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THE IMPACT OF USING MODERN INFORMATION TECHNOLOGY METHODS ON RATIONALIZING THE COSTS OF HEALTH CARE SERVICES - AN EXPERIMENTAL STUDY

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Abstract:
This research aims to examine the role of information technology in enhancing the quality of healthcare services by analyzing the characteristics and advantages of IT, in addition to reviewing the distinctive features of healthcare services and the objectives of service quality provided. The research concludes that information technology represents a fundamental pillar for improving operational efficiency, reducing costs, and enhancing accurate decision-making in healthcare institutions. It also reveals that the unique characteristics of healthcare services, such as intangibility, interdependence, and heterogeneity, pose challenges that require the use of advanced technological solutions to support performance and improve patient satisfaction. The research also emphasizes that achieving quality healthcare services includes enhancing care efficiency, patient safety, reducing costs, developing professional performance, and promoting equity and health prevention. In light of this, the integration of information technology into the healthcare sector becomes a strategic necessity to achieve effective and sustainable healthcare that benefits both individuals and society.

Keywords: Information technology, service costs, health sector

1. INTRODUCTION:

The healthcare sector has witnessed tremendous and rapid development in light of the rapid technological progress witnessed by the world in recent times. Information technology has become an integral part of the infrastructure of various sectors, including the healthcare sector. With the recent increase in financial pressures due to the economic conditions on the healthcare sector, the need has emerged to find effective methods that contribute to improving the quality of healthcare services while rationalizing costs. This is achieved through the optimal use of information technology, which is employed to improve the efficiency of services provided by enhancing the quality of administrative and clinical processes, as well as reducing medical errors. Healthcare systems face numerous challenges, foremost among which are high costs, especially in light of the increasing population growth and the subsequent rise in demand for healthcare. These challenges place significant pressure on healthcare institutions, prompting them to find sustainable solutions that balance service quality with cost rationalization. In this context, information technology has emerged as an effective tool in improving healthcare delivery, especially with the increasing health awareness among patients who do not accept substandard service levels. It has also contributed to eliminating the barriers of time and distance, as the delivery and exchange of information has become easier. It has become imperative for healthcare institutions to use this modern technology in order to improve the quality of services provided. Based on the above, the researcher deemed it appropriate for the research topic to address the variables referred to above, because one of the most important goals of using modern technology is to provide in-depth insights to achieve financial efficiency and improve the quality of healthcare.

2. RESEARCH PROBLEM:

In recent years, the government budget has witnessed a significant increase in expenditures across all sectors, placing significant pressure on the state budget. This, in turn, leads to a high budget deficit, which negatively impacts the continued flexibility of various sectors. One such sector is healthcare. Therefore, the fundamental question being raised is how modern information technology impacts healthcare costs. Do these new technologies contribute to cost reduction?.

3.THE IMPORTANCE OF THE RESEARCH:

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Research into the impact of modern information technology on rationalizing healthcare costs is of great importance for several reasons, the most important of which are:
.Improving the quality of healthcare: Information technology contributes to improving the quality of healthcare by enabling faster and more accurate access to patient information, which helps doctors and nurses make better decisions about treatment.
.Reducing costs: Modern technology can help reduce costs by automating routine processes, reducing the need for paper, and improving resource management. For example, the use of health information systems can reduce medical errors and improve inventory management of medications and medical supplies.
.Increased efficiency: IT systems improve the efficiency of hospital and clinic operations by optimizing staff schedules, reducing waiting time, and improving billing and collection processes.
.Improving access to health services: Information technology can improve patients' access to health services, especially in remote areas, by providing remote medical consultations and electronic health records that can be accessed from anywhere.
.Enhancing analytical and planning capabilities: Modern information technology provides hospitals and healthcare institutions with the data and analysis needed for better planning and resource management, which contributes to rationalizing spending and improving operational efficiency.
Therefore, it can be said that studying the impact of information technology on rationalizing healthcare costs helps understand how this technology can be leveraged to improve healthcare services and reduce costs, which is important for both healthcare systems and patients.

4.RESEARCH OBJECTIVES:

The research objectives can be defined through the following :
.Analyzing the impact of modern information technology on improving the efficiency of healthcare operations: This objective aims to explore how modern information technology (such as electronic medical records, telemedicine, and artificial intelligence) can improve the efficiency of operations within healthcare institutions, which may lead to reduced costs.
.Evaluating the impact of information technology on the quality of healthcare: Studying how new technologies can improve the quality of healthcare provided to patients, which may indirectly impact costs by reducing the need for additional treatments or avoiding medical errors.
.Analyzing the costs of implementing health information technology compared to the potential benefits: The goal here is to estimate the costs associated with implementing modern information technology in health institutions and compare them with the potential benefits in terms of long-term cost savings.
.Exploring the impact of modern technology on access to health care: Studying how technology can improve access to health care, especially in remote areas or for disadvantaged population groups, and whether this has an impact on reducing health costs in general.
.Discussing the challenges and obstacles related to implementing information technology in healthcare: The goal is to identify and understand the challenges faced by healthcare organizations when implementing these technologies, and how these challenges can be overcome to reduce costs and improve efficiency.
These goals can help provide a comprehensive view of how modern information technology impacts healthcare costs and what can be done to maximize benefits and reduce costs.

