



"ARTIFICIAL INTELLIGENCE AND ITS APPLICATIONS IN HEALTH MANAGEMENT IN THE GENERAL DIRECTORATE OF HEALTH AFFAIRS IN RIYADH REGION".

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ABSTRACT

This scientific paper aimed to identify the reality of artificial intelligence and its applications from the point of view of administrative employees in the health administration in the General Directorate of Health Affairs in the Riyadh region. The study followed the descriptive survey method. The study sample consisted of (120) employees, and a questionnaire consisting of (18) items was used to collect the data is distributed into 5 fields of artificial intelligence applications: (Databases used, Support senior management. Users of the system. Computerized health information systems used, Improve the performance). The results showed that the arithmetic averages of the study sample's responses to the reality of applications of artificial intelligence fields in health administration in the General Directorate of Health Affairs in the Riyadh region ranged between (3.40-3.12), with an average application rate for all fields, and the field of databases used came in first place. In health administration, with a mean of (3.40) and a moderate degree, followed by the field of Support senior management, with a mean of (3.36) and a moderate degree, the "Users of the system" field came third, with an arithmetic mean of (3.32) and a moderate degree, followed by the field Computerized health information systems used, with a arithmetic mean (3.28) and a moderate degree, and the field of Improve the Performance came in last place, with a arithmetic mean (3.12) and a moderate degree, and the average reached General arithmetic for areas of artificial intelligence applications in health management (3.29), with a moderate degree of application.

Keywords: Artificial intelligence; Health Administration, General Directorate of Health Affairs; Administrative Staff.

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DOI: 10.53555/ecb/2022.11.12.401

1. Introduction and Theoretical Framework

The combination of rising technologies like artificial intelligence and healthcare is one of the hottest topics today, artificial Intelligence is defined as the ability of machines to mimic human intelligence and perform tasks that would normally require human cognition. Integrating artificial intelligence with healthcare has the potential to change the way healthcare is delivered and managed to become a comprehensive, effective and integrated health system, as artificial intelligence can help analyze large amounts of data, identify patterns, and even make predictions of future patient outcomes (Alhashmi & Salloum, 2019).

In light of the development of global health systems, and with the acceleration and increase in the use of artificial intelligence in health care, and research and health organizations racing to adopt artificial intelligence technology to improve the patient experience and help address some of the pressing problems facing health care today, and in order to obtain a deeper understanding of the impact of these emerging technologies. To patients, healthcare professionals and wider society (Ministry of health Saudi Arabia, 2021). To ensure the continued development of health care services in the Kingdom of Saudi Arabia and to focus efforts in this sector to face the challenges related to health services by raising their quality and efficiency, we can discuss the following topics: Excerpts from the current health care situation; A closer look at ways to use artificial intelligence technology in health care; potential future impact; Challenges in implementation and adoption of emerging technologies in health care (Abu-Shanab, 2019).

Kingdom Vision (2030) plan, launched by the Saudi government in 2016, includes a comprehensive strategy to transform the healthcare system. The plan aims to create a more patient-centered health care system. It also emphasizes the importance of preventive health care, health education, and reducing health care costs. The program includes several goals, such as increasing the number of health care providers, enhancing health care infrastructure, and applying new health care technologies. It also aims to make the Kingdom one of the most efficient countries in the field of health care (Alijerin & Arfat, 2022).

AI in healthcare is an important part of Vision 2030, the Saudi Data and Artificial Intelligence Authority (SDAIA) was created for this purpose, and other entities including the National Healthcare Command and Control Center (NHCCC). According to the 2023 Artificial

Intelligence Index report issued by Stanford University, Saudi Arabia has the second largest amount of knowledge and awareness of the benefits of artificial intelligence among countries (Shaban & Buckeridge, 2018).

According to the results of this recent index, the Kingdom of Saudi Arabia ranked highly among the most "efficient" countries in the health sector, occupying second place directly after Singapore, recording 44.17 points, and surpassing the overall average of the index in the group of 16 countries, by a difference of 17 points, as this represents Points: Rates of countries' spending on the health care sector versus the returns achieved in the health sector.

As part of the Kingdom Vision 2030 strategy, the first World Summit on Artificial Intelligence was held in September 2020 under the patronage of His Royal Highness Prince Mohammed bin Salman bin Abdulaziz, Crown Prince, Deputy Prime Minister and Minister of Defense. The summit included 30 sessions attended by 60 speakers, including ministers, leaders of global entities, academics, investors and businessmen from 20 countries (Alijerin & Arfat, 2022).

