DIGITAL TRANSFORMATION CHALLENGES IN HEALTHCARE AND ITS EFFECT ON THE PATIENT–PHYSICIAN RELATIONSHIP

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ABSTRACT

Healthcare providers worldwide are facing a major challenge: the need to improve the treatment of patients while simultaneously controlling expenses. Due to the technological advances that are helping patients care for themselves and control their health conditions much better than they were able to in past decades, when they were dependent on the physician to attend them physically, there is growing demand for chronic disease management, particularly for ageing people. At present, the implementation of digital transformation in all sectors, and particularly in healthcare, has provided many opportunities to patients, given the huge amount of medical data to be processed, for predicting the possibility of disease and measuring the level of critical cases. This has been enabled by the use of machine learning tools, applications, and technologies like the Internet of Things, Enhanced analysis tools, and Artificial Intelligence, these technologies are considered to play a major role in driving the digital transformation in the healthcare sector. This study examines the relationship between patients and physicians in the context of digital transformation. The entire healthcare system revolves around patients and physicians, who both play a key role in implementing digital transformation. We explore the key components to focus on for successful implementation of digital transformation to enrich the relationship between patients and physicians, thereby enhancing treatment and ensuring excellent outcomes. Maintaining the confidentiality of patient data is the most important of the many tips we suggest for successful implementation of the digital transformation of healthcare and e-health.

Keywords: Data Confidentiality, Digital Transformation, Digitization, EE-Health, Healthcare, Saudi Arabia

INTRODUCTION

The primary purpose of healthcare centers is to provide patients with high-quality medical care. Healthcare sectors worldwide consistently make great efforts to satisfy their customers and accomplish the goal of providing such a level of care (Jacobs, 2013). The services provided by healthcare professionals are measured by the level of satisfaction of their patients with these services and the fulfilment of their patients' expectations. There are few defined elements in the task of meeting the challenges facing the healthcare sector. If these elements, such as the organizational structure, were considered seriously, the quality of services delivered by the healthcare sector would be enhanced significantly (Bass, 1994). The many challenges the healthcare sector is facing include the continuous increase in the cost of technology and equipment. Another challenge is the continuous increase in customers' demands for high-quality services (Jacobs, 2013). These challenges are making it very difficult for healthcare providers to deliver free and low-cost services. This is the main challenge that healthcare organizations in the Kingdom of Saudi Arabia (KSA) are now facing. Healthcare in KSA involves three main organizing bodies: Ministry of Health (MOH) hospitals, military

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hospitals, and private hospitals (MOH). In KSA, the MOH provides approximately 58% of the total hospitals. These MOH hospitals provide free services for residents and their dependents.

As is the case in other countries, the healthcare sector in KSA is facing various challenges, such as the high cost of equipment, the constant increase in the numbers of patients with chronic diseases, and the lack of professional healthcare service providers (Alharbi, 2015). To overcome such issues and resolve the associated challenges, various healthcare organizations are trying to migrate to using Information and Communication Technology (ICT) and are implementing e-health solutions to provide better patient care, increase the efficiency of their services, achieve greater patient satisfaction, and further utilize the economy in an efficient manner.

However, the implementation of ICT and creation of e-health services for Saudi healthcare organizations is not progressing very rapidly and is still at an immature level. Numerous reasons are being given for this slow rate of implementation of e-health services (Khalifa, 2013). The many obstacles facing the healthcare sector include expenditure issues relating to the introduction of ICT, which is said to be more expensive in terms of both capital expenditure and operational expenditure. Another reason for the slow development of e-health is the lack of availability of health informatics experts who specialize in ICT (Khalifa, 2013). Furthermore, implementation of ICT is hindered by technical issues such as complexity, compatibility, and a dearth of infrastructure related to ICT (Alkraiji, 2013). Irrespective of these issues and obstacles, Saudi Arabia's healthcare sector is striving to achieve its goal of both implementing and improving e-health services for the citizens of KSA.

