Ministry of Foreign Affairs

eHealth in the Gulf region, phase 2

Mapping identified eHealth opportunities

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Market Study

Amsterdam, February 1, 2021

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1. Introduction

As digitalization is becoming more important, information and communications technology (ICT) will play a key role in healthcare in the future. Most Gulf countries have already embarked on a promising eHealth journey that will revolutionize the way healthcare is delivered. However, the speed at which they are implementing the various eHealth strategies and the amount of public information about upcoming projects differ between the Gulf countries. COVID has expedited the development and acceptance of eHealth initiatives in Gulf countries, such as booking online appointments, telehealth, and other solutions needed to cope with the pandemic.

The advanced Dutch knowledge economy and the top-level science allowed the Dutch to be the international front-runners in eHealth, by boosting the highest ICT penetration in hospitals and clinics. The Netherlands ranks in the top ten of patent applications, ranks high on the Global Innovation Index, and is one of the top 5 countries offering the best market conditions for mobile health app companies in Europe. The technology, market focus and flexibility of Dutch companies can play a driving role in supporting the eHealth ambition and goals in Gulf countries.

Previously, the Dutch embassies of Qatar, Kuwait, UAE and KSA performed a sector study covering eHealth in the respective countries. These studies conducted during 2020 provided an overview of existing government policies, strategies and initiatives pertaining to eHealth. They also identified future projects and market opportunities. The studies for Kuwait and Qatar were conducted by GS Health. The studies for KSA and UAE were conducted by Sesam Connect. This report is a follow up on the respective sector studies and summarizes the previous 4 studies. This report consists of an overview of eHealth opportunities in the specified Gulf countries and some elaboration on competitors and challenges, meant for Dutch eHealth companies interested in doing business in the region.

Please note that GS Health did not conduct any local research in KSA and the UAE but only summarized the report developed by Sesam Connect. Therefore, Sesam Connect is responsible for the content of this report for the forementioned countries.

Introduction to the Dutch eHealth market

The Netherlands is a front-runner in eHealth solutions and has the highest ICT penetration in hospitals and clinics.[1] Every hospital in the Netherlands keeps electronic medical records, and a considerable number of hospitals are on their way to becoming completely paperless.[2] There is also a focus on electronic data exchange between healthcare providers (e.g. around medication usage between primary and secondary care providers) but this is still limited (e.g. there is no national EHR). Furthermore, patients in the Netherlands can choose from several options to monitor their own health, both online and through apps. Devices or mobile apps that keep track of physical activity, like step counters, are most commonly used.[3] In the past 5 years, many digital decision aids have been developed to assist in decision making between treatments.[4] A lot of practical matters can also easily be arranged online or through apps. Examples are setting up a doctor's appointment, going through one's personal medical file (although <10% of primary care practices offered this in 2019[5]) or getting a prescription renewed. The availability of consultations via app or email is on the rise as well.

[1] eHealth - Factsheet, Health-Holland
[2] eHealth - Contentsheet, Health-Holland
[3] eHealth-monitor 2019, Nictiz and Nivel
[4] Springvloet L, Bos N, De Jong J, Friele R, De Boer D. De Transparantiemonitor 2019/2020: Keuzehulpen. Hoe dragen keuzehulpen bij aan transparantie en de best passende zorg? Utrecht: Nivel, 2020.
[5] 2019 Commonwealth Fund International Health Policy Survey of Primary Care Physicians

Government policies and strategies

Digitalization of the healthcare system has long been a priority of the Dutch Ministry of Health, Welfare and Sport (VWS). The central mission for the societal theme 'Health and Care' developed by the Ministry of VWS is that by 2040, all Dutch citizens will live at least five years longer in good health.[6] This mission is to be realized by achieving underlying missions such as decreasing the burden of disease from an unhealthy lifestyle and living environment (prevention) and organizing care more (often) in one's own living environment instead of in healthcare institutions. These developments require (low-tech, high-impact) technology.

The government supports knowledge sharing and close cooperation and collaboration between companies and research institutions, private and public organizations. In general, there is a focus on prevention.

The Ministry of VWS formulated three objectives for eHealth in 2014.[3]

- The first objective concerns the digital release of medical data to the patient: '**online access'**. This includes access to, e.g., medication information, vital functions, and test results. Due in part to various incentive programs, such as VIPP and MedMij, there has been an increase in the amount of healthcare providers that offer online access through patient portals and/or personal health environments (PHEs) over the course of the years. Effective 1 July 2020, every Dutch citizen has the right to access their medical data electronically or to be provided with an electronic copy.
- The second objective concerns **'self-monitoring and telemonitoring'**. In 2019, four out of ten patients with a chronic condition were self-monitoring health values. Medical specialists also say that the use of telemonitoring is on the rise, and general practitioners in the Netherlands used telemonitoring more often than in other countries in 2019.[5] Self-monitoring, telemonitoring as well as apps and websites enable patients to be more self-sufficient, they are convenient and they improve the quality of patient care.
- The third objective concerns **'telemedicine and home automation'**. The purpose of these is to enable people to live independently and safely and stay in their own homes longer. This includes video communication with a healthcare professional as well as monitoring technology and robotics. There has been an increase in the use of monitoring technologies (such as motion sensors and personal alarms), medicine dispensers, digital medication double-checks, and care robots.

To achieve these objectives, the government has set up the initiative 'Zorg van Nu' to highlight eHealth possibilities and providers, which includes a website (zorgvannu.nl) and an information team that visits healthcare providers. Furthermore, the Ministry promotes eHealth during the annual national eHealth week, which has this year been transformed to the 4-week long 'Slimme Zorg Estafette' and will be held in February 2021. Financially, the Ministry of VWS encourages eHealth initiatives by investing in SME entrepreneurs with impactful eHealth applications. Furthermore, the Ministry provides health innovators that want to create a new digital application with advice and information on options for financial support at zorgvoorinnoveren.nl.

In 2014, the Minister of VWS set up the Citrine Fund to help university medical centers (UMCs) develop sustainable and widely applicable improvements in healthcare. The theme eHealth is one of the themes chosen by VWS and the UMCs to improve health care.

[6] Flyer Gezondheid & Zorg, Health-Holland

Ecosystem players

Besides eHealth companies, there are several organizations and initiatives that are important players in the Dutch eHealth sector.

