

Information Technology (IT) Transformation for E-Healthcare to Enhance Customer Experience in Healthcare Organization

Mohammed Sadhik Shaik

Sr. Software Web Developer Engineer, Computer Science, Germania Insurance, Melissa, Texas, USA

E-mail: mshaik0507@gmail.com

Abstract - In order to enhance and prolong human life, digital transformation is essential in this century. Businesses and industries can't achieve digital transformation without combining the analytics process, which involves artificial intelligence (AI), with the Internet of Things (IoTs). Many nations will need AI and the Internet of Things in the coming decade. But there are additional technologies that make integration of these technologies straightforward and quick, such Blockchain and edge computing. Integrating several technologies will be necessary for digital transformation in the near future. Business process management (BPM) and robotic process automation (RPA) are two examples of AI's workplace applications; the term "Intelligent Automation" covers the use of AI to automate business tasks. Deceptive health claims are weighing on the economies of both rich and poor nations. The detection of healthcare fraud is currently of paramount importance. The use of data mining techniques will help us detect and stop fraud. We have suggested a hybrid model system that combines clustering and classification. After considering the pros and cons of each technique, we settled on the development clustering approach and the support vector machine. Once the insurance company detects a fake claim, they will pay out the valid ones.

Keywords: Artificial Intelligence; Classification; Business process management; Clustering; healthcare.

I. INTRODUCTION

Qualitative research approach

The exploratory potential of the researcher is greatly enhanced by the qualitative research approach, which allows for more thorough investigation and exploration of the research investigations [1]. Research approaches and strategies that deal with phenomena by exploring encounters, methods, and relations without the usage of statistics, arithmetic, and quantitative information are encompassed by the phrase "qualitative research" (Hagberg et al., 2002). The "what," "when," "where," and "how" inquiries form the backbone of qualitative research methods. The word-based approach is another name for this method of study. A crucial conclusion

based on data interpretations and observations, the researcher's results back up the extensive investigation they performed [3]. Greater efficiency and depth have been explored through the use of qualitative research methods and different case study approaches.

Significance of the study

The major importance of this research lies in the fact that it will help improve the eHealth experience for customers and patients by utilizing the most recent technological advancements in the healthcare business. Modern life has been greatly enhanced by technological advancements, particularly in the field of healthcare [4]. Thus, it is critical to study the difficulties encountered in adopting or transforming technology, as well as the degree of adoption and usage, when creating eHealth systems. In order to construct cost-effective eHealth systems, increase transparency, and enhance the quality of care for customers and patients, this study sheds light on the employment of technology in optimizing present technical specifications.

Gustafsson et al. [5] states that the sensitive and complicated character of eHealth makes the transition of information and communication technologies there more difficult than in other sectors.

So, healthcare organizations are still transitioning from older eHealth apps to newer ones that take advantage of the most cutting-edge technologies available. Implementing a unified IT vision supported by a solid business case is essential for successful IT transformation [6]. Examining the role of IT leadership and stakeholder engagement in IT transformation plans, this study seeks to optimize the traditional ITcost model.

It also discusses the need for collaboration between business and IT leaders in defining the project's need, scope, and scalability, as well as its timeline. Information technology (IT) modernization and IT automation are two pillars of any successful IT transformation, and this paper lays out a two-pronged approach to achieving just that. Patient confidence in healthcare providers is bolstered by this study's recommendations for improved data privacy and security. The

current worldwide pandemic (COVID-19) is causing a lot of trouble with patient and customer healthcare service; this study will help healthcare organizations and eHealth vendors understand how to better integrate advanced technology into eHealth systems to better handle the pandemic.



Figure 1: Digital Healthcare Trends that IT Offers

II. LITERATURE REVIEW

There have been countless ways in which people's professional and personal lives have been affected by the technology advancements of the last several decades. The most fundamental description of the enormous digital transformation happening at the moment is the use of technology to ensure a multifold increase in the reach and performance of businesses [7]. The advent of Industry 4.0 and its use of digital technologies such as 3D printing, cloud computing, and artificial intelligence (AI) has altered people's daily lives, interactions with coworkers, and methods of getting things done at work.

