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The Impact of Artificial Intelligence Technologies on Improving Customer Service
Applied to Dallah Hospitals in Riyadh – (A Case Study)

Nadal

Final Project – 1

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Chapter 1: Introduction

1.1. Overview and Background

Digital technology has brought about tremendous changes in the way businesses operate their human resources. The use of Artificial Intelligence (AI) technology has seen tremendous growth within the past few years in many sectors. One of the industries that have been affected by AI is the health care industry. The healthcare industry in Saudi Arabia has gone through many changes as the country has embarked on implementing its Vision 2030 projects. Improvement of the customer experience in private hospitals has been one of the major focal points. Performance indicators for the industry include satisfaction and efficiency (Al-Harbi & Alotaibi, 2021).

Dallah Hospitals, one of the private hospitals in Riyadh in Saudi Arabia, would be an interesting case study when considering the ways in which AI technology can help improve the services that are provided. Customers want immediate responses, personalized services, and smooth interaction with the healthcare system. Traditional customer service approaches, using HR processes, have proven insufficient when it comes to meeting customer demands. Therefore, there have been attempts to incorporate the use of AI such as chatbot, appointment scheduling, predictive analytics, and triage systems in the provision of services (Mahdi et al., 2020).

Artificial Intelligence as used in this study involves computerized mechanisms that have been programmed to do activities that require human intelligence such as natural language processing, machine learning, decision making, and pattern recognition (Russell & Norvig, 2020). If incorporated in the provision of customer service in the health facilities, AI technology will enable reduction of waiting time, personalization of patients' communication, provision of real-time data, and improvement of follow-ups. According to the research carried out by Davenport and Kalakota (2019), application of AI technologies in healthcare sector can help in reduction of administrative workload by 30%.

Speaking about human resource management, the use of AI technologies in business processes does not automatically imply the substitution of people by machines. It means that in order to work in such an environment, the employees have to acquire specific competencies and the HRM has to be adapted accordingly. In other words, it is crucial to align the HRM strategies with the adoption of AI technologies.

In Saudi Arabia, for instance, the healthcare industry has been chosen for special attention in the framework of Vision 2030 program; its aim is to increase the percentage of private sector participation in health services from 40 to 65% by 2030 (Ministry of Health, 2020). Private clinics, such as Dallah, are among the leaders in this transformation and they make huge investments in digital technology and AI in order to distinguish themselves from others. Thus, it is extremely important to know how these investments influence the quality of customer service.

1.2. Research Problem

However, despite the increasing use of AI technologies in private healthcare organizations in Saudi Arabia, there still exists a big lack of knowledge about the influence of such technologies on the quality of customer services provided. Many hospitals implement AI solutions without proper evaluation and without considering the obstacles for their proper implementation. The gap between the implementation of AI technologies and the resulting improvements in the quality of services is what this research seeks to identify.

In particular, the case of Dallah Hospitals located in Riyadh shows that although the company made considerable investments into digitalization, the level of patient satisfaction and the quality of service delivery does not always correspond to these efforts. Barriers include staff reluctance to use technologies, poor training of employees, difficulties in the process of integrating new systems, and the issues of data privacy. There is also a scarcity of literature related to AI applications in healthcare customer service in Saudi Arabia.

Accordingly, the main research question of this study is:

"What is the impact of Artificial Intelligence technologies on improving customer service at Dallah Hospitals in Riyadh?"

1.2.1. Theoretical Gap

Most of the current theoretical paradigms concerning artificial intelligence in healthcare are centered on the use of AI in areas such as diagnosis, therapy, and drugs (Topol, 2019). However, there seems to be a lack of theoretical paradigms that explicitly concern themselves with AI's use in administration and in customer-related aspects of healthcare services delivery. Moreover, theories such as the SERVQUAL paradigm and Technology Acceptance Model (TAM), which originated from the field of service management, do not seem to have been adequately modified to consider the particularities of AI-driven service interactions in an Arab culture (Parasuraman et al., 1988; Davis, 1989).

1.2.2. Empirical Gap

From an empirical perspective, most of the studies conducted on AI within customer services have been done in Western nations or East Asia countries, and there is no empirical research on AI within the context of GCC countries, specifically Saudi Arabia. The cultural requirements of patients in the region such as the preference for interaction with humans and the fear regarding the protection of personal data according to Islamic ethics might be acting as a moderator in the relation between AI usage and customer services.