Currently, people are, on the one hand, hoping to achieve the goal of developing and implementing advanced medical technologies to provide better healthcare services worldwide; however, on the other hand, the costs involved in achieving this vision are mounting, which is a source of major concern for both government and private healthcare sectors worldwide (Dieleman, 2017). The estimated cost of global healthcare is expected to increase overwhelmingly, to approximately $8.7 trillion, by 2023 (Deloitte, 2018) due both to expenditure on drug development ($2.6 billion per newly launched drug) and to inefficient delivery of care (DiMasi, 2016). As people's life expectancy rises worldwide, the demand for better healthcare for the elderly and for specialized care programs is increasing (e.g., for senile dementia and Alzheimer's disease (Roser, 2015)). Furthermore, there are other issues, such as an increase in the rate of chronic diseases and illness related to lifestyle habits. As stated in (WHO, 2018) approximately 70% of the global deaths in 2015 were related to non-communicable diseases like diabetes and stroke (WHO, 2015). These numbers are alarming and prompt urgent need for implementation of new strategies to prevent such diseases and optimize the diagnostic procedures for better care.

Digital transformation is basically a smart investment wherein the idea is to transform the technique of doing the work in a unique way which gives faster, and better outputs compared to the traditional way of doing the work, also during the transformation new techniques and developments are utilized for better outcome. Digital transformation also provides efficient ways of building effective, inexpensive and sustainable society due to the altering way of doing the service for various stake holders like consumers, employees and payees. It is also affecting the productivity by redefining the working culture. Digital transformation is making the need for innovations to appear as the need and demand is constantly changing so also the work environment. These changes range from infrastructure and operating methodologies till the marketing. Healthcare is among the many recipients of Digital transformation wherein electronic health records are implemented for the healthcare providers. The main purpose for this implementation is to enhance the healthcare by advancing the care being provided to the patient by deducing the time for treatment and working on risk aspects by reducing the possible errors and further enhancing the total healthcare system.

Healthcare organizations differ in terms of operation and functioning depending on which country they are in; some move fast, whereas others lag behind. The pace depends on

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various factors, such as a country's legal framework and political policies, organizational functionality, and individual involvement. It also depends on the goal for digital transformation of the physician–patient relationship and on enhancing the conditions in the organization to implement digital transformation in a new direction of care, such as by using ICT tools for remote monitoring of patients' health and employing applications such as the Internet of Things.

Features of Digital Transformation

Digital transformation involves (1) restructuring the way people live, work, think, interact, and communicate, depending on the available technologies, with continuous planning and the constant pursuit of reformulating practical experiences; (2) Improving efficiency, reducing spending, and introducing new services in a fast and flexible manner; (3) Radically changing the services provided to individuals in the areas of health, education, safety, and security, and changing work models and mentalities; (4) Taking advantage of modern technologies to be more responsive and flexible at work, with improved predictability and planning for the future; (5) Enabling faster innovation to achieve desired and successful progress; and (6) Providing a strategy to create higher competitive value, advanced work teams, and a sustainable culture of innovation.

Advantages of Digital Transformation

The advantages of digital transformation include replacing traditional processes with digital processes, increasing the amount of time dedicated to development, changing work models and changing mentalities, increasing workflow efficiency and reducing errors, speeding up everyday work, applying new services quickly and flexibly, improving quality and performance, increasing productivity and improving products, increasing the satisfaction of beneficiaries, and improving the viability of investments. Digital healthcare is a new field, but the developed countries that have already implemented digital healthcare are benefitting from the following digital healthcare solutions: getting an online appointment with a doctor; creating electronic medical health records; making data exchanges easier through creating a unified platform; using chatbots to deliver useful and necessary patient information online; and maintaining electronic medical records of all patients in a database, including the prescriptions they are receiving, their medication history, and other details.