5.RESEARCH HYPOTHESIS:

The research was based on the following basic hypothesis:
.There is a statistically significant relationship between the use of modern information technology and rationalization of health care service costs.
From this hypothesis, a set of sub-hypotheses will be derived, which will be reviewed in the applied study.

PREVIOUS STUDIES:

Some previous studies that addressed the basic research variables can be reviewed, namely:
. A study (Al-Sharif, 2008) entitled "The Impact of the Information System on the Quality of Healthcare Institutions' Services – A Case Study of Bashir Bin Nasser Hospital".
This study examined the extent to which the health institution and its various departments are affected by modern information technology systems, as well as their impact on the health service provided to patients in hospitals. The researcher concluded that the organizational culture existing in the health sector is linked to and greatly affected by the information technology used within the sector and the extent to which its employees are aware of the value of information systems in improving performance, activating communication and exchange, and then joint work.

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. A study (Kawja, 2014) entitled "The role of information and communication technology in improving internal communication in Algerian public hospitals: a case study of Mohamed Boudiaf Hospital in Ouargla".

The study addressed the adoption of information and communication technology (ICT) by institutions, both public and private, to improve their internal and external communication. ICT contributes significantly to coordination, task performance, and goal achievement, enabling institutions to better control the communication process. Given the time and cost savings this technology provides, the Algerian health sector is increasingly using it. The study concluded that the Ministry of Internal and External Communications is showing increasing interest in ICT in hospitals. However, the hospital has yet to truly benefit from the advantages offered by advanced communication tools. This proves the validity of the hypothesis that the use of advanced ICT improves internal communication in hospitals.

. A study (Schreier and Ali, 2017) entitled "Information and Communication Technology and its Role in Improving the Level of Health Services".

This study addressed the contribution of modern information technology in improving the level of health services in terms of modernity and development, as the need for documents and records related to the patient has become obsolete, as data has become digitally transferred between hospitals. The technological development has also helped in telemedicine, eliminating distances and accessing medical services that are often not available in remote rural communities. The researcher concluded that information technology is considered one of the most important achievements of science, and that all sectors in the country have benefited from its applications, especially in the health field, due to the development and modernity it has achieved in the health service provided to patients in hospitals.

. A study by Abu Shukr (2012) entitled "The impact of using information technology in private hospitals on the quality of services".

The study attempted to answer the following research question: Is the quality of services in private sector hospitals in Jordan affected by the use of modern information technology? The internal consistency method was used using statement statistics to determine the stability of the questionnaire questions. After it became clear that the Alpha Cro-Nbach coefficient had a high value and was appropriate for the stability and consistency of the questionnaire questions, the researcher completed the study, which led to a set of results, the most important of which are: The results of the averages for the employees indicated that all the statements had positive results because their averages were greater than (3), meaning (not sure or neutral).

Comment on previous studies and what distinguishes this study:

In light of the review and analysis of previous studies, it becomes clear that most of them focused on the administrative, organizational, and technical aspects of information technology in the healthcare sector, such as improving service quality, developing internal communication, and facilitating access to healthcare, especially in remote areas, as well as studying employee attitudes toward this technology. Despite the importance of these areas, almost all of them overlooked a vital and important aspect of healthcare management: the economic dimension of rationalizing costs.

Here, the proposed study, which examines the impact of using modern information technology methods on rationalizing healthcare service costs, becomes particularly important It goes beyond examining service improvements, employee satisfaction, or communication effectiveness, but rather advances a practical economic assessment of how technology can contribute to reducing costs and improving financial efficiency. This is critically important at this time, especially in light of the increasing economic challenges facing healthcare systems worldwide. Furthermore, this study goes beyond mere description or theoretical analysis; it relies on an experimental approach, giving it greater scientific strength and credibility. This approach enables accurate testing of hypotheses and the actual impact of using modern technology in reducing resource waste, lowering operational costs, and achieving optimal utilization of human and material resources in hospitals and healthcare institutions.

Through this approach, the study has expanded the scope of research in the field of health information technology from simply improving internal performance to achieving sustainable economic efficiency. This makes it more relevant to practical reality and more useful to decision-makers, especially in resource-poor countries seeking effective solutions to provide affordable and quality health services.

The theoretical framework of the research:

Axis 1: The nature of modern information technology:

1-1-The concept of modern information technology.

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The world has recently witnessed many rapid and successive developments in various fields and areas. One of the most important of these developments is the widespread use of information technology in various fields, which constitutes the foundation of modern life. This technology relies on the use of computers, networks, and software to manage, process, and store data. Its use has become an integral part of various sectors, whether in business, education, or healthcare. Information technology has played a major role in propelling various sectors towards development and modernity. The delivery of information to any location in the world has become easier due to the high flexibility in information exchange. In addition, information technology has significantly contributed to eliminating the barriers of time, distance, and cost. This advantage is considered one of the basic components of economic, social, and cultural growth in any society. Health systems in various sectors and institutions are one of the areas that have attracted information technology, through which they have sought to improve the quality of health services, which has become the focus of global attention. The satisfaction of beneficiaries of health services provided through information technology has recently witnessed great interest from the health sector, as it seeks to provide high-quality health services. (Abdul Basit, 2005: 3).