- Top Sector organization **Health-Holland** initiates and stimulates public-private partnerships and facilitates funding, networking, and business support. They maintain a database of health innovations: www.zorginnovatie.nl
- **Nictiz**, the independent national competence center for the electronic exchange of health and care information, published a national eHealth monitor from 2013 to 2019
- The **National eHealth Living Lab** (NeLL) is an open platform focused on new eHealth tools where healthcare providers, companies and patients can make contact to share knowledge, information, and experience.
- Within the **Citrine eHealth** program, UMCs (under direction of the Dutch Federation of UMCs, NFU) work together with many other parties to improve the coherence and scientific substantiation of the use of eHealth. Other hospital collaborations, such as Mprove and Santeon, also prioritize eHealth as a theme to improve healthcare.
- The **Vereniging van Zorgaanbieders voor Zorgcommunicatie** (VZVZ, Association of Healthcare Providers for Healthcare Communication) is responsible for i.a. the management of the Landelijk Schakelpunt (LSP, National Switchboard), a central infrastructure for exchange of data between healthcare providers, and the execution of the program Twiin, which strives for safe exchange of medical data between different healthcare providers and between healthcare providers and patients.
- **Health-RI** is a non-profit foundation with the mission to build an integrated health data research infrastructure.
- The working group healthcare of the **NL AI Coalition**, a public-private partnership, aims to identify the most significant opportunities for artificial intelligence (AI) in the field of healthcare.
- **Digital Health Partners**, a joined force of (inter)national medical companies, (academic) medical centers, service providers, knowledge institutes and investors. The partners operate in various fields of the digital health sector and help and support digital health entrepreneurs with their expert knowledge, services and network focused on digital solutions.
- There are various **regional initiatives**, i.e. Brainport in Eindhoven and other initiatives in for example Twente and Utrecht.
- Almost all general practitioners in the Netherlands recommend **websites with health information** such as Thuisarts.nl to patients. The visitor count for Thuisarts.nl is over 100,000 a day. Research has shown that the use of Thuisarts.nl leads to a reduction in healthcare use.[7]

In terms of corporate social responsibility (CSR) initiatives, Health Impact Bonds are deployed as a new financing instrument. A Health Impact Bond is a partnership where socially responsible private investors provide for an advance to accomplish an innovative health goal.

Impact of COVID

COVID has caused an increased effort in the field of eHealth and more general practitioners started using video communication.[8] In March 2020, a corona check app was developed by a hospital (OLVG, Amsterdam) and the company Luscii. The CoronaMelder app, developed under supervision of the Ministry of VWS, sends people who use it a notification if they have been close to someone infected with COVID. Use of the CoronaMelder app is not mandatory and penetration is ~25%.

[7] Spoelman WA, Bonten TN, de Waal MWM, *et al.* Effect of an evidence-based website on healthcare usage: an interrupted time-series study. BMJ Open 2016;6:e013166. doi: 10.1136/bmjopen-2016-013166
[8] Stand van zaken e-health in 2020, RIVM

2. The structure used to map opportunities and companies

The eHealth related opportunities in the GCC as well as the Dutch companies have been categorized, where possible alongside three dimensions, as also described in the whitepaper of Nictiz[9] and illustrated in the below figure 1, and otherwise alongside the first two dimensions.

1. The place in the care process
    a. The primary care process, which contains diagnosis, therapy/treatment, and care
    b. Applications that support public health, which contains prevention and public information provision
    c. Processes that support the primary care process, i.e. administration, management, quality, patient / family / staff education, decision making, policy, etc.
2. The users
    a. Provider, provider – provider, provider – others
    b. Provider – patient
    c. Patient, patient – patient, patient – others
    d. Other (government, employers, public)
3. The technology
    a. Web applications and web portals
    b. Video communications
    c. EHR (electronic health record) or PHR (personal health record)
    d. Health sensors, gateways and wearable devices
    e. Robotics
    f. HIE (health information exchange)
    g. General data portals
    h. Business intelligence and big data solutions (incl. artificial intelligence)

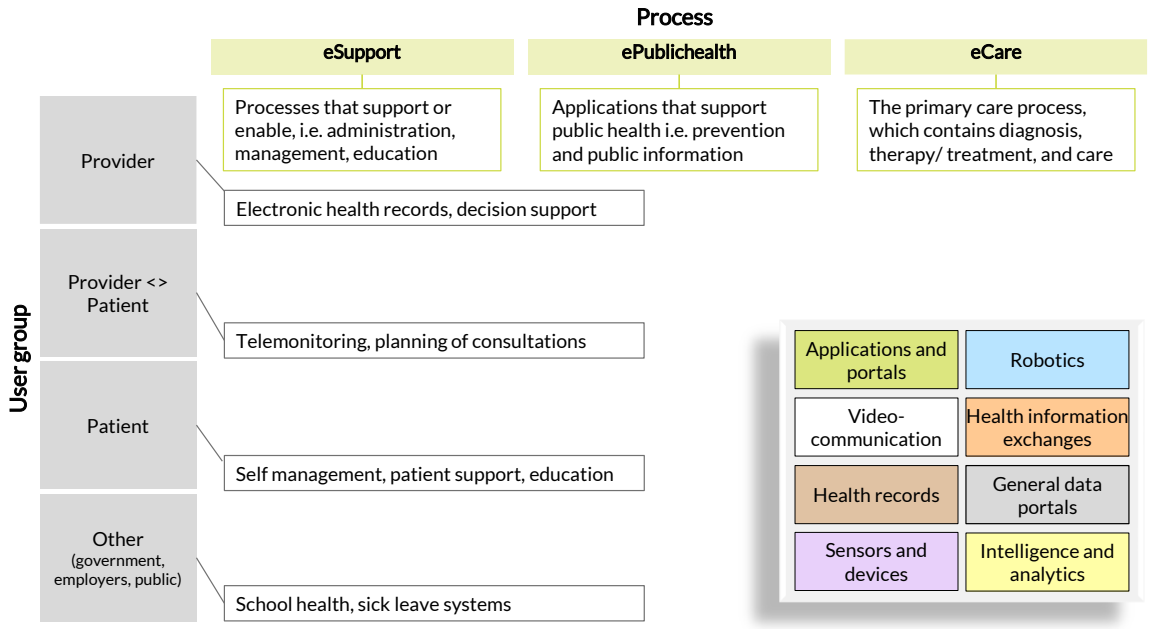

Figure 1: the three dimensions along which eHealth opportunities and companies are categorized.

[9] Ordening in de wereld van eHealth, Nictiz, ID Nummer: 12013

3. eHealth opportunities and challenges in the respective GCC countries

This chapter summarizes existing government policies, strategies and initiatives concerning eHealth and future projects and market opportunities in KSA, Kuwait, Qatar and the UAE. Opportunities and ongoing initiatives are classified along all three dimensions as explained in Chapter 2. For more detailed information on the mapped eHealth ongoing initiatives, opportunities and the described challenges, Dutch companies can approach the Embassy of the Kingdom of the Netherlands in the respective gulf countries.

a. The Kingdom of Saudi Arabia (KSA)

Ongoing local initiatives

KSA is spending a large amount on health services to provide better services to its citizens. The central health program in the Saudi Vision 2030 project is the eHealth system. At present, healthcare providers are adopting eHealth services and technologies, including electronic medical coverage (EMC), electronic medical records (EMRs), electronic health records (EHRs), picture archiving and communication systems (PACSs) and telemedicine.

