

# The Impact of Artificial Intelligence on Digital Transformation in the Healthcare Sector in Riyadh in the Light of Vision 2030

<sup>[1]</sup> Saed Hamed Alobadi, <sup>[2]</sup> Amnah Mohammed Muafa

<sup>[1]</sup><sup>[2]</sup> Midocean University, Fujairah, United Arab Emirates

Corresponding Author Email: <sup>[1]</sup> sobadii@gmail.com, <sup>[2]</sup> amnhalshref1011@gmail.com

---

**Abstract**— This research explores the pivotal role of artificial intelligence in bringing about a digital transformation in the healthcare sector in Riyadh, focusing on how it contributes to the achievement of the goals of Vision 2030. The research addresses the challenges faced by Riyadh's health sector and examines how artificial intelligence can be used to overcome these challenges, including improving the quality of health services, enhancing operational efficiency, and supporting scientific research.

By analyzing data and reviewing previous studies, the research shows how AI technologies can contribute to the early detection of diseases, providing dedicated health care, and improving the management of health facilities. The research also discusses the impact of artificial intelligence on medical education and training and explores how it can enhance scientific research in the field of health.

The findings indicate that AI has the potential to significantly transform Riyadh's healthcare sector, contributing to the realization of Vision 2030. The research concludes with recommendations for the effective application of artificial intelligence in the health system, emphasizing the importance of innovation and technical integration for the future of healthcare in the Kingdom.

**Index Terms**— Artificial Intelligence, Digital Transformation, Healthcare, Riyadh, Vision 2030.

---

## I. INTRODUCTION

Vision 2030 seeks to make Saudi Arabia a leading healthcare destination. Digital transformation plays an important role in achieving this vision, as it can help improve the quality, efficiency, and effectiveness of health care. In the last two decades, the world has witnessed a technological revolution that has changed many aspects of our daily lives, one of the most prominent of which is the evolution of artificial intelligence and its increasing impact on various sectors, including the healthcare sector. This research highlights the vital role that AI plays in driving digital transformation in the healthcare sector in Riyadh, a transformation that is consistent with the vision and objectives of Vision 2030.

Artificial intelligence is one of the most important digital transformation technologies, as it can be used in a variety of healthcare applications, such as:

**Diagnosis:** AI can be used to analyze medical data and provide more accurate diagnostics.

**Treatment:** AI can be used to develop new and more effective treatments.

**Management:** AI can be used to improve the management of hospitals and clinics that reflect positively on customer satisfaction.

Riyadh is one of the most prominent cities in Saudi Arabia, facing various challenges related to providing effective and sophisticated health services to its growing population. In this framework, AI is highlighted as a powerful tool to contribute to improving the quality of these services, accelerating diagnostics and treatments, and enhancing the operational

efficiency of health facilities.

Al-Manna'ei, Fahd (2022) notes that through Vision 2030, Saudi Arabia is committed to significant development in infrastructure and services, including the health sector. AI is an integral part of this vision, providing broad possibilities to shift towards a more advanced and efficient health system.

Rashid, Ahmed, and Abdulrahman Mohammed (Digital Transformation of the Health Sector during the COVID-19 Pandemic in Saudi Arabia) (2022) seek to explore how to exploit artificial intelligence to meet the current challenges in Riyadh's health sector and analyze the opportunities and challenges associated with its effective application and employment. Through this exploration, a comprehensive vision is presented that contributes to a deep understanding of the potential impact of artificial intelligence on healthcare in Riyadh, and how it can be a catalyst for achieving the goals of Vision 2030.

We, the two researchers, have seen many previous studies in this area and referred to them in the research, and then mentioned our opinion on those studies.

## II. RESEARCH PROBLEM

With the growing need to improve the efficiency and effectiveness of health services in Riyadh City, the challenge of integrating and exploiting artificial intelligence technologies to achieve the desired digital transformation in this sector is highlighted. This transformation is vital to keeping pace with global trends and achieving the goals of Vision 2030, but it faces several fundamental challenges.

