families, doctors and doctors unions and institutions of civil society, the media and health organizations, national, regional and international courts to the extent that it brought the outstanding issues to thorny legal issues for consideration by the competent courts, which prompted many researchers to address this issue and look at the causes and consequences and find solutions to it. The study, completed in the state of New York in (1984) that the number of deaths attributable to medical errors than (98000) per year, and the total number of these errors that can be avoided between (500000 and 700000) error.

The study that was completed by (Dodan et al., 2003) estimated the number of deaths caused by medical errors that can be avoided by about (44000) per year, and the same trend the study of American Medical Association (Institute of Medical {IOM}, 1999) estimated the costs of these errors about (17 - 29) billion dollars. The report issued by the "Simians" Company for medical services health treatment also noted more than 7,000 of these deaths can be avoided due to medical treatments wrong, and that about 2 billion dollars are spent annually for treatments erroneous or additional. From the above and under the right conditions, “ICT-Based Health Care” can contribute in reducing a significant portion of these errors caused by the wrong medical treatment (Scott et al. 2005; Chaudry et al. 2006; Shekelle and Goldzweig 2009; OECD 2010a.), by facilitating the task of health care professionals to obtain and sharing the necessary medical information

Electronic prescriptions (e-prescribing) use leads to integration of expert system to check the harmful effects of drugs opposing (interactions). Such a system provides signals interactions possible for patients who are taking multiple medications. it also contains general information on specific patient with regard to on the onset of symptoms, such as allergies to penicillin or sulfa drugs, and provides a warning if it is described these medications for the same patient. studies have shown that “ICT-Based Health Care” (including e-prescribing) contribute to reducing medication errors and reduce the harmful effects of drugs opposing (Chaudry et al., 2006).

3.5. Improve the Management of Chronic Diseases

“ICT-Based Health Care” and its role in improving the management of chronic diseases is also received considerable attention, among the most important of these roles to improve coordination in the provision of care ((OECD 2010b. Treatment of chronic diseases requires complex data input from many health professions different, and then various aspects of health care, thus creating a complex set of data to many of the parties related to the process of care and who need to understand this information and use. In line with what was stated (Kiral, 1985: 78-79) confirms on the medical information systems that provide an opportunity for each physician access to the complete file of the patient as well as the accuracy of the diagnosis of pathological condition and then the accuracy of treatment.

(Bayati, 2001: 64) within the same trend indicates to provide high quality services to beneficiaries through the provision of information about the patient's medical history in relation to the diagnosis, treatment and final results require retain full medical file for each patient, instead of

having separate files for each condition, especially in the same patient which can be achieved through a sound system of medical information.

Therefore, the sharing of patient information by health care providers is essential to improve clinical outcomes and also to prevent unnecessary duplication. Electronic health records can facilitate this task to a great extent. “ICT-Based Health Care” are important to increase the demand for preventive services such as screening for diabetes and cancer.

“ICT-Based Health Care” can also play an important role in increasing compliance with the guidelines and standards in the provision of clinical care or care based on a specific protocol, which is especially valuable in the management of chronic diseases such as asthma, diabetes, heart insufficiency. These are the conditions with a wide evidence base for how best to manage patients, and “ICT-Based Health Care” can help to ensure that health care providers provide such evidence and committed to these standards and protocols. A study conducted by the Foundation (Rand Corporation) in the United States indicated that patients have received a rate (54.9%) only from specific health care according to a set of quality indicators of (439) index, which was placed in the light (30) of the cases of acute and chronic.

4. ANALYZE THE DATA AND TEST HYPOTHESES

First we analysis the reliability of the measurement variables of the study and determine the ranks of the anticipated benefits from the “ICT-Based Health Care” applications in the health care systems according to the respondents, as well as display the results of testing the hypotheses of the study .

4.1. Analysis of the Reliability of the Paragraphs of the Measurement Variables of the Study

Table 2 (Appendix 2) shows the results of Cronbach Alpha test for the questionnaire paragraphs, as evidenced by the results the possibility of adopting these paragraphs in the measurement of the study variables for completeness appropriate reliability.

4.2. Determine Ranks of Expected Benefits from “ICT-Based Health Care” Applications

Table (3) shows the rank of expected benefits to be achieved from the “ICT-Based Health Care” applications according to the respondents in the field of health care. These expected benefits are arranged according to their rates, the benefits of “reduce medical errors” and “improve patient safety” ranked first, while the benefit of “improving the distribution of health care services” ranked last. These results reflect the perceptions about the priorities of achieving such benefits from the standpoint of respondents.