Based on the above, and in view of the profound and rapid transformations that the world has witnessed as a result of the tremendous development of information and communication technology, several basic definitions of the concept of information technology have been addressed, the most important of which are:

A study by (Richards et al,2017) stated that information technology is defined as "a set of tools and methods that an organization uses through its infrastructure to achieve targeted results in terms of production or services".

It is also defined as "all the means, equipment, programs, and services created as a result of changing the information system in order to facilitate work in institutions. These means include computers, the Internet, and other means." (Bou Ali and Fawdil, 2014: 20).

It is also known as "the technology that consists of equipment, programs, networks, databases, and others that focus on using information in performing work (Al-Hanawi and others, 2004: 293).

According to a study (Weidenmier, et al., 2006: 205), information technology was defined as a tool for exchanging information between all beneficiaries using new, highly efficient methods through computers and the Internet.

In addition to the above, the study (Al-Taie, 2013: 59) included the following definition: It is a science through which knowledge can be conveyed in technical, economic and social fields by processing data using a computer.

1-2 The importance of information technology.

The presence and development of information technology in various institutions and sectors is of great importance due to the advantages it provides and its great strategic importance, which revolves around three main dimensions: effort, time and cost. These dimensions have a great impact on the nature of performance and its results, as they provide the necessary information and data for individuals and economic units, making the world a small village where individuals can exchange information among themselves with ease and simplicity at any time and place, in addition to the speed of performance and ease of use as a result of the characteristics that distinguish information technology. This justifies the importance of information technology used in various sectors (Faiq Muhammad and Ibrahim Abdullah, 2016: 3635).

Many studies have identified (Ghassan Qasim, 2007: 166), (Muhammad and Abdullah, 2016: 3635), (Munir and Naima, 2005:2) that the importance of information technology can be summarized as follows:

Through the availability of modern information technologies, information technology is used to make appropriate and effective decisions in performing functions within various sectors.

Its remarkable ability to reduce production and service costs by providing raw materials and reducing labor costs with ease and convenience.

The great flexibility of information technology is a key factor in ensuring rapid response to changes within sectors. Achieving flexibility is one of the most important goals of production systems to meet changing market demands.

Through the digital revolution that information technology enjoys, it contributes significantly to achieving economic development.

From the above, it can be said that information technology is one of the fundamental pillars in improving the performance of organizations of all kinds. It plays a pivotal role in improving efficiency and reducing time, effort, and costs, in addition to supporting decision-making through advanced information systems. Numerous studies have indicated that the operational effectiveness provided by this technology stems from its ability to: automate tasks and reduce service costs, etc.

1-3 -Objectives of information technology.

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There are many goals that information technology plays at the level of improving personal and institutional performance and promoting continuous development in all fields. These goals confirm the comprehensive and diverse role of information technology in all aspects of life at the economic and social level. My studies (Al-Sayrafi, 2009: 13) and (Abdul Rahman and Hussein, 2018: 46) have shown that the most prominent of these goals are:
.Making sound and appropriate decisions within organizations is facilitated by its features, which enable organizations to store massive amounts of data, facilitating data-based decision-making.
.Information technology contributes to cost reduction by reducing the need for manual labor and sourcing materials efficiently.
.Its ability to eliminate all human errors through process automation and reliance on digital systems.
.Information technology is of great importance to both decision-makers and business leaders, as it provides accurate data on all activities within organizations.
From the above, it can be said that the objectives of information technology are to support sound decision-making by providing accurate data, reduce operational costs through automation and reducing reliance on manual labor, and reduce human error through the use of intelligent systems. Furthermore, it enables decision-makers to monitor the organization's activities in real-time and effectively, making it an essential tool for achieving organizational efficiency and excellence.

1-4-Advantages and characteristics of information technology .

There are many advantages and characteristics that distinguish information technology at the present time from other technologies, which are primarily aimed at achieving many advantages within economic units. The most important of these characteristics and advantages are the following: (Mariana, et al, 2016).

1-Advantages of information technology .

Many studies have addressed the benefits of information technology, which are as follows:
.Increase production efficiency and reduce costs: It is achieved by automating all administrative and production processes in organizations, which contributes to accelerating work and reducing human errors (Al-Nasser, 2016).
.Effectiveness: It is the ability to exchange information and roles between all relevant parties, meaning that there are shared roles between them in the communication process, which ultimately allows for the creation of a type of interaction. (Zamzam, 2018). (
.Reducing time: Ease of access to stored data and information at any time, which helps reduce the time required to perform work in institutions.
.Flexibility: That is, the use of information technology through the computer differs from one person to another and according to the purpose of its use, which gives it great flexibility in use. (Al-Sayrafi, 2009: 13).
Therefore, the benefits of information technology are not limited to the technical dimension, but extend to enhancing institutional performance, achieving integration in work, and improving the use of time and resources, making it one of the pillars of excellence and innovation in the digital age.