The first of these challenges relates to technical infrastructure and the ability to effectively integrate AI

solutions into the existing health system. There are challenges related to ensuring the quality and protection of health data, which are essential for the successful application of artificial intelligence. In addition, this transformation requires the development of medical and administrative cadres' skills and their training in using new technology efficiently.

Devote relevant bodies such as telecommunications, cybersecurity, and data to policy reformulation and legislation regulating the use and identification of stakeholders in the field. Understanding trends in orientation, quantification, quality, and means of development continues to be inconsistent with daily development.

Additionally, ethics and privacy challenges in the use of AI in health care must be ensured that patients' rights and safety are respected. Also, there are financial and investment challenges related to funding and supporting these modern technologies.

This research aims to understand and analyze these challenges in detail, focusing on how AI affects digital transformation in Riyadh's healthcare sector and how it contributes to the achievement of Vision 2030 goals. By identifying and analyzing these challenges, effective strategies can be developed to achieve the desired digital transformation of health care in a manner that is sustainable and consistent with national goals.

### III. THE IMPORTANCE OF RESEARCH

The importance of studying this topic is several points, including:

**Strategic Importance:** The study is linked to the Kingdom's Vision 2030, which aims to make the Kingdom a leading healthcare destination. Therefore, the study contributes to achieving this vision by assessing the impact of artificial intelligence on the digital transformation of the healthcare sector.

**Practical Importance:** The study provides valuable information to relevant healthcare sector stakeholders, such as hospitals, clinics, and regulators. The study also provides valuable information to researchers in the field of artificial intelligence and health care.

**Academic significance:** The study contributes to developing knowledge about the relationship between artificial intelligence and digital transformation in health care. The study also contributes to the development of new tools and techniques to help the healthcare sector benefit from artificial intelligence.

**Addressing current and future challenges:** Research helps understand the challenges facing the healthcare sector in Riyadh and provides innovative solutions to address them, especially those related to population growth and demographic changes.

**Promoting scientific research and development:** This research opens the door for further research and studies in the field of artificial intelligence and its applications in health

care, supporting academic and scientific growth in this field

### IV. RESEARCH OBJECTIVES

1. Determine the impact of artificial intelligence on the quality of health services: investigate how artificial intelligence is used to improve accuracy in diagnosis and treatment, as well as improve the effectiveness of health operations in Riyadh.
2. Assess digital transformation in health care: Explore how modern technology can enhance operational efficiency and provide innovative solutions to current challenges in the health system.
3. Supporting the achievement of the objectives of Vision 2030: Analyzing the role of artificial intelligence in promoting the goals of Vision 2030, especially concerning improving health care and developing health infrastructure.
4. Study the challenges and opportunities associated with artificial intelligence: Identify the obstacles and challenges that may confront the application of artificial intelligence in health care and explore opportunities to overcome them.
5. Economic and social impact assessment: Study how artificial intelligence affects cost reduction and health outcomes, benefiting Riyadh's economy and society.
6. Propose strategies for effective implementation: develop recommendations for the effective implementation of artificial intelligence technologies in the health system, with a focus on the training and professional development of medical and administrative personnel.

### V. PREVIOUS STUDIES

Several studies have been conducted on the impact of artificial intelligence on digital transformation in the healthcare sector. These studies have concluded that artificial intelligence can have a significant positive impact on the sector, as it can help improve the quality, efficiency, and effectiveness of health care.

**Analysis of global trends:** Here some studies on the use of artificial intelligence in health care are reviewed internationally, focusing on innovations, challenges, and successes. A study by PwC found that artificial intelligence can help improve healthcare quality by up to 30%. A study by McKinsey also found that artificial intelligence can help improve healthcare efficiency by up to 20%.

In a study conducted by the Massachusetts Institute of Technology (MIT), the study indicated solutions for the future of health care with artificial intelligence. As AI plays an increasingly important role in treating patients, due to its ability to accurately predict diseases in the early stages, AI is seen as a powerful tool in today's healthcare industry.