1.3. Research Significance

1.3.1. Theoretical Significance

This paper is one such attempt to add to the current pool of knowledge about the use of AI technology in the service industry, as it examines an area – private health care services in Saudi Arabia – which has so far not received much attention in academic circles. Through the adaptation of theoretical models, like TAM and SERVQUAL, to the setting of AI in the health care services sector, this paper not only expands the relevance of these theories but also paves the way for future research.

1.3.2. Empirical Significance

In practical terms, the implications drawn from this study will be very useful to hospital administrators, HR managers, and policymakers in Saudi Arabia. Knowledge about the most effective forms of AI application that enhance customer services and the situation in which they should be used will assist private hospitals in budgeting for technology. In addition, the implications of the study will be used by HR managers to develop training programs and manage the change process for the effective implementation of AI.

1.4. Research Questions

Based on the research problem and identified gaps, this study aims to answer the following research questions:

1. 1. What types of AI technologies are currently deployed at Dallah Hospitals in Riyadh for customer service purposes?
2. 2. How do AI technologies impact the quality and efficiency of customer service experienced by patients at Dallah Hospitals?
3. 3. What are the primary challenges and barriers encountered during AI technology implementation in the hospital's customer service operations?
4. 4. How do patients and staff perceive the role of AI technologies in improving their service experience?
5. 5. What strategies can Dallah Hospitals adopt to maximize the effectiveness of AI technologies in customer service delivery?

1.5. Research Objectives

This study is designed to achieve the following objectives:

- To identify and categorize the AI technologies currently utilized at Dallah Hospitals for customer service enhancement.

- To assess the impact of these AI technologies on key customer service dimensions, including response time, personalization, accuracy, and overall patient satisfaction.
- To examine the challenges and obstacles facing AI adoption in the hospital's customer service processes, including technical, organizational, and human factors.
- To explore the perceptions of patients and hospital employees regarding the effectiveness and acceptability of AI-driven customer service tools.
- To propose evidence-based recommendations for optimizing AI technology deployment to improve customer service outcomes at Dallah Hospitals.

1.6. Research Hypotheses

Based on the theoretical framework and previous literature, the following hypotheses are proposed:

H1:

There is a statistically significant positive relationship between AI technology adoption and the improvement of customer service quality at Dallah Hospitals, Riyadh.

H2:

AI-powered tools such as chatbots and automated scheduling systems significantly reduce patient waiting times and improve service response efficiency.

H3:

Employee technological literacy positively moderates the relationship between AI technology deployment and customer service improvement outcomes.

H4:

There is a significant relationship between hospital organizational readiness and the successful implementation of AI-driven customer service improvements.

H5:

Patient satisfaction levels are significantly higher in departments where AI technologies are more extensively integrated into service delivery processes.

1.7. Research Model

The conceptual model of this study positions AI Technology Adoption as the independent variable, with Customer Service Quality as the dependent variable. Employee Technological Readiness serves as a mediating variable, while Organizational Size and Cultural Factors act as moderating variables. This model is grounded in the Technology Acceptance Model (Davis, 1989) and the SERVQUAL framework (Parasuraman et al., 1988), adapted to the AI-healthcare context.

1.8. Research Methodology

This study employs a quantitative research methodology using a structured questionnaire survey. A positivist research philosophy is adopted, with a deductive approach to hypothesis testing. The survey instrument is designed based on validated scales from prior literature and adapted to the healthcare AI context. Data will be collected from patients and employees of Dallah Hospitals in Riyadh, and analyzed using SPSS for descriptive statistics, reliability analysis, and regression modeling.

1.9. Empirical Study

The empirical component of this research will be conducted within Dallah Hospitals, Riyadh, focusing specifically on departments where AI customer service tools have been deployed. Primary data will be gathered through online and paper-based questionnaires distributed to a stratified random sample of hospital employees and patients. Secondary data will be obtained from hospital annual reports, Ministry of Health publications, and peer-reviewed academic literature.

1.10. Project Structure

This final project is organized as follows:

1. Chapter 1: Introduction – covers background, research problem, objectives, hypotheses, and methodology.
2. Chapter 2: Literature Review – reviews theoretical foundations and related empirical studies on AI and customer service in healthcare.
3. Chapter 3: Research Methodology – details the research design, population, sampling, data collection, and analysis procedures.
4. Chapter 4: Statistical Analysis – presents and discusses the quantitative findings.
5. Chapter 5: Conclusions and Recommendations – summarizes findings, discusses limitations, and provides strategic recommendations.