The COVID-19 pandemic has exposed weaknesses in health and care systems and global public health responses, some of which can be addressed through data and digital science. The Riyadh Declaration on Digital Health was formulated during the Riyadh Global Digital Health Summit in Aug 11–12, 2020, a landmark forum that highlighted the importance of digital technology, data, and innovation for resilient global health and care systems. The declaration articulates 7 key priorities and 9 recommendations for data and digital health that need to be adopted by the global health community.

In figure 2, the most relevant identified ongoing eHealth initiatives in KSA are presented.

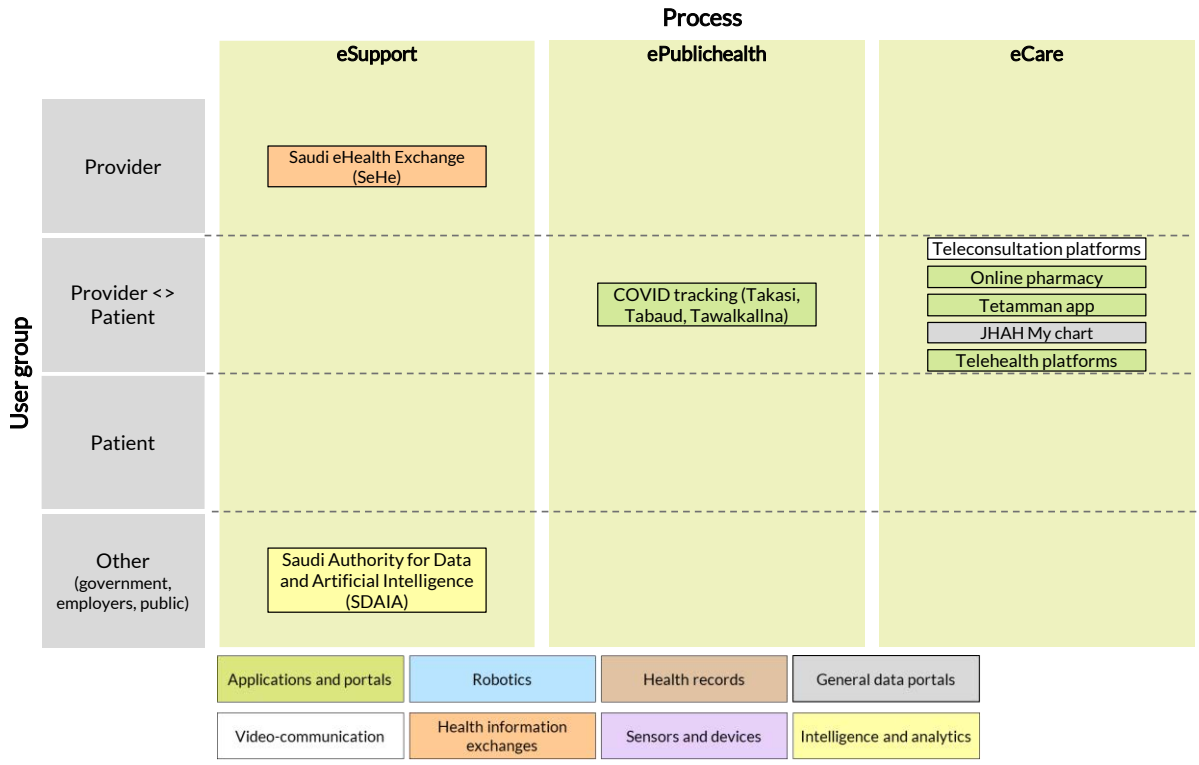

Figure 2 Overview of ongoing eHealth initiatives in KSA.

Especially during the pandemic, the MOH made big efforts to gather and store clinical data from patients and ensure all new medical records are digitally stored. The public sphere of EHR is under the banner of:

- Takasi Platform: An online platform allowing healthcare workers to enter patient data and organize mass testing, active target surveillance and contact tracing for COVID-19.
- Automated Laboratory Medicine Workplace: All Laboratory Medicine services within the Ministry of National Guard Health Affairs (MNGHA) hospitals are automated through a centralized Laboratory Info System (LIS).
- Filmless Radiology Department: A fully integrated picture archiving and communication system (PACS) allowing the information to be shared between MNGHA facilities.

Moreover, various Health Information Exchange (SHIE) projects are underway.

- Etada Enquiry Service: an online portal for e-verification of the delivery of expats' screening results to the Passports Authority.
- Treatment Orders Enquiries Service: an online portal to inquire about the status of his/her transaction submitted to the Medical Commission and Health Attaché General Department.
- Taji Project: a cardiovascular information system (CVIS) across the Kingdom.

Besides, various teleconsultation platforms are being developed:

- E-prescription services: an online portal that allows users to dispense medication from commercial pharmacies through consulting MOH's remote channels.
- Seha for doctors app: a smart Phone App designed to provide online medical consultation services through MOH's accredited doctors.
- Okadoc: an instant doctor appointment booking platform.
- Philips & Saudi Telecom Company (STC): TeleHealth solutions powered by Artificial Intelligence that allows hospitals and clinics anywhere in Saudi Arabia to be connected to command centers, through which doctors in other locations can treat patients remotely.
- STC, Dictum, DAL Digital Information Technology & MOH: The focus of this partnership will be to deliver specialty medical consultations from expert physicians at major hospitals to remote primary healthcare clinics throughout Saudi Arabia.

Also, healthcare platforms are being developed in KSA, most under the banner of:

- Interactive Maps: an online portal using geographical coordinates to search for healthcare facilities by name or distance.
- Vaccinations Reminder Service: an online portal to remind parents of the deadlines of the basic vaccinations against diseases targeted by immunization according to the MOH new vaccinations schedule.
- Visitor Service: an online portal that enables health practitioners to join the (Visitors) Program to temporarily provide their medical services across regions and governorates. This will be according to the need for such health practitioners with scientific and practical skills to work at MOH's hospitals.
- TeleHealth Portable Clinic & TeleHealth Virtual Clinic: an online platform focused on offering advanced virtual healthcare services using standard technology like WebRTC.

Finally, various mobile applications have recently been by different Saudi Arabia Government players, e.g. Tabaud, Tawakkalna, Tetamman Rest Assured, Mawid, Best Care and the Heart Safe City Project. Besides various manpower management and licensing platforms are being developed.

Opportunities

In KSA, the Saudi Data & AI Authority (SDAIA) has been established to drive the national agenda for Data & AI. To capitalize on Data & AI for the Kingdom economically and socially through national combined efforts by all stakeholders, SDAIA has developed the National Strategy for Data & AI. Many opportunities tie into this strategy.

In figure 3, the most relevant identified eHealth opportunities in KSA are presented.