Healthcare in Saudi Arabia

Existing healthcare in KSA is facing many problems, which have been highlighted by various researchers, and many solutions have been offered to develop cost-effective methodologies for high-quality healthcare services. With reference to the above studies, some researchers have discovered not only that there has been a huge increase in the cost of medical equipment and services but also that the quality of these is insufficiently high. Such issues may be handled and resolved via the plan drafted by the government of Saudi Arabia for restructuring and reforming the healthcare systems under the strategic framework of a national transformation plan, known as Vision 2030. The plan also involves the private sectors and increasing the share of the private sectors in healthcare from 25% to 35% in the coming years.

Digital Transformation in Saudi Arabia

The KSA has taken qualitative steps to ensure rapid development of digital transformation through adopting state-of-the-art telecommunications and ICT technology, thereby facilitating the transformation toward a knowledge economy and e-commerce. The ultimate goal of such efforts is to increase the satisfaction rates and quality of living of citizens

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and their everyday lives. To attain this goal, the KSA has worked to increase awareness of electronic processes and the necessity of digitizing government work, in addition to raising government agencies' receptiveness to technology, thereby ensuring a transition toward sustainable development, global effectiveness, and improvement in the overall quality of life. To this end, the National Committee for Digital Transformation was established to undertake the creation of legislation and policies pertaining to digitalization at the governmental level, in addition to establishing strategies and programs necessary to achieving them and overseeing the Digital Transformation Program overall.

In digital transformation and ICT the main element is data, without which no operation or computation would be possible. Just as data are important for complex statistical analysis, confidentiality of data should be maintained, particularly in the healthcare sector, and ICT specialists working on healthcare data should be concerned about the privacy and security of the personal data of patients. As ICT is used to help both healthcare professionals and patients, the discipline should maintain certain norms and regulations regarding the protection and security of patient data. As shown in Fig. 1, the code of conduct of the healthcare system demands that these regulations be maintained with respect to patients' data.

In this study, we first discuss the risks and possible shortcomings of implementing digitalization of the physician–patient relationship. Then, we discuss the possible successive steps to be taken toward enhancing that relationship. ICT is playing an important role in addressing the challenges involved, and it is providing many opportunities to solve the issues and the estimated risks. The most important of these issues is the trust between the physician and patient with respect to the security and confidentiality of patient data.

The main contributions of this study lie in highlighting the importance of the autonomy of patient data, in both estimating their value in the physician–patient relationship for better treatment and assessing the risks of not doing so, and in promoting successful digital transformation in healthcare and the sector's norms and regulations. Our aim is to elucidate both the importance of the physician–patient relationship and the role of ICT in managing patient data confidentiality for successful implementation of digital transformation in the healthcare sector to improve treatment.

We have highlighted the importance both of the autonomy of patient data and the trust to hold its confidentiality. Digital transformation in the healthcare sector can only succeed if this concern is central to any discussion and is resolved; although data protection is not the only concern under digital transformation, it is a very important issue to address. We discuss healthcare in Saudi Arabia in some detail and follow this with discussion of digital transformation and its implementation in Saudi Arabia, the physician–patient relationship and the need to ensure the security of patient data to create trust between patients and physicians and improve this relationship, and the role of ICT in achieving these aims.

FIGURE 1

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HEALTHCARE AND DIGITAL TRANSFORMATION

LITERATURE REVIEW

At present, the Saudi Arabian government follows a national healthcare model, the main objective of which is to provide the best health services to the country's citizens; this service is considered as being the most important responsibility of the government. Patients currently enjoy free treatment and other health services provided by the government healthcare sector (https://vision2030.gov.sa/en/programs/NTP). Alongside the government healthcare sector, Saudi Arabia has a few private hospitals, some of which are primary healthcare centers; however, private hospitals are few in number compared to the MOH hospitals. In implementing Vision 2030, the Saudi government, especially under the leadership of the talented and intelligent young Deputy Crown Prince Muhammad Bin Salman, is playing a big role in improving the support provided to the country's citizens by the field of healthcare. As discussed earlier, over the past 20 years, the Saudi government and the Saudi private sector have together helped to provide excellent healthcare services, as evidenced by the fact that 60% of these services are free of charge and the remainder are taken care of by the private sector. So far, the service has been excellent; however the future could bring huge challenges that will require careful handling. To ensure success in rising to such challenges, the Saudi healthcare sector is anticipated to implement digital transformation and associated changes by 2030. Despite all these challenges and services, the Saudi healthcare system is appreciated by WHO officials. The Saudi healthcare system is not only very well equipped but the hospitals are also chosen to serve, and they seem to be excellent when compared with world-class hospitals (Aldosari, 2014). Analysis shows that Saudi Arabia is doing very well, and, as measured by Bloomberg, its healthcare system currently ranks 29th in the world with respect to efficiency. The Saudi government has laid out a 10-year strategic plan for healthcare (Bah, 2011).