Chapter 2: Literature Review

2.1. Introduction

In this chapter, there will be a comprehensive review of the available literature on the application of AI technologies in enhancing customer services, especially in the healthcare industry. The literature review in this study will be based on two main variables, which include the application of AI technologies as the independent variable and the improvement in customer services as the dependent variable. Also, it will look at the mediator of employee readiness for technology and the overall organizational and cultural setting concerning private hospitals in Saudi Arabia.

2.2. Theoretical Foundations

2.2.1. Technology Acceptance Model (TAM)

The Technology Acceptance Model, originally proposed by Davis (1989), is one of the most widely applied frameworks for understanding how individuals come to accept and use new technologies. TAM posits that two primary factors determine technology adoption: perceived usefulness (PU) and perceived ease of use (PEOU). In the context of AI technologies in healthcare, TAM has been used to explain why some employees and patients readily embrace AI-enabled tools while others resist them (Venkatesh & Morris, 2000). Several researchers have extended TAM to healthcare settings, finding that perceived usefulness is the stronger predictor of AI adoption among healthcare workers, particularly when the technology visibly reduces workload and improves service delivery outcomes (Cresswell et al., 2017). This study builds on TAM to explore how employee perceptions of AI tools influence their effectiveness in customer service improvement.

2.2.2. SERVQUAL Framework

The SERVQUAL model, developed by Parasuraman, Zeithaml, and Berry (1988), measures service quality across five dimensions: tangibles, reliability, responsiveness, assurance, and empathy. This framework has been widely applied in healthcare research to evaluate patient perceptions of service quality (Abuosi & Atinga, 2013). In AI-integrated service environments, the SERVQUAL dimensions take on new meaning: AI can enhance responsiveness through automated systems, improve reliability through data-driven decision-making, and affect empathy dimensions through personalization algorithms. However, critics note that AI-mediated interactions may fall short on the human empathy dimension, which remains central to patient satisfaction in healthcare contexts (Lupton, 2018). This study applies a modified SERVQUAL lens to assess how AI technologies at Dallah Hospitals affect each service quality dimension.

2.3. AI Technologies in Customer Service

2.3.1. Definition and Scope

Artificial Intelligence refers to the simulation of human cognitive processes by machines, encompassing learning, reasoning, problem-solving, language understanding, and perception (McCarthy, 2007). In customer service contexts, AI technologies include chatbots and virtual assistants, natural language processing (NLP) systems, machine learning algorithms, robotic process automation (RPA), and predictive analytics. These technologies collectively enable organizations to deliver faster, more consistent, and increasingly personalized service experiences at scale (Huang & Rust, 2018).

Chatbots powered by NLP, for instance, can handle routine customer inquiries around the clock without human intervention. In healthcare, this translates to 24/7 patient support for appointment scheduling, prescription reminders, and general health information queries (Laranjo et al., 2018). Machine learning algorithms can analyze patient data to predict individual preferences and tailor communication strategies accordingly. Predictive analytics can identify service bottlenecks before they occur, enabling proactive management of patient flow and wait times (Davenport & Kalakota, 2019).

2.3.2. AI Applications in Healthcare Customer Service

Several studies have documented the deployment of AI technologies in healthcare institutions worldwide. Topol (2019) argues that AI has the potential to restore the human connection in medicine by automating administrative tasks and freeing clinicians and service staff for higher-value interactions. A study by Bajwa et al. (2021) found that AI-powered chatbots in hospital settings reduced call center volume by 40% and improved appointment adherence by 28% in a large urban hospital in the United States.

In the GCC context, Al-Borie and Damanhour (2013) examined patient satisfaction in Saudi Arabian hospitals and found that responsiveness and empathy were the service dimensions most closely tied to overall satisfaction. While their study predates widespread AI deployment, the dimensions they identify are precisely those that AI tools are designed to enhance. More recently, a study by Alharthi et al. (2021) examined patient perceptions of digital health services in Saudi Arabia and found that while digital tool adoption was growing, significant gaps remained in patient education and trust regarding automated systems.

International evidence also highlights the importance of staff training and organizational readiness in AI deployment success. A study by Cresswell et al. (2017) in the UK National Health Service found that even well-designed AI tools failed to deliver improvements in service quality when staff lacked the skills or motivation to use them effectively. This finding underscores the mediating role of employee technological readiness proposed in this study's conceptual model.