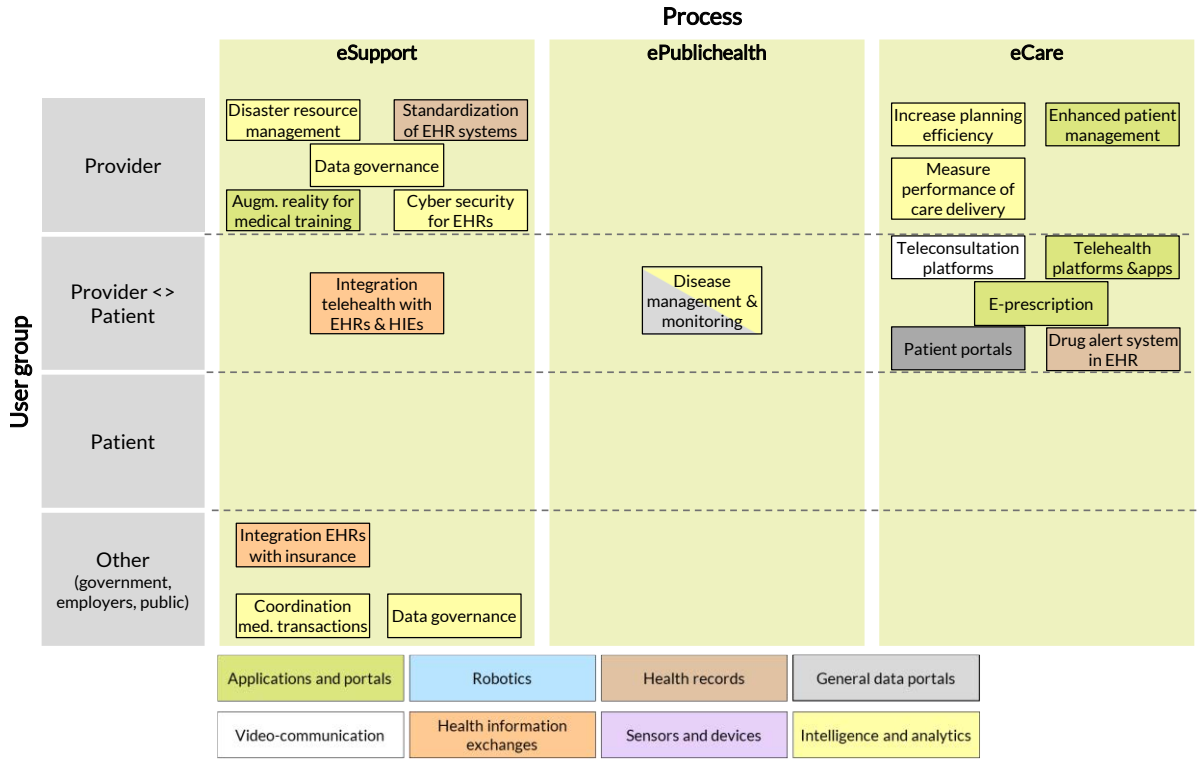

Figure 3 Overview of eHealth opportunities in KSA.

Roughly, there are 7 major eHealth opportunities identified that Dutch eHealth SME's can engage with as their entry points into the KSA eHealth sector:

1. **Electronic Health Records (EHR)**
   This is supposed to be the bedrock of all the federal and emirate level entities. There is one initiative: "Takasi" Platform. The opportunity here is to provide EHR solutions that will speed up the process of compiling the EHR of every citizen and resident in Saudi Arabia but will also integrate seamlessly with the current EHR system and cross talk the HIE with all entities. In the process the EHR solution need to successfully address data protection and governance and their various offshoots. There is also a shortage of local skilled workforce who can manage this transformation; this opens up an additional opportunity for SME's with eHealth EHR staff training solutions.
2. **Health Information Exchange (HIE)**
   As the HIE is compiled and uploaded they need to be integrated with both private and public healthcare providers. These initiatives are "Etada Inquiry Service, Taji Project (between Philips & MOH). By successfully integrating the HIE, the aim is to reduce re- admission, medical errors, duplicate testing and improve diagnosis. Once again, the opportunities lie in system integration, with platforms that are linked with each other in public and private healthcare providers including the all-important health insurance providers and brokers.

3. **Teleconsultation Platforms (TP)**
   The recent countrywide lockdown due to the COVID-19 pandemic has highlighted the need and increased the demand for teleconsultation platforms incorporating video conferencing between physicians and patients and also physicians with physicians. Again, the common opportunity is data protection, integration, governance and a lack of trained skilled workforce.
4. **HealthCare Platforms (HP)**
   The main difference between a Healthcare Platform and Teleconsultation platform is essentially that healthcare platforms provide more features and options and just not a teleconsultation service. There are currently a wide range of HP's being used by different healthcare providers with various degrees of penetration. None have emerged a clear winner. The opportunity lies with providing a platform that will integrate with HIE, EHR and TP platforms that are currently being used in healthcare facilities across the country. Or technology that helps integrate the platforms with each other. Once again, the opportunity is to provide solutions for data protection, integration, governance and up skilling the local workforce.
5. **Manpower Management Platform (MMP)**
   As the technological world advances, we have more tools available which can present efficiency in our daily lives. That is why, several Government bodies in KSA have preferred to channel employee queries, questions and HR or admin related activities through an online platform. The pioneers in implementing MMPS: have MOH, SCHS and MOI and the aspect which they all have in common is their role and positive impact in Saudi Arabia's healthcare ecosystem in some way or the other.
   The opportunities lie in:
   - Smoother upload of HR related documents. Existence of a unified portal in which all issues and topics related to a Government employee are stored in the same platform which an employee can easily access from any device.
   - Need for specific regulations pertaining to health data and data governance in general, policies and clear transparency on the use of such employee data regardless of the type of data, it must be regulated.
   - Once regulation and policies are implemented, any tech-software or solution must comply with the local regulations. That is ethics and privacy are essential and must be adhered to when using these ubiquitous data.
   - E-training solutions to ensure skilled workforce and the seamless use of such MMP platforms by Government employees.
   - Maintain and continue to implement and innovate surveillance and security systems as a core component of the connected global health system and to ensure the data is stored securely.
6. **Mobile Applications (MA)**
   Tremendous digital health acceleration in Saudi Arabia's healthcare system due to the positive acceptance of mobile apps & wearables to obtaining transparency and accessibility to any sort of data, not strictly medical data. Dutch SMEs could help enhance the medical services offered by creating a medical solution with an embedded technological aspect.
7. **Health Licensing Platform (HLP)**
   HLP are a very efficient way for the Government to carry out the necessary due diligence of the different health providers and medical professionals, ensure they all have a valid practicing license and check whether all stakeholders comply with the local rules aimed towards a value based and excellent quality healthcare system.
   The opportunities lie in:
   - Blockchain to connect all the licensing data and documents of the same medical group, should the entity.

- have a great deal of medical facilities.
- Lack of data governance & storage regulations.
- E-training solutions to ensure skilled workforce and the use of such platforms.
- Enhancing the HLP e-portal experience between medical investors & Government.
- Existence of the Healthcare Investor Licensing available in different languages to increase FDI (Its only available in Arabic).
- Security and document detection systems to ensure compliance with medical standards and rules and avoid unlawful licensing documents using AI to verify the individual submitting the documents.