2-Characteristics of information technology.

Both studies (Aasem, 2013, 234), (Verhoef, et al, 2016) agreed that information technology has many characteristics, the most important of which are:
.Through the digital revolution brought about by information technology, it has contributed to economic development, leading to the emergence of new forms of social and economic interactions.
.The ability for all individuals to participate and benefit from information technology through information exchange, which increases the opportunity for the world to become a more peaceful and prosperous place for all its inhabitants.
.Confidentiality and accessibility of information, as the information and data contained in information technology are highly secure and can be accessed by specific groups and relied upon in decision-making.
.The possibility of integration, demonstrated by the ability of information technology to integrate all physical capabilities and equipment with supporting software and communication systems, and to support all administrative and strategic processes within institutions.
The researcher believes that information technology is not just a set of technical tools, but rather an integrated system with multiple features that effectively contribute to developing the business environment, promoting sustainable development, and achieving integration between individuals and institutions in the digital world.

Axis II: The nature of health services:

2-1The concept of health services:

The service sector, which has witnessed significant growth in recent years, occupies a prominent position in the economies of countries. The health services sector occupies a distinguished position among these sectors due to the services it provides and its direct connection with members of society and their health. Economic, social, and cultural development has become directly linked to the health status of society. It is one of the fundamental pillars for achieving

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sustainable development in any society. In this context, health institutions play a pivotal role in developing these services and ensuring their sustainability, with a focus on existing challenges such as chronic diseases and technological advances in medicine, which enables the achievement of an efficient and equitable health system. In order to make the most of available resources, through which patient requirements are met and their satisfaction is achieved, quality in health institutions is considered a sound method and approach to improving and excelling in the provision of health services. The increasing demand for healthcare facilities stems from increased health awareness among community members, as well as the increase in chronic diseases. This has led to the emergence of numerous problems, the most important of which is the long waiting hours at healthcare centers. This has required decision-makers in these institutions to find ways and adopt scientific methods that help solve these problems.

There are many definitions of the concept of health services, the most important of which are:

The study (Dardi Ahlam, 2014: 31) stated that health services are "a group of functions that are linked to other functions of society, whether educational, economic or social, which work to satisfy human needs related to survival and continuity, as they work to adapt the patient's environment, which provides support for his sensory and psychological abilities in order to achieve the required performance".

Health services are defined as "services that can create a positive perception of them in society by providing safer and more satisfying health services to their beneficiaries" (Al-Asali, 2006: 11).

A health service has been defined as "any change desired by an individual that provides positive value and addition to individuals at a specific time and place" (Jochen, 2009:12).

It is also known as "a group of activities through which individual satisfaction can be enhanced by means of the devices through which the consumer obtains the service" (Al-Sumaidaie and Othman, 2010: 24).(

2-2 Distinctive characteristics of health services:

There are several distinctive characteristics of the health services provided by health institutions, which can be identified as follows:

.Intangible service: meaning the inability to measure the service provided by health institutions as it is an intangible or non-material product, as that service can only be sensed by the customer, and the success of that service depends on the efficiency provided and its ability to achieve satisfaction for the service seeker (Fahima and Bilal, 2011).

.Variability: Since health services depend on the skill and performance of the service provider, as well as on the information provided by the patient, these health services can be described as variability and asymmetry. (Ahlam, 2014: 34).(

.Perishability: A health service cannot be stored or inventoried, but is consumed at the moment of its production. Failure to use it within a specific period will result Patient participation in health service procedures: in the service being wasted (Najat, 2011: 23).

.Interdependence: This refers to the inseparable connection between two things. Healthcare institutions produce and consume services simultaneously; they cannot be stored and then resold. A service provided of poor quality cannot be retrieved, even if it is corrected and provided to other patients of high quality (Ahlam, 2014: 33).(

.Patient participation in health service procedures: The inputs of the health service represent the patients who receive that care, while the outputs of the service represent the patient's condition after diagnosis and treatment. Then, the interaction between that institution and the patient takes place through the provision of health care (Ozcan, 2008: 30).

The researcher concludes that healthcare services are highly specific compared to other services, as they combine human, technical, and temporal aspects. This requires healthcare institutions to be flexible, precise, and responsive to ensure the desired therapeutic outcomes and patient satisfaction.

2-3Health service quality objectives:

The most important goals that health institutions seek to achieve can be summarized as follows:

.Improving healthcare efficiency: This is achieved through the effectiveness of healthcare services by optimally utilizing resources to achieve the best results.

.Improving patient safety: This is achieved by providing safe care that reduces medical errors and health risks.

.Reducing costs: One of the most important goals healthcare institutions seek to achieve is reducing waste and improving efficiency to achieve high quality at reasonable costs (Abdul, 2016: 5).

.Developing professional performance: This is achieved through continuous training, which leads to raising the level of professional competence of healthcare providers.

.Health prevention: This is achieved by strengthening prevention programs and early detection of diseases to reduce the spread of chronic and infectious diseases.

.Achieving health equity: This means ensuring the equitable distribution of services among all segments of society (Faraj, 2021: 119).

