

# Technological Innovation in Healthcare Industry: The Case of Etisalat Digital Smart Hospital platform

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**Abstract**— *Etisalat Digital is a newly developed department in Etisalat Group that aims at strategic innovation of technologies. Etisalat Digital has developed a health information exchange framework that has been adopted into the United Arab Emirates (UAE) healthcare system by many healthcare providers in UAE. The technology has been used to successfully improve several components of the healthcare process. The research below aimed to explore the benefits of the solutions provided by Etisalat Digital through its strategic innovation of technology. The qualitative study implemented using focus groups of 4 participants illustrated that the Etisalat Digital healthcare solutions positively impacted the healthcare system. The applications reduced the cost of operation and time spent in providing and receiving care and improved customer satisfaction and quality of care experienced. The efforts by Etisalat Digital were successful and will have a significant impact on the future of digital transformation in the UAE healthcare industry.*

**Index Terms**— *Technological innovation; Healthcare industry; Etisalat Digital.*

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## I. INTRODUCTION

The telecommunications sector in the United Arab Emirates (UAE) has undergone substantial technological development over the last four decades, from the launch of the first telephone call in the 1970s to the 5G network launch accomplished within the previous year. The telecommunications sector has become a primary tool for advancing the fourth industrial revolution and enabling limitless connectivity for the Internet of Things (IoT) devices (Etisalat, 2021). Etisalat is a regional telecommunication powerhouse in UAE that has shown commitment to technological innovation for decades as its strategical approach towards empowering communities and societies with digital technologies that are embedded and manifested across a number of business sectors. In 2021 Etisalat group have introduced Etisalat Digital, a business unit that enables companies and government to become smarter through innovative technologies (www.etisalatdigital.ae, n.d.).

## II. COMPANY INFORMATION

Etisalat was formed in 1976, where it began with the formation of the first national telecom providers in the UAE through the launch of the first mobile network. Throughout time, consumer needs and the evolution of technology have influenced substantial changes in the services and products offered by the organization (Etisalat, 2021). Etisalat group launched the first optic network in 1986, which set the pace for providing the next generation of services in the telecom industry. Within the same year, Etisalat University was launched, which is now known as Khalifa University. The launch of the institution of higher education was in line with the organization's strategy and vision that encouraged the adoption of futuristic technologies through strategic learning.

The organization continues to be a major player in the

global telecommunications industry, with operations across 16 countries in Africa, Asia, and the Middle East. It is currently the 18th largest operator of mobile networks globally and the sole mobile network provider in the UAE (Etisalat Corporation, 2021). The company recently launched a 5G network infrastructure that advanced the organization's digital innovation in many industries, including healthcare and the IoT (Etisalat, 2021). The company continues to be influenced by collaboration and positive organizational culture based on its core values. Etisalat Digital, a part of the Etisalat Group, has for long been pursuing innovative approaches to assist in building future technological capabilities. The organization continues to pursue a strategy focused on accelerating digital learning expertise and bridging the skills gap between current and future digital technological requirements.

## III. SERVICE INFORMATION (SMART HOSPITAL PLATFORM)

The telecommunication industry has overseen an important journey of digital transformation in the healthcare industry. A positive healthcare experience through the understanding of required health outcomes is crucial to healthcare innovation. Over the last two decades, the improvements in technologies and innovation have significantly facilitated the evolution of health care services. What might not all know is that Etisalat is a critical player in the Healthcare industry. Etisalat Digital plays a significant role by utilizing innovative strategic approaches to improve the patient experience throughout the entire healthcare journey (Etisalat, 2021). Its mission is to provide a new care delivery model by leveraging Etisalat's assets (big data, cloud security, and Artificial Intelligent) to improve patient experience (Omnia Heath, 2021). The organization also seeks to increase cost savings for the health care providers,

generate efficient operations, and create a unified patient experience. Etisalat Digital has achieved the positive transformation of the health care industry by providing top-notch solutions like Smart Room, Smart Parking, BMS, EMRs, and medical imaging that allows hospitals to document the patient's journey throughout the healthcare process to implement real-time and informed decision-making. Through innovative solutions, patients can enjoy saver services and help caregiver enhance their processes (Omnia Heath, 2021).

#### **IV. LITERATURE REVIEW**

Digital transformation and strategic innovation are the new norms in the business and academic environment. Multiple sectors of the global economy like business, manufacturing, and government have embraced digital transformation and strategic innovation (Malik et al., 2017, p. 1359). The elements of strategic innovation and digital transformation include drivers and barriers and the strategies and impact they have on any given industry. Increasing attention has been paid to digital transformation and strategic technological innovation as they continue to be the backbone of the fourth industrial revolution.