During this 2020 Global AI Summit, the Kingdom signed strategic agreements with IBM, Alibaba, Huawei and other companies to develop a global framework that supports international cooperation in the field of artificial intelligence. SDAIA also announced a partnership with the World Bank to strengthen local economies in developing countries after that, many meetings and conferences followed, the most important of which was the Riyadh International Summit for Medical Biotechnology in Riyadh, September 2021. The Kingdom of Saudi Arabia hosted the summit as one of the events accompanying its presidency of the G20. The Riyadh Global AI in Healthcare Summit was also held in Riyadh in March 2022. Leading AI scientists, executives and business leaders from around the world gathered to discuss the latest AI research and technologies and to explore the potential of AI, machine learning and deep learning in healthcare. Aramco also established Prosperity Ventures, a global venture fund to invest in emerging technologies (Alijerin & Arfat, 2022).

Health institutions in the Kingdom of Saudi Arabia are witnessing tremendous technological changes, the most important of which are the applications of Artificial Intelligence, which have brought about radical developments in various health services, which requires the preparation of employees with advanced digital skills to achieve productivity and creativity and are able to fill jobs

and professions and meet their requirements in the fields of Artificial intelligence, cryptography, cybersecurity, Internet of Things, mobile application development, etc.

Duan and Dwivedi (2019) state that the challenges and outcomes of artificial intelligence have forced the transfer of health services and administrative procedures to cyberspace, which has led health institutions, regardless of their activities, to develop their services and tasks to keep pace with the requirements of artificial intelligence by shifting from the traditional style to the digital style. Along with linking the digitization of business and health services through what is known as artificial intelligence.

Barrane & Karuranga (2018) believes that the requirements of artificial intelligence have become among the basic necessities that all institutions of Saudi society depend on, especially health institutions, as it is the language of the knowledge and digital age to keep pace with the huge amount of information and data, which imposed the presence of smart digital technologies and means to contain information, control it, and make possible use of it.

The concept of Artificial Intelligence refers to the processes that ensure the effective use of digital technology in enabling health institutions to accomplish their work and achieve their goals, by transforming human energies into a powerful engine that drives artificial intelligence to improve human services and organizational structures that help decision makers benefit, invest, and produce in Artificial Intelligence (Tuomi, 2018).

In this sense, it focuses on preserving accumulated human services and expertise by transferring them to artificial intelligence technologies to improve services and administrative work, develop human resources, and employ data and digital applications, with the aim of further accelerating growth and development in all service fields, and achieving greater benefit and production (Javaid & Suman, 2022). Artificial Intelligence is one of the branches of computer science, and it is a fundamental pillar on which the modern technology industry is based, and is usually represented by the symbol (AI) (Jarrahi, 2018). Copeland (2020) also believes that artificial intelligence depends on the ability of machines and computers to perform specific tasks that mimic the tasks performed by humans. Such as the ability to think or learn from previous experiences and other processes that require mental processes aimed at building systems that have intelligence and behave as humans behave in terms of learning and understanding, these

systems have various services such as education, guidance and interaction.

Artificial intelligence is also one of the most important inventions of the modern era in the world of technology, as studies conducted in a number of universities in the United States of America have proven that increasing reliance on artificial intelligence and robots in many works that involve companies and institutions has led to a reduction in human work opportunities that depend on means. traditional ones that require training and development (Duan, & Dwivedi, 2019). Javaid & Suman, (2022) expect that artificial intelligence will provide many jobs Frost & Sullivan, (2016). Adds that artificial intelligence has succeeded in penetrating all areas of contemporary life, starting with electronic applications that carry out tasks automatically and quickly, through robots that operate with artificial intelligence, and even computers that operate with the same system to enter data and save files.

Artificial intelligence represents an important output of contemporary technology, a means to enhance the quality of services and achieve sustainable development, and an intelligent digital transformation that many institutions seek, due to the features and facilities it provides that reduce time, effort, and money in many cases (Limani, & Retkoceri, 2019). Kaiser & Laszlo (2019) mention that many service institutions seek to transform their services offered to beneficiaries from their traditional form into a smart digital form, ensuring that they provide the service for a longer period, with less effort, and to a larger segment of beneficiaries. It is a qualitative shift in the means of providing Digital services in various institutions.

Importance of Health Information Systems in Health Organizations2.