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From the above, the researcher can say that the quality of healthcare services is not limited to one aspect, but rather is an integrated system that includes efficiency, safety, justice, prevention, and professional development, and seeks to provide comprehensive care with a sustainable impact on the health of the individual and society.

Axis 3: The relationship between modern information technology and healthcare costs.

3-1The relationship between modern information technology and health care costs.

The relationship between modern information technology and healthcare costs revolves around improving the efficiency of healthcare services provided by healthcare institutions at lower costs by reducing waste and increasing transparency in the provision of these services. Achieving these goals by healthcare institutions can be achieved by having modern technology systems that help improve the services provided to patients through the benefits achieved in activating medical and administrative registration systems, such as maintaining patients' personal, medical, and treatment data. The relationship between information technology and healthcare is evident in several key aspects, the most important of which are:

.Improving health information management: This is achieved by storing and managing patient data in an electronic file that facilitates quick and accurate access to medical information related to the patient's medical condition, thus reducing errors associated with paper records.

.Improving the quality of healthcare: This is achieved by analyzing medical data and proposing optimal treatment plans based on available evidence. This helps improve access to healthcare for many beneficiaries, especially in remote areas where residents suffer from a lack of healthcare. As a result of successive developments in information technology, these developments have enabled the provision of healthcare services remotely, without the need for the physical presence of both the patient and physician (Schreier and Hamidoush, 2017: 298).

.Increasing efficiency and reducing costs: Increasing efficiency and reducing costs can be achieved by automating operations within health units by using electronic systems to manage all processes, from patient registration, billing, and medical diagnosis. These tasks contribute to reducing the time required for these operations and also limiting human errors. Information technology helps reduce health costs and improve the efficiency of resource use within health units, as automated systems and automation can reduce the need for manual work and improve planning and organization, which leads to saving money and time.

.Improving communication and coordination: Information technology provides effective communication platforms that contribute to improving communication between medical teams and patients. Patients can communicate with their doctors at all times (Gogia, 2020: 11).

.Telemedicine: Information technology enables remote patient examinations, which in turn reduces visits to hospitals and medical clinics. This significantly reduces patient transportation costs, alleviates pressure on healthcare facilities in general, and makes them more efficient. It also contributes to improving the quality of healthcare services and facilitating patients' access to more of these services.

.Health information security: One of the most important functions of information technology is protecting patient data from unauthorized access, as security and encryption systems play a major role in protecting patient privacy and maintaining the confidentiality of medical information (Schreier and Hamidoush: 300).

From the above, it can be said that the relationship between modern information technology and healthcare costs is complementary and reciprocal. Modern healthcare relies on information technology to improve quality, increase efficiency, and reduce costs incurred by the healthcare sector. Information technology also helps healthcare providers provide better and more comprehensive services to patients.

Applied study:

•Search method:

It involves the process of collecting and analyzing basic data, then determining the sources for obtaining it, defining the research community and its sample, in addition to the methods used in analyzing the data, as explained below:

Primary data and its sources: Based on their sources, the data is divided into two groups:**.**

-**Secondary data: This** data comprises all information collected about the research variables through reviewing Arabic and foreign books and studies related to the variables.

-**Primary data:** This data was collected using a questionnaire and analyzed to verify the validity of the hypotheses upon which the research was based, and then to arrive at the results.

.Research community and sample: The community consists of employees in government hospitals in Salah al-Din Governorate. The research sample was selected using a simple random sampling.

.Data collection tool: It was a questionnaire directed to administrative and financial managers, accountants, and those who are within the programming specialization in hospitals.

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.Data analysis:
-A set of statistical tools was used to analyze the results of the questionnaires distributed and collected by the researcher.
-The impact of using modern information technology on rationalizing healthcare costs.

Statistical analysis results:

After using the Statistical Analysis Program for the Social Sciences (SPSS) and relying on it in the financial analysis, the researcher reached the following set of results:

First: At the beginning of the statistical analysis, it was necessary to verify the validity and reliability of the questionnaire items using Cronbach's alpha coefficient. The researcher found the following results, as they appear in Table (1):

Table No. (1)
Values of the reliability and validity coefficient (Cronbach's alpha) for the research variables

reliability coefficient	Cronbach's alpha reliability coefficient (α)	Variables
0,889	0,786	The impact of using modern information technology
0,895	0,798	Rationalizing the costs of healthcare services

*** Source of results: Cronbach's Alpha test.**

The researcher concluded from Table (1) that the values of Cronbach's alpha appeared between (0.786 - 0.798), and it is known to researchers and specialists that the statistic of this type of test should not be less than 0.7, and accordingly the researcher concludes that these values are acceptable values to the extent that they can be used to reflect an acceptable degree of reliability and confidence in the variables of the research, and this clarifies the extent of their suitability for statistical analysis in the other steps of the research.