Academic and business experts note that efficient strategic technological innovation and digital transformation are achieved through increased support and suitable organizational environments to reinforce the required change initiatives. Literature on strategic technological change and digital transformation are adequate (Secundo et al., 2018, p. 149).

Following the recent global pandemic. We realized the importance of innovation and technology in overcoming the challenges in many sectors like healthcare and education. New innovative technology based healthcare system can considered beneficial and valuable for consumer and in the same time it plays a significant role in improving healthcare by providing a process based solution to day to day challenges (Akenroye, 2012). The implementation of technological system enables a great changes in the health care system and studied showed that Health care has been one of the slowest industries in adapting to information technology because of the complexity of healthcare organization and their fragmented internal structure (England et al., p. 176). Therefore, a significant research gap is noted with particular focus on the topic within the healthcare industry. There are limited research studies that focus on strategic technological innovation in UAE's healthcare industry. The current research aims to fill the identified research gap by providing credible and reliable findings.

#### **V. CONCEPTUAL FRAMEWORK AND RESEARCH QUESTIONS**

Digital transformation (DT) and related topics like barriers, drivers, strategies, and impact have increased focus in the last two decades due to the increasing dependence on technology.

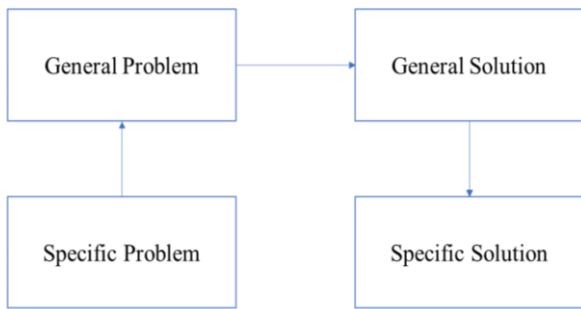
The literature illustrates that digital transformation affects intentional innovation in organizations across multiple economic sectors (Verina and Titko, 2019 p. 9). In UAE government there was a national urge for fast digital transformation for all private and public sectors (U.AE, 2021). The increased focus has funded the strategic digital innovation and the critical need for administrative change to be realized to accomplish the preferred vision and due to the pandemic this focus was accelerated dramatically. Digital transformation necessitates integrating a digital culture supported and initiated by executives within the country. The success of digital transformation within organizations is achieved through instilling an organizational culture that enables companies to achieve their overarching strategy while supporting significant changes therein (Coccia, 2018, p. 31). Two crucial elements, the human and technological elements, are instrumental in achieving strategic digital transformation and innovation experiences. A people-driven approach is preferred in enabling strategic digital innovation and transformation.

The current research is committed to investigating a particular piece of technological innovation that Etisalat Digital in the healthcare sector has successfully implemented. Etisalat Digital has carried out numerous technological innovations that have been strategic in the success of companies across multiple industries worldwide. Placing the focus of the current research in healthcare allows the researcher to understand the strategic innovation of a service or product that has been implemented in the healthcare sector to identify fundamental factors and core elements of the technological innovation that was achieved. The research question will examine the technological innovation in the UAE healthcare sector by introducing Etisalat Digital's Smart Hospital. The research question is:

- 1) What are the core benefits of technological innovation achieved by Etisalat's Digital strategic innovation efforts in the UAE healthcare industry?

#### **VI. RESEARCH METHODOLOGY**

A qualitative research methodology was used as it was suitable for answering the research questions. The research design involved using a focus group to collect data from willing participants. The focus group involved four people directly involved with innovation efforts at Etisalat Group. The focus group members were Etisalat Digital Head of Digital Healthcare Solutions, Etisalat engineer, a staff from a partner Hospital, a Smart Hospital User. As a result, available and willing participants were interviewed. An open interview was conducted using face-to-face and online interviews to collect the research answers. Technology innovation literature and the TRIZ method of problem-solving were used to develop questions that would be asked to the participants in the focus group. The questions focused on how Etisalat Digital used technology innovation to solve the UAE healthcare industry problems.



**Figure 1:** The TRIZ Problem Solving Method

**VII. DISCUSSION**

With the involvement of Etisalat Digital in the healthcare system, the services delivered have improved tremendously, which has been facilitated by outstanding services and digital platforms. Noticeably, digitization in the healthcare system was facilitated by the onset of COVID-19, which demanded the system implement remote treatment and ensure that patients could access medical services even from the comfort of their homes. Therefore, Etisalat expanded its operations to the healthcare system and other industries, an motivation that has facilitated quality services, reduced costs, eased accessibility to the required treatment, and significantly reduced the mortality rate in the UAE and internationally. Additionally, with the introduction of the 5G network, its implementation into the healthcare ambulances services has enabled effective pre-hospital care to patients during the Golden hour. Therefore, the integration of Etisalat Digital into healthcare has facilitated innumerable growth within the system.