Digital Transformation in Saudi Arabia

The issues faced by the Middle East demand exceptional change. The reason for this is the decline in oil prices, which has led the governments of countries in the Middle East to rethink and identify their accomplishments to improve their economies, make their nations independent of oil, and actively respond to these changing situations in an appropriate way (Alharbi, 2015). On many occasions, these countries have faced tremendous pressure and challenges that have forced them to diversify urgently from their considerable dependency on oil and energy incomes. These needs for change have opened many routes for diversification and encouraged changes in different directions, with a big vision for improvement; for example, in 2016, Saudi Arabia introduced Vision 2030. These changes and planned programs are leading to a big and ambitious change, with bold decisions being taken for providing better service to citizens in the near future (Alkraiji, 2013). The main aim of Vision 2030 is to implement a huge program of modernization that would be reflected in increased growth in technology, and increased economic diversification.

Digital transformation can be considered as being the most critical component in the success of this ambitious vision (Deloitte, 2018). The use of smartphones and the latest technologies is growing continuously, disrupting the old-style operational models of business. Given this fact, the Saudi government, like the country's organizations, now has to face the question of whether to be disrupted or to disrupt (Alkraiji, 2013). In just a few years, the citizens of KSA have accepted smartphone devices and technologies, to the extent that KSA is one of the world's biggest recipients of digital technology and is a leader in the rate of implementation of such technology. Due to these rapid changes, government organizations must update their applications and methodologies to meet the needs of their customers and the citizens, and this

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has led to a new revolution based on digitalization (Jacobs, 2013). If organizations do not update themselves they may fail to satisfy their customers' needs and to run their business efficiently. Thus, given these consequences, organizations are now bound to adopt and implement digital transformation. Government organizations must embrace digital technologies to satisfy the needs of their citizens and the expectations of patients in the healthcare sector (Dieleman, 2017). However, most of the organization in Saudi Arabia are lagging behind in terms of making real policies and plans for implementing a digital economy. Moreover, these transformations impose a threat to some organizations and companies because of the fear that digital technologies may render their businesses obsolete in the coming years. According to Altuwaijri (Altuwaijri, 2010), only 4% of the business organizations in KSA and the United Arab Emirates can be regarded as digital leaders, and as many as 44% of the business organizations in this region are hesitating to embrace these technologies and are concerned about how they will affect their future?". Many organizations have been disrupted because of adopting the Internet of Everything. Altuwaijri highlighted the need for a national e-health program and proposed a national e-health scope of work in Saudi Arabia. Similarly, Alsanea (Alsanea, 2012) highlighted the importance of EHR at the King Faisal Specialist Hospital and Research Centre and reported that implementation of EHR enabled the organization to conduct data analysis for the benefit of public health and to share information with national agencies and other organizations.