On the consumer side, innovations like smartwatches, smart homes, and online food delivery have changed the way people live and work. It is worth mentioning that these new digital technologies and information and communication technologies (ICTs) have greatly improved companies' capacity to deal with the unpredictable business climate and provided them with numerous chances for growth in the last twenty years. In a similar vein, the IoT has drastically altered how businesses generate value from their routine activities [9]. At the same time, big data is becoming an important differentiator for companies and a driver of new ways of generating knowledge.

Without a doubt, this conducive setting for company expansion has increased the availability of high-paying jobs, which in turn has helped people's lives in all areas. Particularly affected by this tsunami of technical advancements in the last several years is the healthcare

industry. There have been numerous technical shifts in healthcare administration, management, and delivery brought about by digitalization, in addition to changes in diagnosis and equipment. The health cloud, m-health, telemedicine, EMR, CPOE, IT-based assistive services, clinical decision support systems, and information technology have all been recognized in the academic literature as impactful new developments in healthcare technology [10]. The diagnostic process and the management of patient care have been greatly enhanced by these developments. Despite the many advantages, they have not spread as quickly as expected. Among the numerous benefits of digital healthcare technology are improved healthcare delivery and reduced diagnostic errors. These technologies are sometimes called electronic health or healthcare information technologies (HIT). But some stakeholders aren't on board with these changes, according to the research [11]. Users' overt and covert resistance to digital technology acceptance and implementation is widespread throughout industries, including healthcare.

Past research has shown in numerous contexts that digital transformation implies several dangers, which is the root cause of this resistance. It was found that doctors' intentions to use HIT were negatively affected by resistance to change, particularly in the healthcare industry. We may safely presume that this kind of opposition has subsided since these writers performed their research during the early stages of HIT breakthroughs. Despite this, researchers have noticed that people are still resistant, especially when it comes to mHealth apps and EMRs.

In 2020, the COVID-19 pandemic came to light, adding another layer to the puzzle as researchers tried to understand the ongoing stakeholder opposition to e-health technologies. Indeed, the global economic and non-economic obstacles caused by the pandemic's onset and travel restrictions had far-reaching consequences on people's attitudes, actions, and behaviors, including their approach to digital transformation. This is especially the case in healthcare, where the pandemic created a new standard of difficulty in the previously unimaginable task of providing safe treatment to people with illnesses other than COVID-19 infections. When it was shown that COVID-19 problems were more common in the elderly and those with co-morbidities such as diabetes, this already challenging undertaking became even more so [12]. In this regard, telehealth and other digital innovations/e-health solutions offered practical means of providing distant medical treatment [13].

As a result, digital technology and e-health solutions were more widely used for healthcare administration and delivery during the early stages of the epidemic. Many onlookers saw this uptick in usage as evidence that the

pandemic's previously noticeable pushback against e-health advances was beginning to fade. Despite the slowdown in the spread of COVID-19, the rising adoption of e-health solutions has not been sustained. Indeed, during the first phase of the pandemic, many doctors returned to more personal encounters for healthcare delivery, and new research show that doctors are wary of using digital tools [14]. This conduct is representative of the general public's reluctance to embrace digital change in healthcare administration and delivery, which is a problem despite the numerous benefits. So, it is up to the researchers to figure out why this is happening again.

Early Implementations of EHRs

In the late 80s and early 90s, technological advancements led to the widespread adoption of small, powerful personal computers connected to efficient local area networks. The advent of the internet, along with other factors, made medical records more accessible and paved the way for the adoption of web-based applications for EHRs (EHRs). New features have been made available to consumers to enhance their experience, thanks to advancements in both software and hardware. Features unique to electronic health record (EHR) access through online applications include control functions, assistance displays, and data uploading and downloading.