Etisalat Digital has facilitated over 70% improvement in healthcare by providing smart solutions, including smart rooms, smart parking, medical imaging, BMS, and Electronic Medical records (EMRs). According to its Director, Khalid Adine, Etisalat has helped create smart hospitals through its solutions and offered smart assistance to healthcare providers in delivering their services in commendable ways (Brady, 2020). The introduction of the Smart Hospital platform keeps patients updated about their medical appointments and prescriptions and even provides directional maps to facilitate timely appointments in the hospital. The Smart Hospital have been integrated into various telehealth systems in hospitals, and thus the Digital market collaborates closely with the patients, utilizing their personal cloud information to help them access faster, reliable treatment (Sardana, 2021). Additionally, the smart solutions have improved healthcare tremendously by ensuring that patients receive unmatched assistance in efficient parking, directions to the hospital, and indoor navigations within the hospital to provide fast service access.

Secondly, through its cloud, Etisalat Digital has facilitated the use of EMRs, which are essential for healthcare providers. This powerful, cloud-based software solution has immensely

advanced the capability of healthcare facilities in the UAE and cities such as Abu Dhabi, Dubai, and the Northern Emirates (Etisalat, 2021). With EMRs, healthcare providers can access real-time patient information and records, have live video/audio consultations with patients, send prescriptions directly to pharmacies, and schedule check-in appointments. Thus, with smart solutions, Etisalat Digital has facilitated quality improvement for patients and hastened the healthcare providers’ services.

Etisalat Digital has also facilitated population health management both in the UAE and internationally. Mayo Clinic, which utilizes Etisalat Digital’s Smart Hospital platform, serves more than two hundred million patients annually across the globe through smartphone technology, internet communication, and telemedicine (Etisalat, 2021). Etisalat works with various healthcare institutions and utilizes digital innovations to provide telehealth. Primarily, its integration into the Smart Hospital systems has facilitated the provision of round-the-clock monitoring of the patient’s data, including blood pressure, oxygen saturation, body temperature, and drug intake (Samena, 2021). Substantially, technology has provided wearable medical equipment, such as heart rate sensors; exercise trackers, sweat meters to monitor blood sugar levels of people with diabetes; and oximeters, which check oxygen carried in the blood (Etisalat, 2021). Thus, Etisalat utilizes these innovations to help healthcare providers with their remote treatment. Through Smart Hospital, patients can seek medical consultations in real-time through gadgets such as smartphones, tablets, and computers. With online consultations and drug prescriptions, doctors have reached as many people as possible, leading to a healthy population (Etisalat, 2021b). Additionally, digitization has facilitated aging in place as most people can seek help from the comfort of their homes and have medicine prescriptions delivered digitally through tele-Pharmacy. Remote treatment has also enabled caregivers to monitor and control patients’ conditions from the house and assisted them to transmit data to the healthcare providers digitally. Thus, these telehealth solutions have reduced unnecessary patient admissions and increased transparency and convenience within the healthcare system.

Etisalat Digital also utilizes advanced digital platforms, including Artificial Intelligence industry solutions, Cloud, Internet of Things (IoT), Cybersecurity, Big Data, and Analytics network. These advanced digital platforms have facilitated technological shifts in the healthcare system and improved its operations. First, with the use of AI-enabled medical devices and blockchain electronic records, patient-medical professionals’ relations have improved (Etisalat, 2021). These platforms provide data sharing among healthcare providers. The platforms assist the providers with reliable data on the patients’ health records, enabling them to make unified decisions based on their treatment schedules (Etisalat, 2021). The use of these platforms reduces human error, streamlines physicians’ work, and improves the

patients' conditions due to quality treatment. The improved services have facilitated better relations between the providers and the patients due to the patient's experiencing satisfaction from their providers (AlAli, 2021). Second, the use of big data platforms has exacerbated healthcare services as it helps identify errors in treatment, enabling quality services. Particularly, big data is software that can 'red flag' irregularities that may lead to a potential risk of error and provide a more sophisticated preventive incentive (Etisalat, 2021). Additionally, big data has aided the healthcare system in achieving more accurate hospital staffing by developing a predictive analysis essential in estimating admission rates that can reduce ER waiting time (Etisalat, 2021). Therefore, the Etisalat Digital Platforms have improved healthcare services by reducing error-free treatments and enhancing patient-doctor treatment.