The physician–patient relationship is affected by the implementation of digital transformation in healthcare, and the communication between them is compromised, leading to a substantial amount of influence in their relationship. The field of medicine has always provided patients with freedom of therapy and generally maintained good physician–patient relationships, even though there is always a chance of misunderstanding and miscommunication. The basic relationship is that the patient asks for help and the physician ministers to the patient's expectation of being cured. However, that scenario is now changing slightly, with patients not always being totally dependent on their physicians but occasionally using the available ICT resources to investigate their problems and receive assistance. Nevertheless, patients mainly still look to their physicians for help, not only in the role of an expert doctor but also in the role of a partner. Patients want to comply with the commands and suggestions of their physicians to overcome their illness. An expert physician does not look just at the illness of the patient but at the whole person as an entity whose health should be taken care of and treated to the best of the physician's abilities (Woopen, 2009). As per , (Hartmann, 1994); (Steinfath, 2016). physician-patient relationship can be considered as a common relation on the well-established society, where they both share strong relationship with great values and norms. So, it is a kind of natural relationship for centuries. But, this relation needs some enhancement in helping both the patient and the physician to make a strong bond by helping them. Digital transformation can be a useful tool to enhance this relationship by providing essential guidelines to both of them. Although this relation is for centuries and will continue further (Wiesing, 2003), still it needs some advancements and modifications which can assist them for mutual communication. In the following sections, we examine three transformations of the physician–patient relationship.

Data for Healthcare Digitalization

As discussed in the literature, though the pace of implementing digital transformation is very slow, the amount of data gathered from patients is growing continuously when compared to recent decades (Roser, 2015). The healthcare sector can be said to be generating a lot of data and to fall into the category of a Big Data sector. In all, 30% of the data generated in the world is related to the healthcare industry (on the yottabyte~1024 gigabytes scale (WHO, 2018)). On average, each patient generates approximately 80 megabytes of data in terms of imaging and for EHRs (https://vision2030.gov.sa/en/programs/NTP). Managing and processing this huge amount of data represents a challenge, but the challenge is not only the size of the data but also the

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variety of types of data types. These data include patient demographics; encounters; diagnoses; pathology; laboratory tests; medications; radiology; radiation treatments; surgical treatments; post-therapy care; notes and documents; operational, financial, and insurance information; and provider characteristics. The biggest of these data types is image datasets that are utilized for diagnosing, such as data for extracting proteomics' information. For each patient, many data fields and files can be collected to assess the patient's health status. In addition, the challenge of veracity, a typical Big Data issue, must be addressed. Appropriate quality of information is key to ensuring sound clinical decision-making, as it directly impacts patients' lives Benchmark datasets.

Data analysis is also applied in the field of medicine, with a vast amount of data related to medicines and patient's personal information records being used for processing. The data related to health are considered as being very crucial and sensitive and in need of legal protection. Digital ICT is gaining in popularity and importance because of the huge increase in the amount of data. The data related to people's health have a dual effect, as they can be utilized either to benefit or harm a patient. Patient data represent the most critical component in the digitalization of healthcare and should be at the center of the discussion. Thus, medical data can be considered to be the crucial component in the context of digital transformation. Trust plays an important role in the physician–patient relationship (Schütze, 2018).

METHODOLOGY

Based on the aim and objectives of this study, we propose two scenarios: in the first scenario, technology is given full control in patient interventions, with all the decision-making done by the ICT application. Patients have limited freedom in making decisions about themselves both voluntarily and involuntarily. In this scenario, there is no close interaction between patients and physicians, and there is not complete trust in the technology, leading ultimately to the patients' loss of interest in medication. However, by way of contrast, the second scenario implies that patients work together with the technology with complete autonomy. This scenario allows interactions between the physicians and patients in addition to the use of technological applications.

Another aspect of research investigation is regarding the data, protecting it and securing it and giving access rights are the concerns which need to be addressed for successful implementation of digital transformation in healthcare. During this period of development, patients are feeling a new sense of vulnerability due to fear of misuse of their data through it being stolen and passed to an unknown entity. If a patient's data are identified correctly, they may be misused to harass the patient. If a patient's data are accessed unprofessionally and handled by unknown people, then there is also a chance of a group discriminating against that individual. Bearing these consequences in mind, security standards should be strengthened, particularly for sensitive data, and allowing these data to circulate beyond control should be avoided.

Data are not only very crucial, as discussed before, but the reliability and validity of data is also very important, especially in healthcare and also in business model development. Medical confidentiality is very important. If care is not taken in this regard, a vast amount of destruction can ensue. ICT specialists implementing digitalization should be very careful in this respect, and these types of challenge also present ICT experts with the opportunity to learn to overcome such issues and ensure efficient and successful implementation of digital transformation for the healthcare sector. The main concern when collecting data is to bear in mind who would benefit and who would be harmed harm by the data (Stellungnahme, 2017).