Second: Descriptive analysis of the research sample:

The demographic description of the research sample can be explained through Table (2) below, which is according to the results of the repetitions:

Table No. (2)
Demographic description of the sample

Percentage	repetition	Category	variable
%32	32	Higher certificates	Academic qualification
%68	68	Bachelor's Degree	
%20	20	Senior Management	Job
%28	28	Financial Management	
%20	30	Accountants	
%22	22	Programmers	
%34	34	Less than 10 years	Years of experience
%46	46	10 years and less than 20 years	
%20	20	20 years and older	

***Source of results: Descriptive statistics - Frequencies test.**

The researcher found, according to Table No. (2):

-The percentage of bachelor's degree holders was 68% of the total sample, and the percentage of postgraduate degree holders was 43% of the total sample, which indicates to the researcher that there is a positive aspect in the diversity of the sample's academic qualifications.

- Regarding the job, the results showed the researcher that the percentages were distributed among the sample members in a way that varied to an acceptable extent, as they ranged between 20% and 22% for senior management and programmers, respectively, of the total sample size. The percentage of accountants and financial management came in at 28% and 30% for each of them, respectively, which is an acceptable diversity in statistical analysis.

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-As for the years of experience of the research sample, the researcher found the following: (46%) of the total sample size is for employees whose experience ranges between 10 years and less than 20 years, while the percentage of those who were less than 10 years was (34%), and finally the percentage of those with more than 20 years of experience was 20%.
-From the above, it becomes clear to the researcher that the research sample includes a group of scientific and practical competencies that are expected to be qualified to answer accurately and objectively the paragraphs that make up the questionnaire form.
Main hypothesis: There is a statistically significant relationship between the use of modern information technology and the rationalization of health care service costs.
The results related to the statistical analysis of the basic hypothesis test above showed the following:

Table No. (3)
Results of the analysis of the impact of using modern information technology on rationalizing the costs of healthcare services

R^2	β = (R)	T (Sig)	F (Sig)	dependent variable	independent variable
0,544	0,575	7,458 (0,000)	66,729 (0,000)	**Health services costs**	**information technology**

***Source: Results of regression analysis.**
The previous table No. (3) shows the following:
1-The stability of the significance of the regression model, as the value (F) reached 66.729, which is significant at a significance level less than 0.01.
2- The stability of the significance of the regression coefficients for the requirements of applying artificial intelligence and the fixed limit, as the value of (T) for the requirements of applying artificial intelligence reached 7.458 at a significance level of 0.01.
3-The values of (R) and (β) were (0.575), which means that there is a positive role for information technology in rationalizing the costs of health services with a regression coefficient of 0.575, at a significance level of 0.01.
4-The value of ((R2 (0.544) came, which shows that the use of information technology explains 54% of the changes that enhance the rationalization of health services costs, while the remaining percentage is due to other variables that were not addressed by the model.
Accordingly, and through the above, the researcher finds that there is a statistically significant relationship between modern information technology and rationalization of health care costs.
First sub-hypothesis: There is no significant difference between the research sample items regarding the effect of using information technology on rationalizing the costs of health services with regard to (reducing the average cost of a single health service).
Through statistical analysis of the results of the hypothesis test, the researcher obtained the following results, as shown in Table No. (4):

Table No. (4)
Results of the first sub-hypothesis test

significance	morale level	T	standard deviation	arithmetic mean	Phrase number
Moral	0,000	38,234	0,55453	2,8147	1
Moral	0,000	35,067	0,44032	2,6345	2
Moral	0,000	32,255	0,77479	2,3452	3
Moral	0,000	35,855	0,44367	2,3800	4
Moral	0,000	42,012	0,56667	2,7229	5
Moral	0,000	31,200	0,80345	2,4734	6
Moral	0,000	31,456	0,58345	2,4422	7
Moral	0,000	31.763	0.98543	2.6796	Total

***Source of results: Statistical analysis of T-test.**
-Through Table (4)

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The researcher found that the level of awareness of the research sample members about the impact of using information technology on rationalizing the costs of health services with regard to (reducing the average cost of a single health service) was relatively high. The arithmetic averages ranged between (2.3452) as the lowest value for paragraph (3), which indicates that the sample members' awareness that the use of information technology can contribute through electronic systems to reducing the time of providing the service and thus reducing its cost, with a standard deviation of (0.77476), which shows the presence of a degree of heterogeneity in the opinions of the research sample members. The highest value was (2.8147) with a standard deviation of (0.55453) for paragraph (1), which indicates that the use of information technology helps reduce the cost of medical consultations, reflecting their approval of it to a very high degree. Since all the values of (t) were statistically significant, this means that there is a significant difference in the opinions of the research sample regarding the extent of their awareness or knowledge about the impact of information technology on rationalizing the costs of health services with regard to (reducing the average cost of one health service), which came about their agreement on the importance of its important role in strengthening this dimension.

Second sub-hypothesis: There is no significant difference between the research sample items regarding the impact of using information technology on rationalizing the costs of health services with regard to (reducing the number of costly medical or administrative errors).