Various surveys on the significance of Etisalat Digital in the healthcare system have provided significant numerical data on its impacts on healthcare institutions' performance. Primarily, the survey done by the Omnia hospital proves that the introduction of digital platforms in healthcare has contributed to a 15% increase in the comprehension of the importance of patient satisfaction among providers (Samena, 2021). Additionally, with the improved Etisalat Digital, Omnia observed a 13% increase in the technological application within the hospital. Therefore, with Etisalat, there has been a surge in transparency, convenience, wait time, and better clinical atmospheres (Brady, 2021). Secondly, Etisalat Digital has improved patient satisfaction within healthcare institutions by ensuring timely appointments, easy access to information for both patients and providers, and effective communication between the two parties (Brady, 2021). Patient satisfaction has increased by 14.29%, and Omnia data is currently at 80.35%. The total care load has also increased to 81% for the patients, scheduled and timely check-ins have surged due to digital reminders, and there has been an increase in online scheduled appointments and a tremendous reduction in "no-show" data by 20% within the hospital (Brady, 2021). Lastly, the waiting time has been reduced to an average of 30 minutes and care time increased to 40 minutes, thus improving the quality of care that the patients receive within the Omnia Hospital (Brady, 2021). Such data illustrates real-time numerical changes that have been achieved through the implementation of Etisalat Digital in healthcare.

The introduction of the 5G network in ambulance facilities has also improved healthcare tremendously. Markedly, compared to the previous records, the 5G has been reported to be three hundred times faster (Steers, 2022). In healthcare, the 5G has improved the quality of care by supporting telemedicine, online consultations, continuous health monitoring, and remote surgeries (Steers, 2022). Additionally, Etisalat's 5G network has been integrated into ambulance facilities to enable efficient pre-hospital care for the patients in the Golden hour (Steers, 2022). Prior to the

involvement of the 5G network in healthcare, there was a surge of patient mortality death en-route, the paramedics did not have reliable assistance to ensure patient survival, and the kind of gadgets used in the ambulances were not standard. However, after the integration of the 5G network, the ambulances are always connected to the hospital. Primarily, with 5G, most ambulances now have high-resolution onboard cameras, advanced monitoring, and diagnostic and life support equipment, all of which are connected to hospitals at super speed (Steers, 2022). Thus, doctors can see what is going on within the ambulance and offer reliable assistance to the paramedics.

Additionally, the 5G network transmits information at an exceedingly high speed, providing real-time information on the patient's vitals. This real-time data is essential as it facilitates a virtual reality for the practitioners, helping them to prepare for the incoming patient (Kaundal & Gupta, n.d.). Secondly, the use of 5G speed virtually brings patients into the emergency room, thus offering them real-time critical support and treatment en-transient and providing state-of-the-art care that guarantees patient survival.

## VIII. CONCLUSION

The study's findings illustrated the importance of technological innovation conducted by Etisalat Digital to improve the overall patient experience in healthcare facilities and hospitals across the UAE. The respondents noted that one of the effective and strategic technological innovations was the development of a mobile healthcare application. The application collected and communicated data across multiple care departments to enable the patient to have a simple transition throughout the care process. The Smart Hospital platform enabled the digitization of the healthcare process.

The Smart Hospital reduces the time used in providing or receiving healthcare services, facilitates the cost of operation for the hospitals, and improves the quality of care for the patient. However, there is still more that Etisalat needs to do to efficiently solve problems within the healthcare industry through strategic innovation of technology. And more international cooperation will benefit the joining effort between Etisalat Digital and the Healthcare industry locally and globally. "The strategic innovation by Etisalat Digital in the healthcare industry paid attention to the important role technology plays in the digital transformation of industries," said Dr Prateek Sardana, Head of Digital Healthcare Solutions in Etisalat Digital (Sardana, 2021). Etisalat sought to create value in both the private and public sectors. The increasing need for digital transformation did not overcome the need for patient safety and central components of quality care. After the first successful year, many international organizations have contacted Etisalat Digital for further collaboration in healthcare solutions. Management in Etisalat Group has sought the new unit success an opportunity for Etisalat to expand their operation to new industries.

### IX. MANAGERIAL IMPLICATIONS AND LIMITATIONS

Etisalat Digital's work in the healthcare industry positively impacts the management of healthcare services. One of the critical components of modern healthcare systems is the security of the patient data, which Etisalat Digital assures due to the encryption of the data while in transit and while in use (Venkatesh et al., 2019, p. 58). The mobile healthcare application allows hospitals to ensure the patient experiences efficient services delivery and quality healthcare services by reducing the challenges witnessed in providing care through traditional and non-digital methods. The application will significantly influence the improvement of the healthcare industry as the costs of operations, increased time efficiency, and higher capability of realizing desired health outcomes.

The study's primary limitation was utilizing a convenience sample and a small sample population, which limited the diversity of participants and the richness of the collected data. As a result of the limited sample, it would be impossible for the findings to be generalized to the entire population in the UAE as the sample was not representative enough of the population. Future research conducted with a similar aim or focus should ensure that a larger and more representative sample than the one used is utilized to increase the generalizability and external validity of the study.

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