RECOMMENDATIONS

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Before the implementation of digitized healthcare systems, patients were often over-prescribed medications, and the intake of unnecessary medicines was the most common cause of death after heart disease and cancer. Digitalization dealt with this issue by reducing the unnecessary prescription of medication, over-diagnosis, and over-treatment, resulting in improvement in health.

Digitalization helps the service provider with standardized and cross-sectoral computer systems that have the facilities of accurate documentation, reporting, and communications; these capabilities make procedures more cost effective and enable faster processing of tasks. ICT is helping to reduce unwanted deviations in regional supplies that lead to a reduction in interdisciplinary networking between healthcare professionals such as doctors, nurses, and physiotherapists. Digitalization in medical systems is also helping medical professionals make reliable diagnoses rapidly and assisting them in selecting the best treatment method for their patients based on their diagnoses. These capabilities enable avoidance of repeated examinations and errors in medication. With these advantages being available, even non-medical personnel can handle medical issues efficiently.

With the help of digital ICT, patients can get assistance from the system and remind themselves about their medical information, and they can also play a major role in determining the treatment processes that best suit their circumstances. Health providers can be evaluated by consultation with other patients through the communication channels provided by ICT. These capabilities allow reduction of treatment time, travel time, and waiting time. Since self-measurement techniques like apps and wearables have become available, it is becoming possible to detect and assess health-related risks on time. Hence, thanks to digitalization in healthcare enhancing health-promoting lifestyles, people's quality of life is improving.

Patients' safety can be enhanced if their information and treatment procedures are available and provided in real time without delay and free of location constraints for both outpatients' and inpatients' healthcare.

With the elimination of over-medication, over-diagnosis, and over-treatment, other treatment options can be included in the process of medication.

The development and implementation of ICT and the application of digital transformation have also influenced the physician–patient relationship. Doctors and their patients can now engage in effective communication with each other and interact frequently with the help of digital applications. They can inform each other, data issues are dealt with due to the greater ease with which patient data can be generated, and analysis is becoming increasingly easy. As healthcare deals with gigantic volumes of data, the use of networks now facilitates very rapid sharing of data.

The WHO's definition of e-health is "the use of information and communication" for health. The tasks assigned to e-health are as follows: treating patients, conducting research, educating health professionals, tracking diseases, and monitoring public health (WHO, 2017). Though we have discussed so many advantages of e-health, it still cannot replace the traditional method of consulting with the physician in person and undergoing personal medical examinations by doctors. Personal physician–patient interaction cannot be compared with telemedicine and sophisticated statistical calculations with a very well-maintained dataset.

Nevertheless, e-health systems not only complement healthcare, but have become an increasing part of its substance. Although the personal physician–patient relationship cannot be replaced, it might no longer be offered or demanded, especially in rural areas where not all doctors can find successors to take over their practice. The introduction of digital ICT in the medical care routine will be the logical consequence in the coming years (Seufert, 2016).

With the discovery and implementation of digitalization, the relationships between physicians and patients have been redefined and redistributed based on their individual tasks and roles. Digital ICT has strengthened relationships between physicians and their patients.

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It is not good and inhume to be dependent on doctors all the time (Hoppe, 2009). Due to digitalization and technology a situation could occur where doctors are experts but may not act as partners of their patients. The other side of the story would be patients growing too smart and being able to obtain complete information about their diseases and their treatment from the internet, thereby making his/her position a bit stronger. Though digital ICT has the capability to focus on and obtain accurate data, health professionals can construct a digital network through which they can obtain information on their patients. Digital transformation offers both risks and opportunities, but healthcare professionals face difficulty in balancing their sympathy for a person needing help and support with dealing with scientific and economic bureaucratic tasks which is making it very difficult to handle digital ICT.