The purpose of information management is to access, manage and use information in order to improve the performance of health-care services in better targeting, management and support (Parveen & Palaniammal, 2019). Keikhosrokiani & Kamaruddin (2022). Sees the importance of health information systems in health organizations is as follows:

- Data information and medical statistics are useful in the field of planning and the development of the policy of comprehensive treatment services, both preventive and therapeutic.
- Data, information and medical statistics enable performance evaluation. A close and accurate view of available data enables us to shed light on

the efficiency of medical, therapeutic and administrative activities in the hospital.

- The statistical, medical, therapeutic and administrative data are used in hospitals in the proper preparation of the budget, since the correct and correct data have reached the appropriate performance rates and this leads to the precise identification of the material and human possibilities on which the budget is based. Whether it is necessary for medical, therapeutic, or financial, or administrative work, this enables the establishment of a sound basis for the budget.

- The improvement of services in hospitals comes in large part through data and statistics, whether inside or outside the hospital, this data enables to determine the efficiency of performance.

2. Theoretical framework of Unified Theory

UTAUT is a combination of 8 behaviors and theories that have been regularly used to visualize user uptake of ICT: Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM), Motivational Model (MM), Theory of Planned

Behavior (TPB), mixed intentional behavior appeal principles version (C-TPB-TAM), Model of Personal Computer Utilization (MPCU), Innovation Diffusion Theory (IDT), and Social Cognitive Theory (SCT) (Venkatesh et al, 2013). Empirically analyzing user adoption by statistical age in an organizational context, researchers find that UTAUTs shown in figure 1 predicts 70% of users' adoption intentions and 50% of their adoption behavior, which may be higher than several current attractiveness modes (Venkatesh et al., 2012). These approaches include the Technology Acceptance Model (TAM), Theory of Reasoned Action (TRA), mixed of TAM and TPB, Theory of Planned Behavior (TPB), Model of Personal Computer Utilization (MPCU), Innovation Diffusion Theory (IDT), Motivational Model (MM), and Social Cognitive Theory (SCT). Various existing studies utilized combination of different theories to find the acceptance and use of intelligent healthcare systems among users (Keikhosrokiani, et al, 2019).

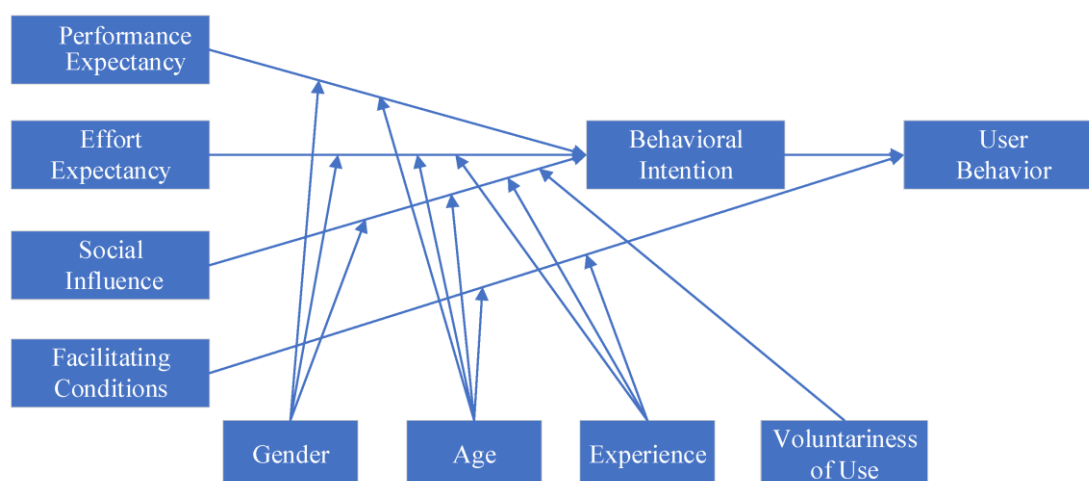


Figure 1: Original UTAUT Model (Keikhosrokiani et al., 2019).

3. Problem statement:

Various health institutions in the Kingdom of Saudi Arabia have witnessed a digital breakthrough in artificial intelligence technology, and have worked to benefit from artificial intelligence in completing health services and administrative work, and thus it has become available to their workers to program and carry out tasks and administrative work through artificial intelligence techniques. By studying the reality of artificial intelligence and its applications in various health institutions in general, and in the health administration in the General Directorate of Health Affairs in the Riyadh region in particular, it is noted that it still suffers from some kind of

difficulties that often appear in the technical or human aspects.