2.3.3. AI and Patient Satisfaction

Patient satisfaction is a multidimensional construct influenced by both clinical outcomes and service process experiences. Research has consistently found that timely communication, ease of access to information, and feeling valued as an individual are central drivers of patient satisfaction (Doyle et al., 2013). AI technologies, when effectively implemented, can positively influence all these dimensions. Personalized communication driven by machine learning, automated follow-up messages, and AI-powered triage systems that reduce wait times all contribute to higher satisfaction scores (Marr, 2020).

However, the relationship between AI and patient satisfaction is not unconditionally positive. Patients who prefer human interaction, those who lack digital literacy, or those with privacy concerns may respond negatively to AI-mediated service channels. A study by Lupton (2018) warns of the risk of "digital disempowerment" when healthcare systems over-rely on AI at the expense of human judgment and compassion. These nuances are particularly relevant in a cultural context like Saudi Arabia, where interpersonal communication norms and trust in technology may differ from those in Western settings.

2.4. Related Studies

2.4.1. First Variable: AI Technologies

Study 1: Davenport & Kalakota (2019) – The Potential for Artificial Intelligence in Healthcare

Objective: To explore the future role of AI across clinical and administrative healthcare functions.

Methodology: Conceptual review drawing on published case studies and industry reports.

Key Findings: AI can automate 30–40% of administrative healthcare tasks, significantly reducing costs and improving service efficiency. The authors identify chatbots, diagnostic imaging AI, and clinical decision support as key application areas with near-term implementation potential.

Relevance: This study provides a macro-level rationale for AI investment in healthcare, supporting the study's argument for AI's potential to improve customer service efficiency at Dallah Hospitals.

Study 2: Bajwa et al. (2021) – Systematic Review of the Use of Artificial Intelligence in Healthcare

Objective: To systematically review evidence on AI implementation outcomes in healthcare settings.

Methodology: Systematic review of 107 peer-reviewed studies published between 2010 and 2020.

Key Findings: AI interventions showed measurable improvements in appointment scheduling, patient triage, and communication. However, outcomes varied significantly depending on organizational readiness and staff training levels.

Relevance: The emphasis on organizational readiness directly supports this study's hypothesis regarding the moderating role of hospital preparation in AI effectiveness.

Study 3: Laranjo et al. (2018) – Conversational Agents in Healthcare: A Systematic Review

Objective: To evaluate the effectiveness of conversational AI agents in patient engagement and healthcare delivery.

Methodology: Systematic review of 17 randomized trials and controlled studies.

Key Findings: Conversational AI showed statistically significant improvements in patient engagement for chronic disease management, medication adherence, and appointment keeping. Patients generally rated their experience positively.

Relevance: This study provides direct empirical support for the AI-customer service quality relationship in healthcare contexts, informing the study's measurement of AI effectiveness.

2.4.2. Second Variable: Customer Service Quality

Study 1: Alharthi et al. (2021) – Patient Perceptions of Digital Health in Saudi Arabia

Objective: To assess Saudi patients' perceptions and acceptance of digital health services.

Methodology: Cross-sectional survey of 430 patients at three major hospitals in Riyadh.

Key Findings: While digital health adoption has increased significantly, gaps in digital literacy and trust in automated systems remain barriers to full adoption. Responsiveness and information quality were identified as the most valued service dimensions.

Relevance: This study provides culturally specific insights into patient expectations in Saudi Arabia, directly informing this study's measurement of customer service quality dimensions.

Study 2: Al-Borie & Damanhour (2013) – Patients' Satisfaction of Service Quality in Saudi Hospitals

Objective: To measure patient satisfaction with hospital service quality using the SERVQUAL model.

Methodology: Survey-based study using modified SERVQUAL questionnaire with 346 patients from three hospitals in Saudi Arabia.

Key Findings: Empathy and responsiveness were the dimensions with the highest impact on patient satisfaction. Significant gaps were found between patient expectations and perceptions of service delivery.

Relevance: This foundational Saudi-context study validates the use of SERVQUAL in this setting and identifies the specific service dimensions most in need of AI-driven improvement.

Study 3: Doyle et al. (2013) – A Systematic Review of Evidence on the Links Between Patient Experience and Clinical Safety and Effectiveness

Objective: To examine the relationship between patient service experience and clinical outcomes.

Methodology: Systematic review of 55 empirical studies across multiple countries.

Key Findings: Positive patient service experiences were significantly associated with improved clinical outcomes, medication adherence, and reduced hospital readmission rates. Communication quality was the strongest single predictor.