Digitizing the healthcare sector would not only influence the physicians and patients, but it can also influence the other participants who are somehow connected to medical field. This process starts from medication in telemedicine and then continuous till the cognitive computer systems which has the capability of the controlling the whole system and influence the treatment process. The current modern intelligent systems are loaded with more and more tasks to do it automatically, but this is not the case in medical field where most of the tasks are done manually in natural process. In healthcare the issue with technology is not normal. The digitization is not done only for recommendation purpose for doctors and decision of patients. But, these decision and recommendations are extracted from the technology, like: the treatment is based on app for chronic disease by utilizing Artificial Intelligence (AI) for the diagnosis and treatment of cancer.

Direct Involvement of technology for the detection and treatment of disease is very risky and the system cannot be reliable for this kind of work. The trust should be on the doctors for better relation between the doctor and the patient. The main issue is the trust. Who will take the responsibility and how the system can be considered as reliable is a challenging task. The following are the main issues which needs to be resolved, these issues would decide the responsible entity. 1) Technology which is developed for handling digital information. 2) the doctor or the patients who should use the system and is they don't understand the system fully. 3) The policy makers in healthcare who are not familiar with the system. 4) The engineers who are handling the data. 5)The person who has provided the training data. 6) The software developer who took the data from data experts to develop the system. So, how can one trust the above individuals, who are most trustworthy and on what bases is the critical issue which needs a proper solution.

In general, the digitalization of the health sector is seen in terms of the networking, evaluation, and use of vast amounts of health-related data (Big Data). Data protection and data autonomy are put into position to protect patients from abuse. Data protection serves the informational self-determination of the persons involved. It is the right of a person to determine the content of his/her communication.

Chances and Risks of the Digital Transformation for the Health Sector

Digital transformation in the recent times is considered as transforming the entire healthcare system. It is not about individual involvement like overview of electronic health systems or small treatments which are based on apps with the backend as AI for diagnosing. Also, it is not about transforming only the core area of healthcare but rather it influences the whole healthcare department, which consists of healthy nutrition, activities related to physical actions, and reduction of alcohol consumption. Digital transformation is the process of change in healthcare which is based on applying digital technology which help both the patients and medical professions. Therefore, the scientific literature does not shy away from comparing the digital transformation with electrification. Digitalization in medicine has the potential to improve prevention, diagnostics, and treatment, in addition to the overall healthcare system.

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However, along with the strengths and opportunities of digitalization, there are also serious shortcomings and risks, as illustrated by the following analysis by the Ethics Council.

DISCUSSION

In this work, we have comprehensively studied digital transformation in healthcare. We have taken Saudi Arabia as our case study and have been able to show the current and future aspects of digital transformation in healthcare. We have discussed datasets and their importance in implementing successful digital transformation. The major issue is the safely, security and confidentiality of patient datasets; if these concerns are not taken into consideration patient data could be used in a harmful manner, resulting in the failure of e-health and digitization. A few of the risk factors that could result in failure to implement e-health have also been discussed. Further to the successful implementation of digitization we have considered a serious issue that influences the digitization process: that issue is the physician–patient relationship. We have listed the major concerns that need to be addressed with respect to the physician–patient relationship. We have discussed all the necessary steps that would benefit patients through provision of better treatment. We have discussed the advantages and limitations of digitization in the context of the physician–patient relationship. Furthermore, we have discussed the importance of this relationship, what damages this relationship, and what steps can be taken to enhance this relationship for the successful implementation of e-health. Finally, we have concluded with a set of recommendations that any organization can take into consideration when implementing digitalization and digital transformation in healthcare.

CONCLUSION

Healthcare is very important in every country. Every government tries its best to provide its citizens with high-quality healthcare services. So also does Saudi Arabia, which is striving hard to deliver the best quality of healthcare services to its citizens, particularly under the Vision 2030. The Saudi Ministry of Health has proposed many initiatives to improve and enhance the quality of healthcare services; one of these is digital transformation in the healthcare sector. In this work, we have the current status of the KSA in the healthcare sector and the possible issues involved in implementing digitalization in healthcare. Many issues must be dealt with for successful implementation of digital health services. We have discussed a few of them, such as patient data confidentiality and the physician–patient relationship. The advantages of physicians and patients having a strong relationship include the ultimate goal of providing patients with better treatment and healthcare services. Finally, we have concluded with a few recommendations that should be taken into consideration for successful implementation of digital transformation in the healthcare sector.