Challenges

Summarized, challenges of doing business in the eHealth sector in KSA are the following:

- There is a lack of technical expertise in workforce and not enough eHealth technology trainers/support.
- There is a hesitance to change and to adopt new technologies as the additional time required for data entry and complexity of technology could negatively affects the utilization of eHealth systems.
- Patient consent is challenging in KSA: authorization by the patient is one of the biggest challenges in health information exchange.
- There are several autonomous government bodies with their own separate healthcare system, facilities, policies and practices and they are very protective of their own territory (e.g. Ministry of Defense and Aviation, Ministry of National Guard Health Affairs).
- There is currently no federal data protection legislation in place in Saudi Arabia. Personal data and privacy are somewhat protected in other sectorial laws (i.e. in the medical field the Law of Practicing Healthcare Professions of 2005) but these are not very specific.
- The market is very price-driven, and technology investments must pay off over the short to maximum medium term. Therefore, even solutions with considerable savings potential during operation should not create extraordinarily high initial investments and must be carefully calculated.

b. Kuwait

Ongoing local initiatives

To better manage health information, Kuwait has made significant investments in the eHealth infrastructure since 2000. A variety of health IT solutions have been implemented at MOH facilities, including Electronic Health Records (EHRs) at primary healthcare centers and hospitals, as well as Picture Archiving and Communication Systems. However, the maturity and adoption levels of digital solutions is limited and varies greatly among healthcare facilities. Since the market is fragmented these initiatives are usually uncoordinated and most initiatives take a siloed approach.[10]

In general, communication between primary and secondary care and between hospitals is not in place. Moreover, communication between providers and laboratory or pharmacies happens trough fragmented systems. Examples of systems that have been implemented so far:

[10] https://blogs.lse.ac.uk/mec/2018/09/21/diagnosing-kuwaits-digital-health-maturity-implications-for-policy/

System wide initiatives

- There is one unified system connecting the ~120 MOH polyclinics in different districts. This system is very basic, only contains names and Civil ID and details on the visit. It is not a medical record
- Through Ministry of Education (MOE) and MOH a School Health Information System was developed by the MOH and implemented across schools
- The sick leave process has recently been digitized
- There is a national electronic database for bariatric surgery
- There is an ePathology solution currently used across the MOH hospitals
- COVID testing and monitoring is done electronically

Hospital based initiatives

- Public sector:
    - Amiri Hospital is digitizing health records including the ordering process. Moreover, they are engaging in a tele health platform that interfaces with patients. They are not connected to other MOH facilities.
    - Farwaniya hospital has the most evolved system that enables communications between primary care and the hospital but has various disadvantages. For example, there are separate systems for the laboratory and for the pharmacy and the user interface is not very user friendly.
    - In both these hospitals, Amiri and Farwaniya hospital, during the early stages of the COVID crisis a pilot with a more elaborate eHealth system started (https://www.sihaty.com/)
    - The new Jaber Al Ahmad hospital is fully paperless.
- Private sector: Many providers are engaged in various eHealth solutions, for example in-house developed solutions or solutions using WhatsApp or DOCSIS, to provide online consultations.

Figure 4 provides the above-described examples of current developments in eHealth in the State of Kuwait plotted onto the categorization framework.

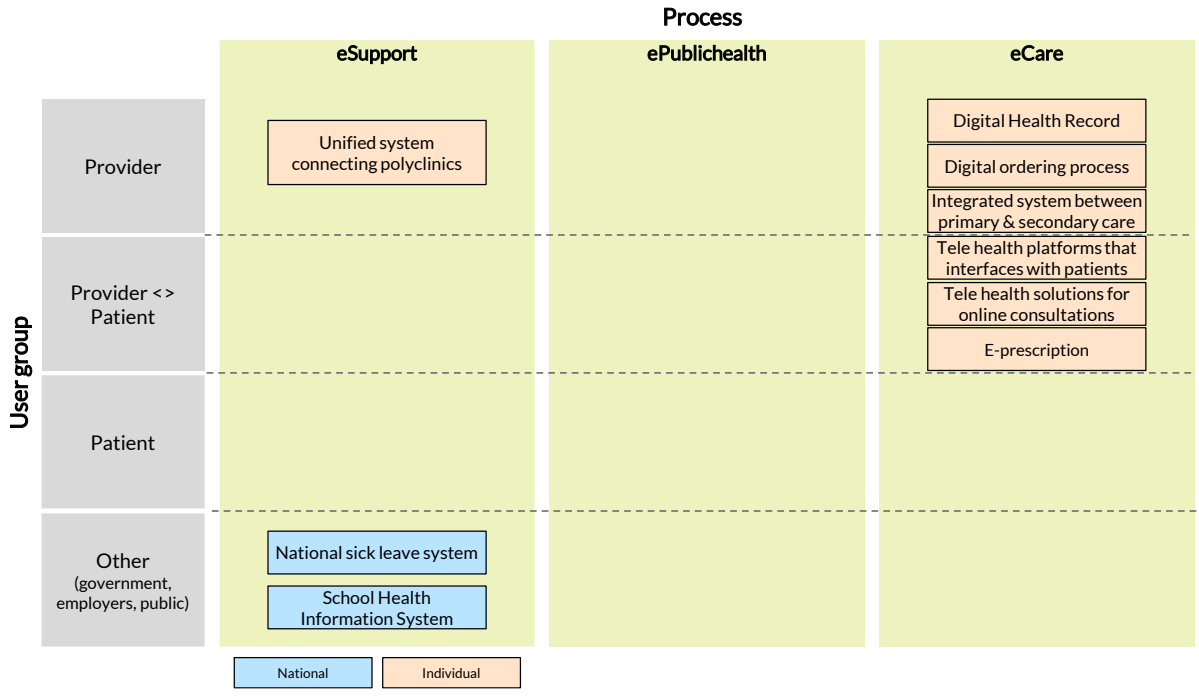

Figure 4 Overview of ongoing eHealth initiatives in Kuwait.

Opportunities

There is no public eHealth roadmap for the state of Kuwait and there is barely any public information about upcoming projects. However, interviews with various stakeholders provide the following potential opportunities:[11]

- **Health information exchange;** Integrate and improve access to patient information for all relevant parties (government, patients, providers, insurance, education). Coordination of records across different institutions is hardly present and is a priority for the current minister.
- **Improve the patient experience**; Digitize the patient experience so the patient has a seamless experience from booking online appointments to electronic check in in the clinic to receiving directions and seeing the physician to receiving medication, check-out, referral and/or discharge. For example, the minister has plans to launch WASFA, an e-prescription application, both in the public as well as in the private sector to increase transparency and visibility. Other examples are patient portals.
- **Create a digitized scheduling and tracking system for care providers**; Develop a simple to use and standardized system across the board to pinpoint where the required physicians are or who is on call at every moment in time.
- **Supply chain management**; Reduce misuse and overuse, for example by a central dispensing record. Similarly, tracking and tracing is becoming the norm (for example by using GS1) for implants, disposables used in surgery and pharmaceuticals.
- **Wearables to improve public health and affordability of care**; partnerships between either patients or providers of wearables and healthcare insurance companies to use wearables to lower premiums and increase public health.