Automating the once labor-intensive process of data transfer for claim processing was a primary goal of early EHR implementation, according to [16]. This allowed for significant time savings. Integrating EHR software into physician workstations has been a gradual but steady introduction to clinical settings, allowing for quick and easy access to patients' medical records, lab results, treatment plans, prescription estimates, and personal physician notes. The physician also had access to pharmacological, clinical, CDS, and electronic communication manuals (Evans, 2016). The advent of EHRs has opened up a new field of medical informatics known as clinical decision support (CDS).

Databases used for clinical decision support are structured and developed as an independent body of knowledge that is integrated and utilized with electronic health records.

III. METHODS

Study instrument

Our qualitative study, which took the form of an open-ended essay, was based on the methods employed by previously published research. The essay's questions sought information regarding (a) the different e-health (or m-Health) technologies that those who participated in the survey were already familiar with; (b) the specific e-health (or m-Health)

technologies that those who participated had used or were using; (c) the challenges and worries that those who participated had when using these technologies with their patients; and (d) the aspects of these technologies that those who participated found most unpleasant. (e) cases where respondents felt that using m-Health technologies was a bad decision following their recent implementation.

Data collection

Through Prolific Academic, we extended an invitation to all UK citizens to take part in the research. We used a purposive sampling technique to find medical professionals (nurses, doctors, etc.) who were either familiar with or actively implementing e-health innovations into their respective practices and hospitals. While the COVID-19 pandemic was underway in January and February of 2021, we were able to gather this data after the first lockdown limitations had been partially lifted. A grand total of 59 replies were received. The age range of the responders was 25 to 50, with 22 of them being men. Table 1 displays the pertinent respondent demographic information.

Table 1: Demographic profile of study respondents

Gender	Percentage	Frequency
Female	62.7	37
Male	37.3	22
Age group		
21–25 years	11.9	7
26–30 years	18.6	11
31–35 years	25.4	15
36–40 years	22.0	13
41–45 years	13.6	8
46–50 years	8.5	5
Type of professional		
Doctor	22.0	13
Psychologist	6.8	4
Nurse	25.4	15
Clinical staff	20.3	12
Other	25.4	15
Years of experience		
1–5 years	35.6	21
6–10 years	39.0	23
11–15 years	15.3	9
16–20 years	0.0	0
21 years or more	10.2	6

Data analysis

We followed the guidelines and used thematic coding to examine the responses that were gathered. Additionally, our coding method was consistent with those of more recent

research. Using this strategy, we were able to ascertain the difficulties that the participating healthcare providers ascribed to various e-health innovations' adoption. In addition, by analyzing the language, we were able to infer how healthcare practitioners see e-health technologies developing in the future and how they intend to recommend these innovations to their patients.

An expert in the field, two post-doctoral researchers, and a professor made up the four-person panel that helped with the content analysis, theme extraction from the qualitative replies, and barrier categorization. After establishing zero-order elements with open coding, first-order constructs with axial coding, and second-order constructs with selective coding, the four-person panel followed the standard coding technique.

Investing in Digital Health on a Private Basis Yearly Figure 1 displayed the data from 2019 to 2022. According to the study, 57 participants stated that the proposed e-Health card could have numerous positive effects on Bangladesh's healthcare system. These include proper medication distribution (10%), easy access to health services (10%), reduced paperwork (8.75%), an improved healthcare system (7.5%), less corruption (5%) and the ability to store patients' profiles and data (3.75%). Furthermore, 23 participants did not provide any comments on this question (Fig. 2).