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REFERENCES

Aldosari, B. (2014). “Rates, levels, and determinants of electronic health record system adoption: A study of hospitals in Riyadh, Saudi Arabia,” *Int. J. Med. Inform*.

Alharbi, F., Atkins, A., & Stanier, C. (2015). “*Strategic framework for cloud computing decision-making in healthcare sector in Saudi Arabia*,” Seventh Int. Conf. eHealth, Telemedicine, Soc. Med.

Alkraiji, A., Jackson, T., & Murray, I. (2013). “Barriers to the widespread adoption of health data standards: An exploratory qualitative study in tertiary healthcare organizations in Saudi Arabia,” *J. Med. Syst.*

Citation Information: Aldakheel, E.A., & Zakariah, M. (2021). Digital transformation challenges in healthcare and its effect on the patient–physician relationship. *Journal of Management Information and Decision Sciences, 24*(S6), 1-11.

Alsanea, N. (2012). "The future of health care delivery and the experience of a tertiary care center in Saudi Arabia," Ann. *Saudi Med*.

Altuwaijri, M.M. (2010). "Supporting the Saudi e-health initiative: The master of health informatics programme at KSAU-HS," East. *Mediterr. Heal. J*.

Bah, S., Alharthi, H., El Mahalli, A.A., Jabali, A., Al-Qahtani, M., & Al-kahtani, N. (2011). "Annual survey on the level and extent of usage of electronic health records in government-related hospitals in Eastern Province, Saudi Arabia.," Perspect. *Health Inf. Manag*.

Bass, B.M., & Avolio, B.J. (1994). "Transformational leadership, organizational culture," *Int. J. Public Adm*.

Deloitte, (2018). "2018 Global health care outlook: The evolution of smart health care," *Deloitte*.

Dieleman, J.L. (2017). "Future and potential spending on health 2015-40: Development assistance for health, and government, prepaid private, and out-of-pocket health spending in 184 countries," *Lancet*.

DiMasi, J.A., Grabowski, H.G., & Hansen, R.W. (2016). "Innovation in the pharmaceutical industry: New estimates of R&D costs," *J. Health Econ*.

Hartmann, M. (1994). The practice of trust.

Hoppe, J.D. (2009). "The Patient-Doctor Relationship in the 21st Century,"

https://vision2030.gov.sa/en/programs/NTP.

Jacobs, R., Mannion, R., Davies, H.T.O., Harrison, S., Konteh, F., & Walshe, K. (2013). "The relationship between organizational culture and performance in acute hospitals," *Soc. Sci. Med*.

Khalifa, M. (2013). "Barriers to health information systems and electronic medical records implementation a field study of Saudi Arabian hospitals," *in Procedia Computer Science*.

Roser, M., Ospina, E.O., & Ritchie, H. (2015). "Life expectancy — our world in data," Our World In Data Blog,.

Schütze, B., Hänold, S., & Forgó, N. (2018). "Big Data – Eine informationsrechtliche Annäherung,".

Seufert, S., & Meier, C. (2016). "Digital transformation: From blended learning to the digitized performance process "teaching and learning", *Digit. Media collaboration of the picture*.

Steinfath, H. (2016). "The Interplay of Autonomy and Trust - A Philosophical Introduction, "into Autonomy and Trust.

Stellungnahme, (2017). "Big data and health - data sovereignty as an informational freedom design, "Dtsch. Ethics Council.

WHO, "WHO | NCD mortality and morbidity," Who, 2018.

Wiesing, U. (2002). "Günther Pöltner (2002) Basic course in medical ethics, "Ethics of medicine.

Woopen, C. (2009). "The doctor as healer and manager - for the necessary integration of the."

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