Through statistical analysis of the results of the hypothesis test, the researcher obtained the following results, as shown in Table No. (5):

Table No. (5)
Second sub-hypothesis test results

significance	morale level	T	standard deviation	arithmetic mean	Phrase number
Moral	0,000	35,423	0,54073	2,5322	1
Moral	0,000	41,512	0,46638	2,4322	2
Moral	0,000	43,123	0,45472	2,5700	3
Moral	0,000	30,124	0,54417	2,4532	4
Moral	0,000	29,432	0,63421	2,5466	5
Moral	0,000	27,785	0,61207	2,3210	6
Moral	0,000	44,733	0,43421	2,6848	7
Moral	0,000	58,169	0,38543	2,4542	Total

***Source of results: Statistical analysis of T-test.**

-It is clear from Table No. (5)

The researcher found that the level of awareness of the research sample individuals regarding the impact of using information technology on rationalizing health service costs with regard to (improving the efficiency of using human and medical resources) was relatively high. The arithmetic averages ranged between (2.3210) as the lowest value for paragraph (6), which indicates that the sample individuals' awareness that the use of information technology helped facilitate review and auditing, which reduced administrative errors with a standard deviation of (0.61207), which indicates the presence of a degree of heterogeneity in the opinions of the research sample individuals. The highest value was (2.6848) with a standard deviation of (0.43421) for paragraph (7), which indicates that the use of information technology led to a decline in the need to repeat medical procedures due to technical or administrative errors, reflecting their approval of it with a very high degree of approval. Since all the values of (t) were statistically significant, this means that there is a significant difference in the opinions of the research sample regarding the extent of their awareness or knowledge of the impact of using information technology on rationalizing the costs of health services with regard to (improving the efficiency of using human and medical resources), which came around their agreement on the importance of its important role in strengthening this dimension.

The third sub-hypothesis: There is no significant difference between the research sample items regarding the impact of using information technology on rationalizing the costs of health services with regard to (improving the efficiency of using human and medical resources).

Through statistical analysis of the results of the hypothesis test, the researcher found the following results, as shown in Table No. (6):

Table No. (6)
Results of the third sub-hypothesis test

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significance	morale level	T	standard deviation	arithmetic mean	Phrase number
Moral	0,000	32,742	0,52032	2,3130	1
Moral	0,000	44,832	0,46632	2,4714	2
Moral	0,000	41,521	0,51287	2,5324	3
Moral	0,000	35,130	0,74321	2,5211	4
Moral	0,000	30,210	0,62311	2,5432	5
Moral	0,000	25,732	0,67210	2,3123	6
Moral	0,000	46,432	0,78732	2,6876	7
Moral	0,000	57,123	0,29327	2,5321	Total

***Source of results: Statistical analysis of T-test.**

-It is clear from Table No. (6)

The researcher found that the level of awareness of the research sample individuals regarding the impact of using information technology on rationalizing health service costs with regard to (improving the efficiency of using human and medical resources) was relatively high. The arithmetic averages ranged between (2.3123) as the lowest value for paragraph (6), which indicates that the sample individuals' awareness that information technology can provide electronic systems with immediate data that helped in making better decisions, with a standard deviation of (0.67210), which indicates the presence of a degree of heterogeneity in the opinions of the research sample individuals. The highest value was (2.6876) with a standard deviation of (0.78732) for paragraph (7), which indicates that information technology has contributed to increasing the number of patients served daily with the same resources, reflecting their approval of it with a very high degree of approval. Since all the values of (t) were statistically significant, this means that there is a significant difference in the opinions of the research sample regarding the extent of their awareness or knowledge of the impact of using information technology on rationalizing the costs of health services with regard to (improving the efficiency of using human and medical resources), which came in favor of their agreement on the importance of its significant role in strengthening this dimension.

CONCLUSION:

From the above, the researcher concluded that information technology has become a pivotal tool in supporting and developing various sectors, most notably the health sector. This is due to its characteristics and advantages that contribute to increasing performance efficiency, reducing costs, and enhancing the quality of services provided. The study demonstrated that the distinctive characteristics of health services—such as intangibility, interdependence, and heterogeneity—pose unique challenges for health institutions that require smart and effective responses. This can be achieved through the effective use of information technology. Furthermore, the objectives of health service quality are not limited to improving patient safety or increasing efficiency alone, but extend to developing professional performance, achieving health equity, and enhancing prevention. All of these objectives complement the potential of technology to improve the level of comprehensive care. Therefore, integrating information technology into health services is no longer an option; it is a strategic necessity to ensure the provision of effective, safe, and equitable health care. Keeping pace with technological developments and directing them toward improving service quality represents a fundamental pillar for achieving sustainable development in the health sector, achieving patient satisfaction, and enhancing community confidence in health institutions.

SOURCES:

1. Ahmed Khanjar Abdul, (2016) "Health Information Systems," a study in health marketing, College of Administration and Economics, University of Kufa, Iraq.
2. Ahmed Walid Abu Shukr, (2012) "The Impact of the Use of Information Technology in Private Hospitals on Service Quality," a thesis submitted for a Master's degree in e-Business, Middle East University, Amman.
3. Hadada Najat, (2011) "Supply Challenges in Healthcare Institutions," a graduation thesis for a Master's degree, Abu Bakr al-Qaed University, Tlemcen, Algeria.
4. Badisi Fahima, Ziouch Bilal (2011) "Service Quality: Characteristics, Dimensions, and Indicators," Journal of Economics and Society, Issue 7.