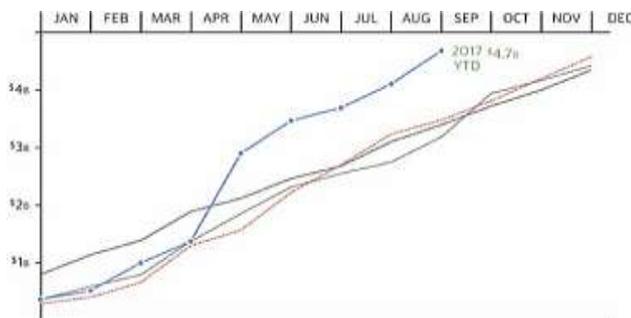


Figure 2: Annual Private Spending on Digital Health from 2019–2022

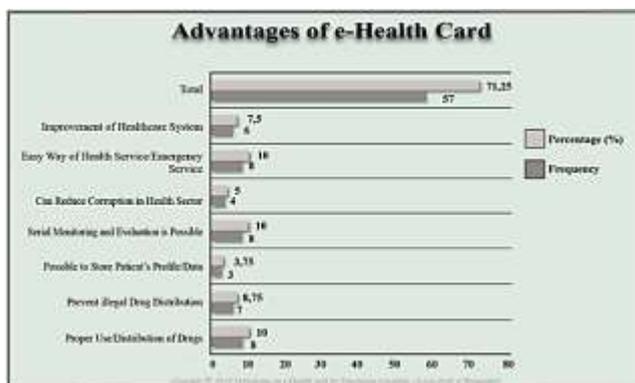


Figure 3: Features of the e-Health card as shown in a bar chart (n = 57)

Both physicians and patients stand to benefit greatly from the proposed e-Health card system, according to the report.

Some of these benefits include: the ability to save patient profiles on the system (17.5%), accurate medication distribution (15.5%), access to doctors' prescriptions (13.75%), a decrease in the sale of illegal drugs and an increase in patients' access to emergency services (10%), the development of doctor-patient relationships (7.5%), the prediction of disease and treatment trends (7.5%), the identification of fundamental health problems in the country (7.5%), a reduction in doctors' workload (6.25%), and the ease of patient recognition (5%).

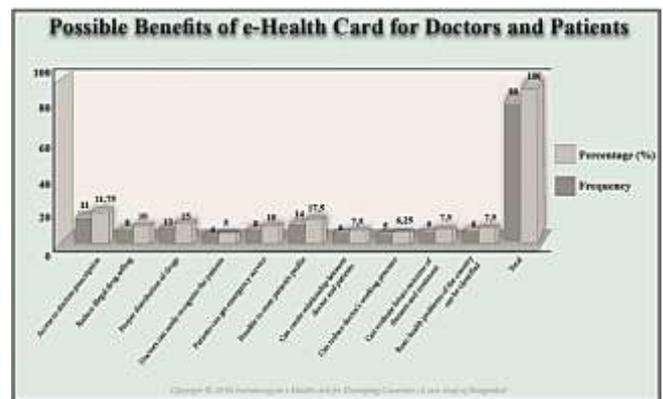


Figure 4: E-Health card potential benefits for both patients and doctors (n = 80) shown in a bar chart

IV. CONCLUSION

Respondents were encouraged to elaborate on their ideas and experiences in response to the researcher's open-ended questions. Also, the researcher wanted to know people's overall thoughts, so she asked for general comments when the interview was over. The utilization of in-depth interviews with eight individuals allowed us to attain data saturation for this qualitative investigation.

Throughout each interview, the researcher meticulously recorded the participants' remarks and answers in handwritten field notes, which were later deemed vital. Members met for 30 minutes to an hour at a time in digitally recorded sessions. The researcher meticulously recorded each meeting using a web-based technology called Zoom. We saved the transcripts to Word and then categorized them according to the interview questions so that we could compare them and identify trends. To ensure confidentiality and anonymity, each participant was identified using a number instead of a name, in accordance with the guidelines set out by the IRB.

For the sake of objectivity, this researcher detailed the steps taken to guarantee validity and reliability and to replicate the study (CSEP, 2009). Validity and reliability are key considerations when undertaking a qualitative study with several case studies.