4. Methodology of the study:

To achieve the objectives of the study, study used the descriptive analytical method in which he tries to describe the phenomenon of the subject of the study, and analysis of data, and the relationship between the components and opinions that are raised around it and the processes that it contains and effects.

Study Instrument:5 .

A questionnaire consisting of (18) items were used to collect the data is distributed into 5 areas of artificial intelligence applications: (Data bases

used, Support senior management. Users of the system. Computerized health information systems used, Improve the performance).

Results:

To answer the study question: What is the reality of artificial intelligence and its applications in

health management in the General Directorate of Health Affairs in the Riyadh region? Arithmetic means and deviations were calculated for the study sample's responses to the areas of artificial intelligence applications in health administration in the General Directorate of Health Affairs in the Riyadh region, and table (1) shows that:

Table (1): Arithmetic means and standard deviations of the study sample's responses to the areas of artificial intelligence applications

Fields	Arithmetic mean	standard deviation	Sig value
Databases used.	3.40	0.78	0.842
Support senior management.	3.36	0.82	0.878
Users of the system.	3.32	0.86	0.762
Computerized health information systems used.	3.28	0.92	0.872
Improve the performance.	3.12	0.96	0.980
All Fields	3.29	0.87	0.866

It is clear from Table (1) that the arithmetic averages of the study sample's responses to the reality of applications of artificial intelligence fields in health administration in the General Directorate of Health Affairs in the Riyadh region ranged between (3.40-3.12), with an average application rate for all fields, and the field of databases used came in first place. In health administration, with a mean of (3.40) and a moderate degree, followed by the field of Support senior management, with a mean of (3.36) and a moderate degree, the "Users of the system" field came third, with an arithmetic mean of (3.32) and a moderate degree, followed by the field Computerized health information systems used, with a arithmetic mean (3.28) and a moderate degree, and the field of Improve the Performance came in last place, with a arithmetic mean (3.12) and a moderate degree, and the average reached General arithmetic for areas of artificial intelligence applications in health management (3.29), with a moderate degree of application.

Also, it is clear from the results shown in Table (1) that the probability value (Sig) of the study fields is greater than the significance level ($\alpha \leq 0.05$). Thus, the distribution of data for these fields follows the natural distribution, where the scientific tests will be used to answer the hypotheses of the study.

The following statistical tools were used:

- Frequencies & Percentages: to describe the sample of the study.
- Arithmetic mean and relative arithmetic mean.
- The Cronbach's Alpha test: to determine the persistence of the paragraphs of the questionnaire.
- K-S test: Kolmogorov-Smirnov Test: to see whether the data follow normal distribution.

- Pearson Correlation Coefficient: to measure the degree of correlation: This test examines the relationship between two variables. It has been used to calculate internal consistency and structural honesty of the questionnaire, and the relationship between variables.
- T test in the case of a single sample: to determine whether the average response has reached the intermediate approval level (3) or increased or decreased. It has been used to ascertain the mean significance of each paragraph of the questionnaire.

Conclusion:

The researcher noted that 84.3% of the sample agreed to the availability of office automation systems and document management at in the General Directorate of Health Affairs in Riyadh Region 89.8% of the sample agreed to the availability of patient registration systems. 90.9% of the sample agreed to the availability of medical records systems. 66.0% of the sample agreed to the availability of blood bank records systems. It also confirmed that (49.7%) of the study. 51.8% agreed to the availability of radiation Systems of the sample agreed to the availability of pharmacy systems The results showed that (50.3%) of the study sample agreed to the availability of laboratory systems 68.5% of the sample agreed to the availability of medical reporting systems . 61.9% of the sample agree on the study of electronic reporting systems The results showed that 71.6% of the study sample agreed on the availability of internal department systems (84.8%) of the study sample agreed to the availability of outpatient clinics and emergency department . The results confirmed that (28.4%) of the sample of the study agree to the availability

of messaging systems such as e-mail and voice mail.

Recommendation:

The need to establish a specialized department of computerized health information systems, with clear responsibilities, and includes technical and administrative specialists and health personnel, and the number and efficiency required, working as a team work to apply the mechanisms of work computerized health information systems, and be in direct contact with staff in clinics and sections to provide services and technical support as soon as possible with the best quality. Increased support from senior management to users by encouraging them to use computerized health information systems and understanding their different needs.

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