Table 3. *Expected benefits from the “ICT-Based Health Care” applications*

Benefits	Average	Rank
Reduce medical errors and improve patient safety	4.6515	1
Increase efficiency and reduce costs	4.4428	2
Increase growth and employment opportunities	4.2990	3
Improve the care of chronic diseases	4.0120	4
Improve the distribution of health care services	3.9795	5

This is due to the fact that ICT does not contribute well in the core functions of the health sector and its contribution so far only limited and more on the level of support functions, also did not take any real initiatives to automate basic tasks, but when Jordanian health sector becomes more aware the importance of the use of ICT in their operations, and to try to increase the number of patients coming from outside Aalmofh of Jordan, it is expected to see a greater impact of ICT on the productivity of the sector and the “ICT-Based Health Care” applications may really help to increase revenue and reduce costs for the sector. (MoICT, Final Report)

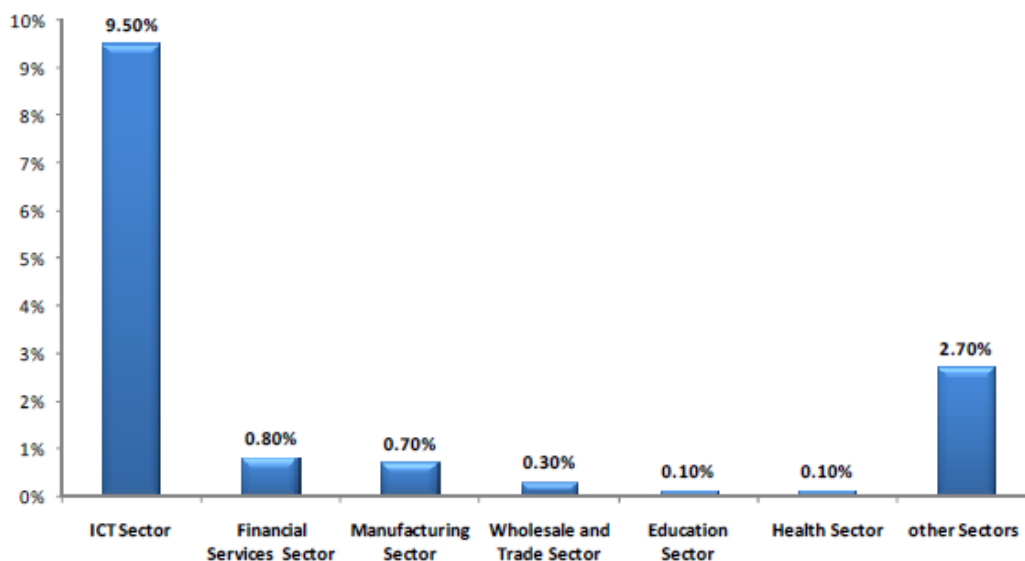


Figure 2. *The Effect of ICT on productivity in the health sector, compared to the effect of the ICT on Jordanian macroeconomic*

4.3. The Results of Testing the Hypotheses of the Study

When looking into the details of the “ICT-Based Health Care” dimensions effect on the effectiveness of the health care systems through their sub variables, table 4 (Appendix 3) shows the results of the regression analysis as follows:

4.3.1. The value of coefficient ($R^2 = 0.463$) shows that the three dimensions of “ICT-Based Health Care”, explain what rate (46.3%) of the changes in the dimension of increase growth and job creation in the health care systems, with the remainder of (53.7 %), it is due to other variables not included in the multiple linear regression model. In Jordan, the number of individuals who work in the field of health care system increased gradually from (39,000) employees in the year (1999) to more than (55,400) employees in the year (2011), where the contribution of “ICT-Based Health Care” in creating (2,041) jobs in the health care sector of Jordan, (98%) of which came from the indirect employment, and the rest came from the new jobs.

The number of indirect jobs created in the health sector is relatively low. This is due to the need for ICT support staff to manage ICT processes and tools related to information technology and communications only, which is still considered in its early stages. The most dramatic effect of “ICT-Based Health Care” on the employment of workers was to recruit females, where female employees turned in the health sector of the Jordanian from minority in (1999) to a majority in the year (2011), the percentage of females (74.2%) of the total number of employees in this sector, which is this reflects a strong relationship between the index of the use of ICT and female employment in the health sector. It also reflects the importance of ICT in facilitating the work of female employees in different functional centers, where they provide a more flexible environment, and reduce the restrictions place. (MoICT, Final Report)

4.3.2. The value of coefficient ($R^2 = 0.154$) shows that the three dimensions of “ICT-Based Health Care”, explain what accounted for (15.4. %) Of the changes in the dimension of organizational efficiency, the remaining amount (84.6%), are attributable to other variables not included in the multiple linear regression model.