Figure 5 provides on overview of opportunities in eHealth in the State of Kuwait.

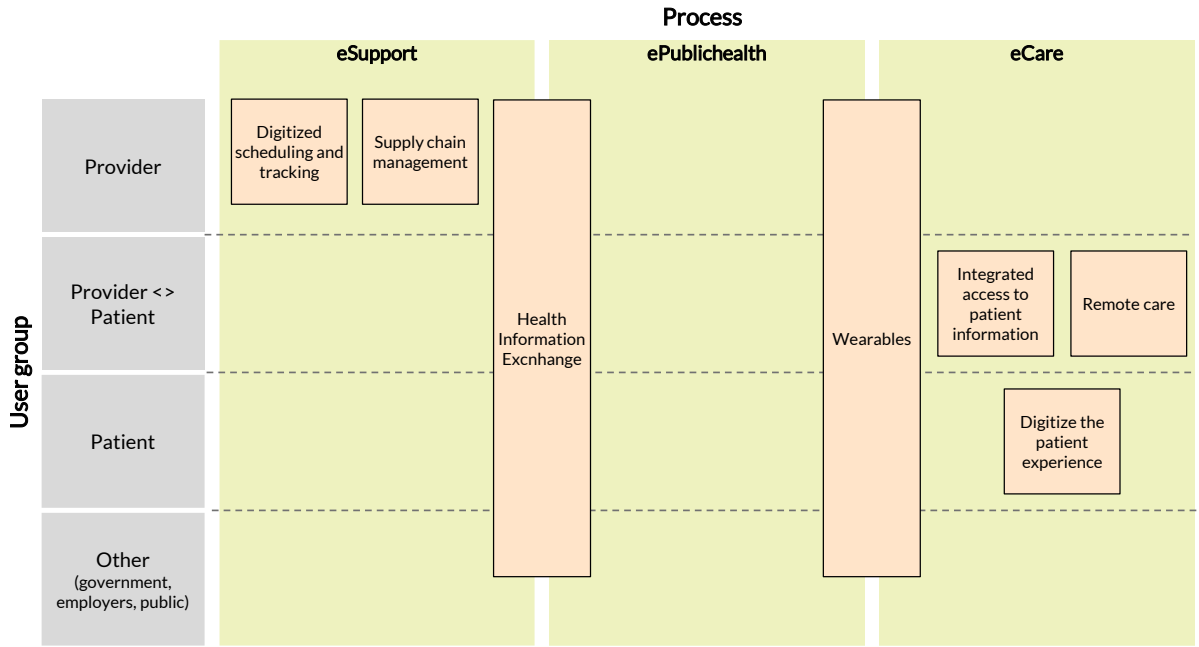

Figure 5 Overview of eHealth opportunities in Kuwait.

[11] Please note, this entire paragraph is based on interviews with stakeholders. There are no formal documents publicly available to confirm these opportunities.

Challenges

Summarized, challenges of doing business in the eHealth sector in Kuwait are the following:

- When it comes to eHealth, there is no clear vision and direction from the government, and there is barely any public information about upcoming projects. The approach is mostly fragmented and led by individual providers.
- Relevant regulation is immature/lacking. There is a law on data security that has been implemented, but not consistently enforced. There is a law to protect individual privacy, governing ownership, access and sharing of individually identifiable digital health data that has been passed, but not yet fully implemented.
- Strong local relations are key.
- Even when modern technologies are available, the people of Kuwait are expected to value the human touch. Also, certain adoption challenges can be expected; not everybody is keen to use all those different kinds of applications currently under development.
- Limited funding mechanisms to reimburse eHealth solutions in the private sector.
- Few hospitals have a digitization strategy and budgets are not (yet) available for this purpose.
- Most care providers, both in the public sector as well as in the private sector, have a siloed approach towards optimizing their care delivery process. The software systems technically speaking are separated in different organizational units. Most departments have their own governance structure and therefore can decide to acquire (parts of) technical solutions without consulting the IT department.

c. Qatar

Ongoing local initiatives

Qatar has a long history of eHealth, with several eHealth strategies that have been developed on a national level. There is a dedicated eHealth strategy that is embedded in the National Health Strategy. Additionally, the National Health Strategy has a focus on areas that can benefit from eHealth: prevention and wellbeing, preventing hospital admissions (especially for chronic diseases) and healthy ageing. Generally speaking, eHealth initiatives are available to the entire population, not just the Qatari citizens.

In figure 6, the most relevant identified ongoing eHealth initiatives in Qatar are presented.

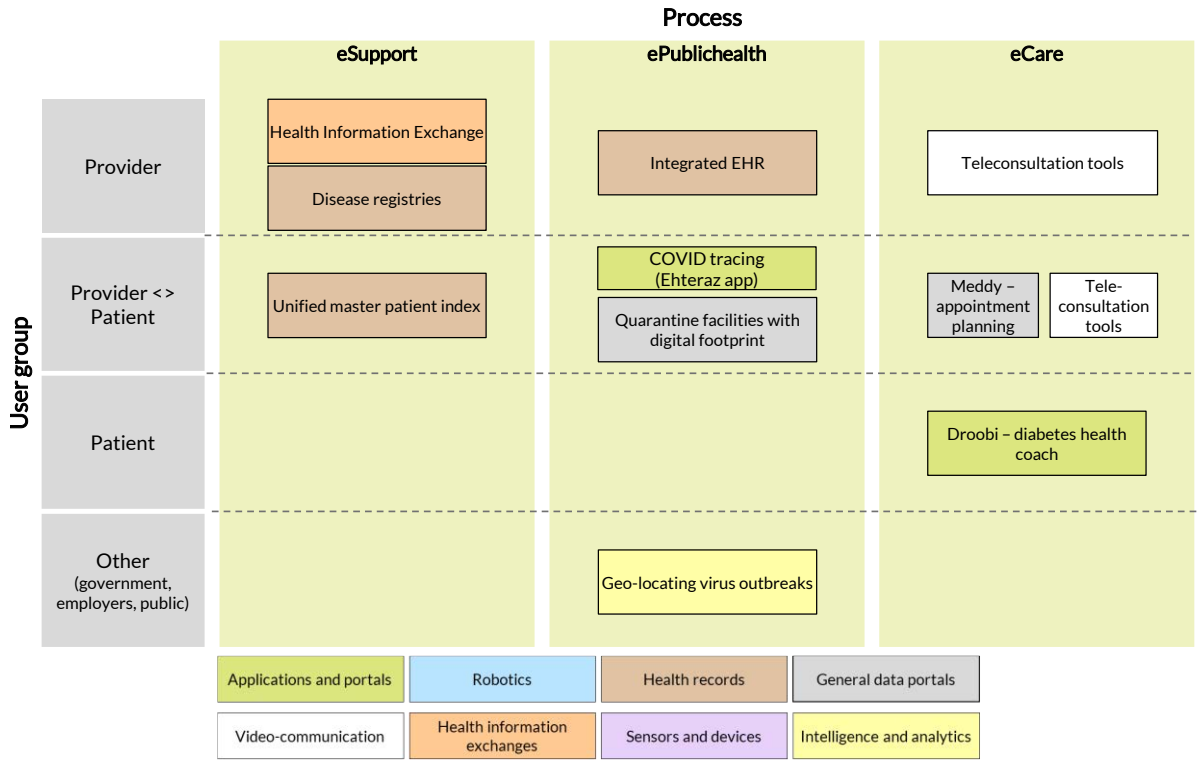

Figure 6 Overview of ongoing eHealth initiatives in Qatar.