REFERENCES

- [1] Gartner_Inc. (n. d). Definition of Digitization - Gartner Information Technology Glossary. *Gartner*. <https://www.gartner.com/en/information-technology/glossary/digitization>.
- [2] Hagberg, J., Sundstrom, M., & Egels-Zandén, N. (2016). The digitalization of retailing: an exploratory framework. *International Journal of Retail & Distribution Management*, 44(7), 694–712.
- [3] Kierkegaard, P. (2011). Electronic health record: wiring Europe's healthcare. *Computer Law & Security Review*, 27(5), 503–515.
- [4] Gerdes, M. (2019). Holistic System Design for Distributed National eHealth Services.
- [5] Gustafsson, J. (2017). Single Case Studies vs. Multiple Case Studies: A Comparative Study.
- [6] Hatch, J.A. (2002). Doing Qualitative Research in Education Settings. *SUNY Press*.
- [7] Henry, S.G., & Fetters, M.D. (2012). Video elicitation interviews: a qualitative research method for investigating physician-patient interactions. *Annals of Family Medicine*, 10(2), 118–125.
- [8] Hiremath, S., Yang, G., & Mankodiya, K. (2014). Wearable internet of things: concept, architectural components and promises for person-centered healthcare. In *2014 4th International Conference on Wireless Mobile Communication and Healthcare—Transforming Healthcare through Innovations in Mobile and Wireless Technologies (MOBIHEALTH)* (pp. 304–307). IEEE.
- [9] Høstgaard, A.M.B., Bertelsen, P., & Nøhr, C. (2017). Constructive eHealth evaluation: lessons from evaluation of EHR development in 4 Danish hospitals. *BMC Medical Informatics and Decision Making*, 17(1), 1–15.
- [10] Johannessen, J.A., Olaisen, J., & Olsen, B. (1999). Strategic use of information technology for increased innovation and performance. *Information Management & Computer Security*, 7(1), 5–22.
- [11] Jonsen, K., & Jehn, K.A. (2009). Using triangulation to validate themes in qualitative studies. *Qualitative Research in Organizations and Management*, 4(2), 123–150. doi:10.1108/17465640910978391.
- [12] Kazmer, M.M., & Xie, B. (2008). Qualitative interviewing in Internet studies: Playing with the media, playing with the method. *Information, Communication & Society*, 11(2), 257–278.
- [13] Kgasi, M., & Kalema, B. (2014). Assessment E-health readiness for rural South African areas. *Journal of Industrial and Intelligent Information*, 2(2).
- [14] Khilnani, A., Schulz, J., & Robinson, L. (2020). The COVID-19 pandemic: new concerns and connections between eHealth and digital inequalities. *Journal of Information, Communication and Ethics in Society*, 18(3), 393–403.
- [15] Kibiwott, K.P., Zhang, F., Kimeli Victor, K., Omala, A.A., & Opoku-Mensah, E. (2019). Privacy preservation for eHealth big data in cloud accessed using resource-constrained devices: survey. *International Journal of Network Security*, 21(2), 312–325.
- [16] Kiunsi, D., & Ferwerda, B. (2019). Using a serious game to teach user-centered design. In *24th International Conference on Intelligent User Interfaces (IUI)*, March 16-20, 2019, Los Angeles, USA, vol. 2327. *CEUR-WS*.
- [17] Mkono, M., & Hughes, K. (2020). Eco-guilt and eco-shame in tourism consumption contexts: Understanding the triggers and responses. *Journal of Sustainable Tourism*, 28(8), 1223–1244. <https://doi.org/10.1080/09669582.2020.1730388>
- [18] Mohammed, A., & Ferraris, A. (2021). Factors influencing user participation in social media: Evidence from Twitter usage during COVID-19 pandemic in Saudi Arabia. *Technology in Society*, 66, Article 101651.
- [19] Monaghesh, E., & Hajizadeh, A. (2020). The role of tele-health during COVID-19 outbreak: A systematic review based on current evidence. *BMC Public Health*, 20(1), 1–9.
- [20] Ngafeeson, M. N., & Manga, J. A. (2021). The nature and role of perceived threats in user resistance to healthcare information technology: A psychological reactance theory perspective. *International Journal of Healthcare Information Systems and Informatics (IJHISI)*, 16(3), 21–45.

Citation of this Article:

Mohammed Sadhik Shaik, “Information Technology (IT) Transformation for E-Healthcare to Enhance Customer Experience in Healthcare Organization” Published in *International Research Journal of Innovations in Engineering and Technology - IRJIET*, Volume 7, Issue 7, pp 196-201, July 2023. Article DOI <https://doi.org/10.47001/IRJIET/2023.707030>