In Jordan, is the impact of “ICT-Based Health Care” on the productivity of individuals working in the health sector average compared to the impact of ICT on the overall economy, due to the fact that “ICT-Based Health Care” reduce the need for employees, while maintaining the level of production in health facilities, in addition to that the health sector didn’t have initiatives really focused so far on the adoption of “ICT-Based Health Care” applications and use it correctly. However, it is expected to have a significant

impact on the productivity of the work when the individuals working in the health sector more capable of dealing with “ICT-Based Health Care” applications and its use in various areas of health care system. (MoICT, Final Report)

- 4.3.3. The value of coefficient interpretation debugger ($R^2 = 0.503$) that the dimensions (strategic vision, and commitment to applications), explain what rate (50.3%) of the changes in a better distribution of services for health care systems, with the remainder of (49.7 %), it is due to other variables not included in the multiple linear regression model. The researcher here confirms the scarcity of data related to this dimension in Jordan.
- 4.3.4. The value of coefficient interpretation ($R^2= 0.239$) shows that the dimensions (strategic vision, and commitment to applications), explain what rate (23.9%) of the changes in the reducing errors in health care systems and improve patient safety, with the remainder, amounting to (76.1%), they are attributable to other variables not included in the multiple linear regression model. Accordingly, and despite the fact that estimates of the number and nature of these medical errors, and those who got them are not available in the Hashemite Kingdom of Jordan, but that the relevant authorities and private doctors' syndicate and the media pointed to the existence of this problem (Al-Rai newspaper, Sunday, 24 / October / 2004), and the study suggests that a large part of the causes of this problem and its solutions lies in the weakness of interest in the “ICT-Based Health Care” applications, particularly with regard to medical information systems and electronic records and ignore the importance of these systems in reducing the large proportion of those medical errors
- 4.3.5. The value of coefficient interpretation ($R^2= 0.343$) show that the dimensions (strategic vision, and commitment to applications), explain what rate (34.3%) Of the changes in the post-improving care of chronic diseases, with the remainder of \$ (65.7 %), it is due to other variables not included in the multiple linear regression model. The researcher here again confirms the scarcity of data related to the number of people living with this disease and demographic distribution for them.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1. Conclusions

In light of the previous view of the results of the analysis and testing of hypotheses, this study adopts the following conclusions:

- The factors that exerted pressure to increase spending on health, such as demographic change, and chronic diseases, and new technology will continue to push to maintain the high levels of health spending. According to expert forecasts, the total spending on health will see an increase of between (50-90%) by the year (2050). So the message is simple but urgent is that the sustainability and affordability of health systems is a challenge that must be addressed.
- There are other promising prospects to control spending on health over the long term. For example, improving the quality of health care, and increase patient safety, and care coordination across the relevant authorities to provide health care can all help to control costs.
- The transformation that took place in the nature of care provided in particular with the multiplicity and diversity and prevalence of chronic diseases (special care facilities and integration into the community and home care) also gained greater importance, particularly in light of the growing aging population.

5.2. Recommendations

- Governments need to use a wide range of policy tools available to control escalating costs. Policies “Command and-Control” can contribute to the reduction of expenses in the short term, but they often have unintended consequences in the long term. In addition, such policies have the effect of weak (or no affect at all) to alleviate the pressures inherent that will continue to pay health care spending increases, and evidence suggests that “ICT-Based Health Care” applications can play a crucial role in achieving this Group of goals.

The Role of “ICT-Based Health Care” in Enhancing the Effectiveness of Health Care Systems Case Study. Hashemite Kingdom of Jordan

-Accordingly it should be emphasized on the need to be the main target of the “ICT-Based Health Care” applications is not just a tradition or keep up with the application of developments in this technology, but appropriate to the needs of beneficiaries, including any contributes to enhance the effectiveness of health care systems.

-Supplement the above recommendation and to reap the potential benefits of “ICT-Based Health Care” applications, it requires careful planning, to make significant investments in advance, and cooperation across a wide range of stakeholders. Policy priorities could lead short-term and long-term in different directions. Without strong evidence-based decision-making will be, it becomes spending on information and communications technology in the field of health a matter of opinion and often a political gamble. It should be the decision-makers seeking to reach a clearer vision about the best evidence for the reason that supports the spread of the widespread use of information and communication technology in the field of health care and the best way to do this.

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Appendix 1

Table 1. *Questionnaire Combination*

Variables of the study	Number of Paragraphs	Paragraph Symbol
The existence of appropriate strategic vision	5	X1 to X5
Possession of supporting philosophy by senior management	5	X6 to X10
The existence of a commitment of ICT applications	5	X11 to X15
Increase growth and jobs	4	X16 to X19
Increase efficiency and reduce costs	4	X20 to X23
Improve the distribution of health care services	5	X24 to X28
Reduce medical errors and improve patient safety	7	X29 to X35
Improve the care chronic diseases	6	X36 to X42

Appendix 2

Table 2. *Cronbach Alpha test for the questionnaire paragraphs*

Variables of the study	Alpha value
The existence of appropriate strategic vision	0.748
Possession of supporting philosophy by senior management	0.882
The existence of a commitment of ICT applications	0.650
Independent variable as a whole	0.772
Increase growth and jobs	0.609
Increase efficiency and reduce costs	0.806
Improve the distribution of health care services	0.844
Reduce medical errors and improve patient safety	0.941
Improve the care chronic diseases	0.748
The dependent variable as a whole	0.866