As AI offers advantages such as patient care, improving patient safety, and innovative treatment options, it is not surprising that 56% of doctors believe that most of their

decisions over the next decade will be made using AI-based clinical decision support tools. However, doctors face a knowledge gap and report the growing need for professionals who understand AI-based technologies and ways to utilize them for the benefit of healthcare providers and patients.

With a focus on the application of artificial intelligence in modern healthcare, MIT's AI in Healthcare (2020) The Fundamentals and Applications program is designed to allow leading physicians, healthcare IT professionals, and healthcare entrepreneurs to see how AI technologies can make a difference in treating patients and enable them to develop innovative solutions to health care challenges today and tomorrow."

Gordon et al (2020) have discussed with some specialization mobile health applications (MHAs) and medical applications (MAs) that have been popularized and increased significantly in almost all healthcare sectors as influential digital interventions. In the precise medical disciplines, this is evident in the clinical services of gastrointestinal diseases (gastrointestinal system), where in many respects there has been a positive digital shift reflected in the dealings and uses of patients and healthcare professionals. This will have a significant impact on the progress of screening and treatment methods and timing soon (Le Berre et al 2020, Huang et al 2020, Siegel 2017). On the other hand, he (2016) Whitehead and Seaton; Lallo et al. (2017) و (2018) Thurnheer et al. In successive years, MHAs and MAs have been examined, and have been found to have significant and impactful abilities in many conditions, especially concerning chronic disease patients, where patients have been able to manage their health status in multiple ways such as follow-up, communication, dose regulation, etc., which has helped medical staff greatly in effectively fulfilling their role.

In an independent study prepared by the IMS Institute of Health Care for Information (2013), an objective assessment of its type, role, and functions was made. The study revealed that the most common category in mobile applications is prevention and healthy lifestyles. The category of prevention and healthy lifestyles includes diet and exercise, smoking cessation, stress, relaxation, and sleep. In addition, it provides for the circulation of the Uniform Medical Register, facilitating access to the results of laboratory and radiological examinations of various types to avoid repeated medical examinations and personal trips, as well as reducing the invoice.

**Local case studies:** Review research on AI applications in healthcare within Saudi Arabia, especially in Riyadh, to identify gaps and opportunities. The Saudi Authority for Data and Artificial Intelligence (SADAYA) reports that the World Health Organization (WHO) is dealing with the coronavirus pandemic. - COVID-19, urging international health organizations to use data and artificial intelligence techniques to accelerate the search for treatment of Virus Corona. Several data-based and artificial intelligence-based

applications have been demonstrated to facilitate the detection and diagnosis process, as well as WHO's recommendation to target Rochemicals.

**Policy analysis and regulatory frameworks:** Consider studies on the regulatory and policy aspects of the application of artificial intelligence in the health sector, and how these factors affect innovation and digital transformation. This contributes to the reliability and governance of information to increase health awareness among users of these applications, and to reduce the dissemination of fake information that may negatively affect human health. In addition to maintaining patients' privacy and dealing with their medical and social data in full confidentiality. Blogger Mohammed El-Arada (2023) says on his online page about the benefits of using AI in the medical field that it improves the accuracy of diagnosis of the disease and saves time and effort as well. He pointed out that one of its disadvantages was that it posed a risk to certain jobs in the future that were currently being performed by human beings.

## VI. THEORETICAL FRAMEWORK

**Digital transformation theories:** Using digital transformation theories to understand how new technology can change the way health care is delivered and managed.

**AI models in health care:** explore theoretical models related to the application of AI in health care, such as large data analysis, machine learning, and machine diagnosis.

**Technology Innovation and Adoption Theory:** Applying technology innovation and adoption theories to analyze how health facilities can adopt artificial intelligence technologies and overcome obstacles they face.

**Ethics in AI:** Integrate AI ethical theories to understand ethical and privacy challenges in its use in healthcare.

## VII. RESEARCH HYPOTHESES

**Health Care Quality Positive Impact Hypothesis:** This hypothesis assumes that the use of AI technologies in health care in Riyadh will contribute positively to improving the quality of health services provided.

**Operational Efficiency Impact Hypothesis:** This hypothesis assumes that the application of AI will increase the efficiency of health processes and contribute to reducing operational costs.