Relevance: This study strengthens the case for investing in AI-driven customer service improvements by linking service quality directly to clinical and organizational outcomes.

2.5. Conclusion

This chapter has reviewed the theoretical and empirical foundations underpinning the study's examination of AI technologies and their impact on customer service quality at Dallah Hospitals in Riyadh. The Technology Acceptance Model and SERVQUAL framework provide a complementary theoretical basis for understanding both the adoption process and the multi-dimensional nature of service quality in this context. Empirical evidence from both global and Saudi-specific studies supports the hypothesis that AI can meaningfully improve customer service dimensions, while simultaneously highlighting the critical importance of employee readiness, organizational culture, and patient digital literacy as mediating and moderating factors.

The reviewed literature reveals a gap in studies specifically focused on AI-driven customer service improvement within Saudi Arabian private hospital settings. This study directly addresses this gap by providing primary empirical evidence from Dallah Hospitals, contributing to both academic knowledge and practical management insights. The following chapter details the research methodology employed to generate these findings.

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Appendix: Questionnaire for Research Variables

Research Instruments: Questionnaire Survey

Dear Participant,

This questionnaire is part of an academic research project titled "The Impact of Artificial Intelligence Technologies on Improving Customer Service – Applied to Dallah Hospitals in Riyadh." The purpose of this survey is to gather your valuable perceptions and experiences regarding the use of AI technologies in customer service within the hospital.

Your responses are entirely confidential and will be used solely for academic research purposes. The questionnaire takes approximately 10–12 minutes to complete. There are no right or wrong answers – your honest opinion is what matters most.

Thank you for your time and cooperation.

Part 1: Demographic Information

Variable	Category
Respondent Type	☐ Hospital Employee ☐ Patient / Visitor
Gender	☐ Male ☐ Female
Age Group	☐ 18–25 ☐ 26–35 ☐ 36–45 ☐ 46–55 ☐ 56 and above
Educational Level	☐ High School ☐ Bachelor's ☐ Master's ☐ PhD
Years of Experience (if employee)	☐ < 2 years ☐ 2–5 years ☐ 6–10 years ☐ > 10 years

Table of Research Instruments

Variable	Dimensions	No. of Items
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AI Technologies (Independent Variable)	1. AI Chatbots and Virtual Assistants 2. Automated Appointment Scheduling 3. Predictive Analytics Tools 4. AI-powered Triage Systems 5. Personalization Algorithms	5
Customer Service Quality (Dependent Variable)	1. Responsiveness 2. Reliability 3. Patient Satisfaction 4. Personalization of Service 5. Communication Quality	5

Part 2: Section 1 – AI Technologies (Independent Variable)

Please rate each statement using the following scale:

1 = Strongly Disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly Agree

No.	Statement	1	2	3	4	5
1	AI-powered chatbots at Dallah Hospitals provide fast and accurate responses to patient inquiries.	☐	☐	☐	☐	☐
2	The automated appointment scheduling system saves time and reduces errors compared to manual processes.	☐	☐	☐	☐	☐
3	Predictive analytics tools help the hospital anticipate patient needs and allocate resources more effectively.	☐	☐	☐	☐	☐
4	AI-powered triage systems improve the speed and accuracy of directing patients to the appropriate department.	☐	☐	☐	☐	☐
5	Personalization algorithms in the hospital's digital platforms help tailor services to individual patient needs.	☐	☐	☐	☐	☐

Part 3: Section 2 – Customer Service Quality (Dependent Variable)

Please rate each statement using the following scale:

1 = Strongly Disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly Agree

No.	Statement	1	2	3	4	5
1	The hospital's AI-enabled service systems respond to my inquiries in a timely and efficient manner.	☐	☐	☐	☐	☐
2	Services provided through AI platforms at Dallah Hospitals are consistent and reliable.	☐	☐	☐	☐	☐
3	Overall, I am satisfied with the quality of customer service supported by AI technologies at this hospital.	☐	☐	☐	☐	☐
4	The hospital's digital service platforms provide personalized information and recommendations relevant to my specific needs.	☐	☐	☐	☐	☐
5	The quality of communication through AI-powered channels at the hospital is clear, accurate, and helpful.	☐	☐	☐	☐	☐

Thank you for completing this questionnaire. Your contribution is greatly appreciated and will help advance academic understanding of AI in healthcare service management.