Integrated EHR (Cerner) based on the health card's unique patient identifier

Qatar has digitized all medical records and has put substantial effort into implementing one integrated EHR across the public healthcare providers (PHCC, HMC and the Ambulance service). This has not been fully integrated, but the basic functionalities are in place.

Disease registries

Qatar has adopted and implemented various registries across the healthcare system. Based on the health card ID, patients for every specific disease can be selected. And based on the specific needs, registries can be designed that fulfil the needs. There already is a registry for communicable diseases and plans for a cancer registry and a diabetes registry are in the making.

National health strategy initiatives

The national health strategy is the driving force of many of the realized and planned changes in Qatar's healthcare landscape. The national health strategy is divided into seven priority patient groups and five cross-cutting systemwide areas. The strategic plans for these patient groups may require the introduction of new eHealth technologies. These opportunities arise and are either awarded directly or publicly tendered. This happens not on an ad-hoc basis, but such specific opportunities are usually not planned several years in advance.

Droobi (https://www.droobihealth.com/)

Droobi is a privately owned start-up that has been started to promote care for diabetes. Droobi is a digital therapeutics program (an App that leverages data analytics and artificial intelligence) that focuses on delivering outcomes. Droobi is the first Arabic Digital Therapeutic service used to manage Diabetes through behavioral change, established to empower people to manage chronic diabetes. It offers educational material, tracking tools and real health coaches.

Meddy.com (https://www.meddy.com/)

Meddy is a privately owned tool to help planning of consultations, in Qatar it is used by certain private hospitals.

Opportunities

Building onto the strong foundation that Qatar has established, many eHealth services and products are anticipated for the coming years, end-user services as well as supporting enablers. While the eHealth goals have been presented clearly in the national strategies, there is no complete roadmap on a detailed level available. Since there is no clarity on the detail of the scope, the estimated value of the projects is also unknown. However, based on input from the various interviews, we can pinpoint in which areas investments are likely. These investments can be mid-term but even long-term, as there are some big ambitions that may take years to materialize.

In figure 7, the most relevant identified eHealth opportunities and local players in Qatar are presented.

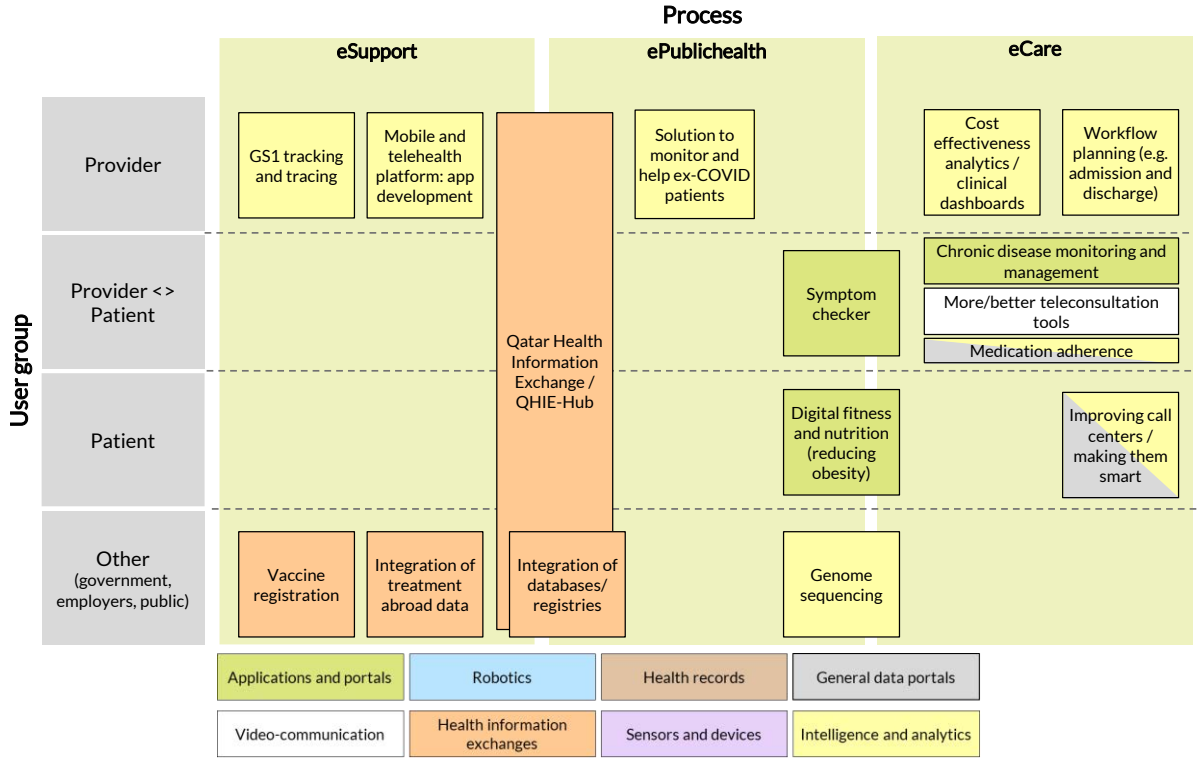

Figure 7 Overview of eHealth opportunities in Qatar.

General areas where opportunities are to be expected:

1. **Qatar Health Information Exchange (QHIE)**. QHIE will be a centralized database that connects public and private care providers, patients, and organizations from other sectors. The government leads, manages, and will enforce implementation of the national digital health architecture and/or QHIE.
2. **Remote monitoring, with a focus on integration and workflow optimization**. There is an extensive range of devices on the market. Some devices are already available, pushed by consumers or distributed by care providers. More are expected to be acquired as part of the national health strategy.
3. **Improvement of services that have been implemented during COVID-19.** As mentioned, the COVID-crisis has been a catalyst for several long-existing technologies, i.e. teleconsultations. These services have accelerated because there was an actual and urgent need to use them.

However, the launched initiatives have been, understandably, implemented in a quick way; they can be improved in terms of ease of use, stability, level of integration and (data) security.