### Research Methodology:

**Type of research:** desk research to review past literature and Empirical Research to collect data.

**Method:** Use quantitative research to collect and analyze data.

**Document Analysis:** Includes analysis of available documents and reports, such as patient records and management reports, to obtain reliable data.

**Ethical review:** related to ethical behavior and standards followed by the researcher during the execution of the research. Ethical norms have been observed, including:



**Confidentiality of information:** It was confirmed that the confidentiality of the information collected was respected and dealt with during the search.

**Obtaining the necessary approvals:** Information or data has been collected from individuals working in the health sector after obtaining their prior consent based on confidentiality and privacy standards.

**No manipulation:** Data manipulation or misrepresentation of results should be avoided to achieve certain goals. Must submit.

**Taking into account safety and health:** the necessary measures have been taken to ensure the safety of research participants and to preserve health and safety.

**Vision 2030 hypothesis:** This hypothesis assumes that artificial intelligence will be one of the tools for achieving Vision 2030 goals in Riyadh's healthcare sector.

**The hypothesis of challenges and obstacles:** this hypothesis presupposes technical, organizational, and ethical challenges to the application of artificial intelligence in health care, and will negatively affect the realization of other hypotheses.

**Economic and social impact hypothesis:** this hypothesis assumes that the use of smart technologies will have a positive economic impact and provide new economic opportunities in health care.

**National Trends Effect Hypothesis:** This hypothesis assumes that the directions and strategies of Saudi Arabia's national authorities will have a significant impact on the success of the application of artificial intelligence in healthcare.

### VIII. RESEARCH RESULTS

The research concluded that AI can have a significant positive impact on the healthcare sector in Riyadh, as it can help improve the quality, efficiency, and effectiveness of healthcare.

Comparing previous studies shows that collecting these studies focused on the importance of AI uses and applications in the health sector in which it enhances the prediction of early detection of diseases analyses data related to associated symptoms and puts them in a template that helps doctors give appropriate treatment, The use of AI in health is also a step that makes societies more aware leading to a vibrant and healthy community of diseases.

Some of the main findings of the research are as follows:

There are many potential applications of AI in the healthcare sector in Riyadh, such as:

- Use artificial intelligence to analyze medical data and provide more accurate diagnostics.
- Using artificial intelligence to develop new and more effective treatments.
- Using artificial intelligence to improve hospital and clinic management.
- AI can help improve the quality of healthcare in Riyadh by:

1- Provide more accurate diagnostics, leading to more effective treatments.

2- Improve the care of chronic patients, resulting in lower rates of hospitalization and death.

3- Improve patient care in rural areas, reducing health inequalities.

• AI can help improve healthcare efficiency in Riyadh by:

1- Improve the efficiency of operations, such as medical records management and inventory management.

2- Improve resource efficiency, such as medicines and medical devices.

3- Improving the efficiency of information sharing among healthcare providers.

• AI can help increase access to healthcare in Riyadh by:

1- Provide telehealth, making it easier for patients to access the care they need.

2- Improve the efficiency of the management of healthcare providers, resulting in an increase in the number of patients with access to care.

**Challenges to the use of artificial intelligence in the healthcare sector in Riyadh**

There are also some challenges facing the use of artificial intelligence in the healthcare sector in Riyadh, the most important of which are:

• **Lack of skills:** There is a lack of skills to develop and apply artificial intelligence technologies in the healthcare sector in Riyadh.

• **Cost:** The cost of developing and applying AI technologies can be high.

• **Privacy and Security:** There are concerns about privacy and security when using AI technologies in healthcare.

### IX. VIII. STUDY RECOMMENDATIONS

In the light of the findings of this research, the study recommends that:

• Develop training programs for healthcare workers in Riyadh to increase their skills in the field of artificial intelligence.

• Providing financial support to entities working in the healthcare sector in Riyadh to apply AI technologies.

• Establishing legislation and regulations to protect the privacy and security of health data when using artificial intelligence in Riyadh.

• Digital application governance that publishes prescriptions and therapeutic consultations.