World Economics & Finance Bulletin (WEFB)
Available Online at: https://www.scholarexpress.net
Vol. 48, July, 2025
ISSN: 2749-3628,

5. Bashir Kawja, (2014) "The Role of Information and Communication Technology in Improving Internal Communication in Algerian Public Hospitals," a thesis submitted for a Master's degree in Economics, Business, and Management, University of Ouargla, Algeria.
6. Jarboua Mounira, (2021) "Telemedicine: A Necessity Imposed by the COVID-19 Pandemic," Algerian Journal of Legal and Political Sciences, Volume 58, Issue 2, Faculty of Law, University of Algiers.
7. Hassan Jaafar Al-Taie, (2013) "Information Technology and Its Applications," First Edition, Dar Al-Bidaya, Amman, Jordan.
8. Hussein Muhammad Ahmad Abdul Basit, (2005) "Successful Applications and Methods of Using Information and Communication Technology in Teaching and Learning Geography," Journal of Online Education, Issue 5.
9. Hanan Yahya Al-Sharif, (2008) "The Impact of Information Systems on the Quality of Healthcare Services - A Case Study of Bashir Bin Nasser Hospital," a thesis submitted for a Master's degree in Management Sciences, University of Mohamed Khider, Biskra, Algeria.
10. Kholoud Asim, (2013) "The Role of Information and Communication Technology in Improving Information Quality and its Impact on Economic Development," Journal of the Baghdad College of Economics, Special Issue of the College Conference.
11. Dridi Ahlam, (2014) "The Role of Using Queue Models in Improving the Quality of Healthcare Services: A Case Study of the Public Institution for Neighborhood Health in Biskra," Master's Thesis in Economics, Social Sciences, and Management, University of Biskra, Algeria.
12. Sultan Abdul Rahman, Raafat Hussein, (2018) "Information Technology and Its Impact on Technical Innovation," Tikrit Journal of Administrative and Economic Sciences, published by the College of Administration and Economics, Tikrit University, Iraq, Volume 3, Issue 8.
13. Shrier, Suad, and Ali Hamidoush, (2017) "Information and Communication Technology and Its Role in Improving the Level of Health Services," New Economics Journal, Vol. 1, No. 16, p. 291.
14. Amer Al-Nasser, (2016) "Knowledge Management in the Framework of Business Intelligence Systems," Dar Al-Yazouri, Amman, Jordan.
15. Al-Asali, Muhammad Adeeb, (2006) "The Reality of the Requirements for Developing Health Websites," The National Influencer for Scientific Research and Cultural Development, Damascus, Syria.
16. Alaa Farag Hassan, (2021) "The Role of Patient Interaction Skills in Improving the Quality of Healthcare Services," Scientific Journal of Economics and Commerce, Menoufia University.
17. Ghassan Qasim Daoud Al-Lami, (2007) "Technology Management," First Edition, Dar Al-Manahij, Amman, Jordan.
18. Fayeq Muhammad Sarhan Al-Zuwaini, Ibrahim Abdullah Eidan, (2016) "Information Technology in Construction Project Management," Dar Ghaida, Amman, Jordan.
19. Farida Bou Ali, Hakima Fawdil, (2014) "The Role of Information and Communication Technology in Improving Internal Communication in the Institution," Master's Thesis, Department of Economics, University of Bouira, Algeria.
20. Mohamed El-Sayrafi, (2009) "Information Technology Management", First Edition, Dar El-Fikr El-Gam'i, Alexandria, Egypt.
21. Mohamed Saleh El-Hanawi et al., (2004) "Introduction to Business in the Age of Technology", Dar El-Gam'iyya, Egypt.
22. Mounir Nouri, Naima Barak, (2005) "Information and Communication Technology and its Importance in the Economies of Arab Countries to Keep Up with the Challenges of the New Global Economy - Recommendations and Requirements", Faculty of Economics and Management Sciences, Hassiba Ben Bouali University, Chlef.
23. Gogia. S(2020)" Fundamentals of Telemedicine and Telehealth", AcademicPress, United State.
24. Jochen Wirtz autrre(2009) "Marketing de services" , edition , pearson education, France**.**
25. Mariani, M.M., Buhalis,D., Czakon, W.,and Vitouladiti, O.(2016)" Tourism Management, Marketing, and Development. Performance, Strategies, and Sustainability", New York, Palgrave- Macmillan.
26. Richards, G., Yeoh , W.,Chong, A., and Popovicm A(2017)"Business Intelligence Effectiveness and Corporate Performance Management: An Empirical Analysis" Journal of Computer Information Systems, 25(2).
27. Verhoef, P.C., Kooge, E., and Walk, N.,(2016)"Creating Value With Big Data Analytics: Making Smarter Marketing Decisions, London, Routledge.
28. Weidenmier, Marcia 1 ¸ and Ramamoorti ¸ Sridhar (2006) " Research Opportunities In Information Technology and Internet Auditing", Journal Of Information Systems ¸ Volume 20 ¸ Issue 1.