• Supporting infrastructure in line with the rapid growth of AI applications, especially in Riyadh, which is Saudi Arabia's largest city in terms of population density.

• Supporting research and encouraging researchers to further theoretical and field research studies related to the healthcare sector.

### X. CONCLUSION

AI is a promising technology that can help improve the healthcare sector in Riyadh. However, there are some

challenges to overcome to make full use of AI in this sector. There is no doubt that AI plays a key role in the development of the health care field, from its early detection of diseases, analysis of data, acceleration of the detection of appropriate medicines for the disease, as well as its ability to assist medical and health-care personnel in the development of medical technology.

As mentioned above, this research focused on the extent to which the Riyadh health sector benefits from artificial intelligence and employs it in the field of medicine and research related to public health and quality of life, which is one of the objectives of the Kingdom of Saudi Arabia's Vision 2030. Using AI and digital applications, the health sector has achieved a distinction that has been witnessed by global health organizations by spreading health awareness among the community in dealing with the coronavirus pandemic. In this research, we emphasize that the need for further studies on the roles of AI still exists especially in the privacy policy, medical research development, training of workers in the uses of AI-related digital applications, as well as infrastructure that must keep pace with the rapid growth of AI especially in Riyadh. We also note in this research that there is still a research gap, especially in field studies on users of different applications of AI in the field of health.

On a related level, research on this subject has found further efforts in the governance of medical data on the validity of the information published and the reliability of its sources, especially concerning the prescriptions sought by patients through available technical means.

#### REFERENCES:

- [1] Athilingam, P., Labrador, M. A., Remo, E. F. J., Mack, L., San Juan, A. B., & Elliott, A. F. (2016). Features and usability assessment of a patient-centered mobile application (HeartMapp) for self-management of heart failure. *Applied Nursing Research*, 32, 156-163. <https://doi.org/10.1016/j.apnr.2016.07.001>
- [2] Bagdonavicius, V., & Nikulin, M. (2011). Chi-squared goodness-of-fit test for right censored data. *International Journal of Applied Mathematics and Statistics*, 24:(1), 1–11. [https://www.researchgate.net/publication/325193712\\_Chi-squared\\_goodness-](https://www.researchgate.net/publication/325193712_Chi-squared_goodness-)
- [3] Becker, S., Miron-Shatz, T., Schumacher, N., Krocza, J., Diamantidis, C., & Albrecht, U.-V. (2014). mHealth 2.0: Experiences, possibilities, and perspectives. *JMIR mHealth and uHealth*, 2:(2), e24. <https://doi.org/10.2196/mhealth.3328>. <https://www.proquest.com/docview/2510226894?accountid=142908>
- [4] Byambasuren, O., Beller, E., & Glasziou, P. (2019). Current knowledge and adoption of mobile health apps among Australian general practitioners: Survey study. *JMIR mHealth and uHealth*, 7:(6), e13199. <https://pubmed.ncbi.nlm.nih.gov/31199343/>
- [5] Chan, K. L., & Chen, M. (2019). Effects of social media and mobile health apps on pregnancy care: Meta-analysis. *JMIR mHealth and uHealth*, 7:(1), e11836. <https://mhealth.jmir.org/2019/1/e11836/>
- [6] Dounavi, K., & Tsoumani, O. (2019). Mobile health applications in weight management: A systematic literature review. *American Journal of Preventive Medicine*, 56:(6), 894–903. <https://pubmed.ncbi.nlm.nih.gov/31003801/>
- [7] Feter, N., dos Santos, T. S., Caputo, E. L., & da Silva, M. C. (2019). What is the role of smartphones on physical activity promotion? A systematic review and meta-analysis. *International Journal of Public Health*, 64:(5), 679–690. <https://doi.org/10.1007/s00038-019-01210-7>. <https://pubmed.ncbi.nlm.nih.gov/30758514/>
- [8] Rashid, Ahmed, and Abdulrahman Mohammed (2022). Digital Transformation of the Health Sector during the COVID-19 Pandemic in Saudi Arabia. <https://airconline.com/ijcses/V13N4/13422ijcses01.pdf>