4. **Workflow implementation**
   Just like the previous point, this is not about specific physical technologies (sensors, devices etc.), but rather about how to implement these technologies for the benefit of the patient.

Organization specific opportunities:

1. **Tasmu use-cases**
   Tasmu is an initiative to lead the Smart Qatar mission, inspired by Qatar's 2030 Vision and championed by the Ministry of Transport and Communications. It will bind five different sectors by promoting technology-led initiatives, including the healthcare sector. Tasmu focusses on 'hard-wired' initiatives, rather than on enablers. In healthcare, there are currently 30 initiatives, with four of them being high priority.
2. **MOPH and National Health Strategy derived projects**
   - Qatar Mobile Health and TeleHealth Platform (QMTP)
   - Qatar Health Information Exchange (QHIE)
   - Solutions to improve lifestyle and reducing obesity
   - Electronic Vaccine Registration services
   - Integration of treatment abroad data
3. **Opportunities at the various providers, with a focus on Hamad Medical Corporation and Sidra.**
   For all these initiatives, no concrete timeline or budget was provided. Similarly, exact requirements and needs have not yet been determined. However, based on interviewee input, it is likely that these opportunities will arise in the future. If they will, they will most likely be published on the government tender website.

Challenges

Summarized, challenges of doing business in the eHealth sector in Qatar are the following:

- There is no complete roadmap of eHealth goals on a detailed level (in terms of actual products or services); they know what is needed on a high level but not in terms of concrete solutions (at least not on a 5-year horizon).
- The appetite for risk is low; therefore, small companies will need strong credentials and/or a partnership with an established name.
- Local commitment and presence are often required.
- Compliance with data security laws and rules can be challenging.
- The country's small size is a restrictive factor in terms of available expertise.

d. The United Arab Emirates (UAE)

Ongoing local initiatives

The UAE government recognizes that innovation in the health sector is highly important. It has an impact on both individual health and the social and economic development. Thus, they have actively pursued to develop a health system based on the best international standards and enhance the quality of life.

The Ministry of Health and Prevention (MOHAP) has launched its Innovation Strategy 2019-2021. It aims to make UAE a leading international destination for sustainable future in the smart healthcare. This is so they will be well-prepared for facing future diseases, through technology integration into diagnostic and therapeutic methods by utilizing analytical data and enhance the readiness to prevent diseases and epidemics, in addition to exploring it proactively.

The Dubai Health Strategy 2021 ensures that patients have access to continuous quality care, with an emphasis on innovation. The strategy outlines ten initiatives to deliver solutions to long-term care, rehabilitation, home and remote care, telemedicine and new technologies and pharmaceuticals.

Although the UAE is composed of seven emirates and lead by the federal government, in actual practice there is quite a bit of leeway given to the individual emirates. Hence, in the healthcare and eHealth sector, there are various initiatives all similar in scope but driven by different emirates.

In figure 8, the most relevant identified ongoing eHealth initiatives in the UAE are presented.

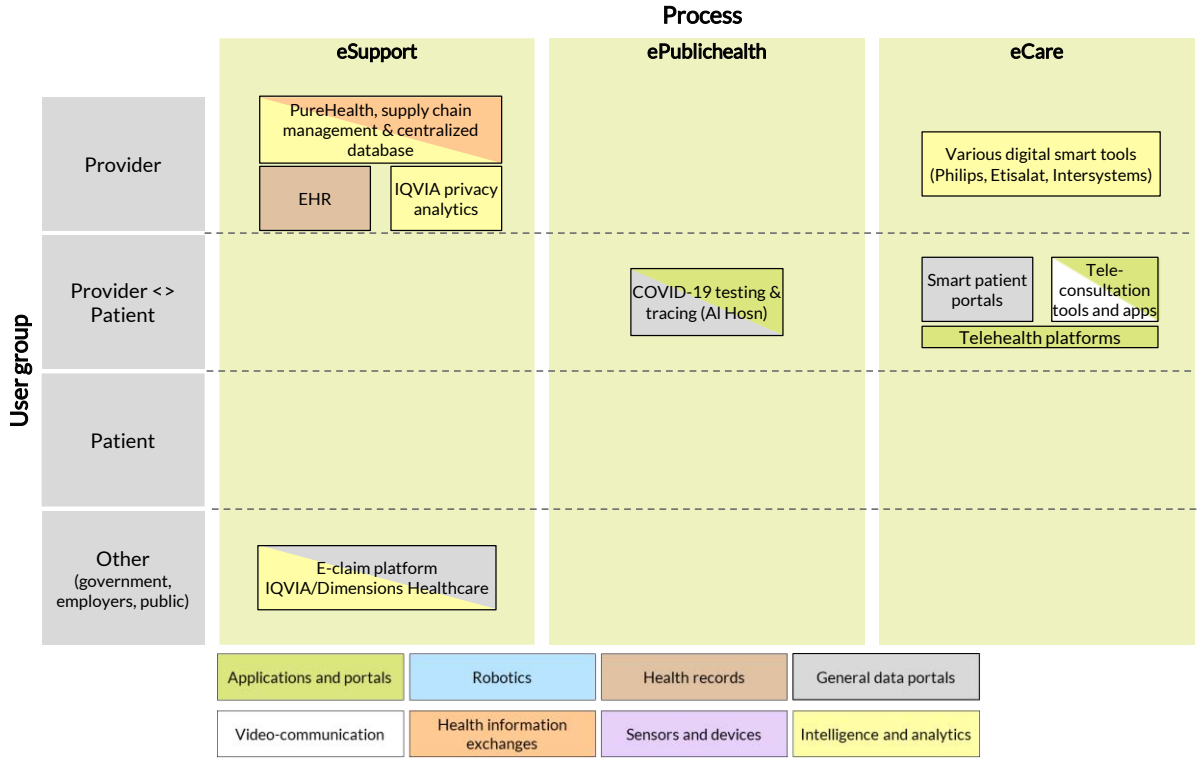

Figure 8 Overview of ongoing eHealth initiatives in the UAE.

There are various eHealth Initiatives at Federal & Emirate Level, for example Malaffi in Abu Dhabi, the Riayati Program in the Northern Emirates and Nabidh and Hasana in Dubai. Moreover, various public eHealth initiatives are ongoing:

- Al Hosn App & Smartwatch
- Hasana
- Remote Care Program
- Smart Patient Portal- Al Malaf System
- Virtual Doctor for Covid 19
- Wareed Project
- Salama Program
- Abu Dhabi Telemedicine Centre
- Connect 2 My Doctor
- Etisalat Digital
- E-ICU
- G-42
- Homepital TeleHealth
- Livedoc
- Okadoc

The Teleconsultation Platforms in the UAE's healthcare system are gradually rolling out following a PPP model in which the private and the public sectors join forces which lead them to a common goal as well as a common result and profit. The teleconsultation platforms are under the banner of the following projects:

- Remote Care Program: Under the program, COVID-19 patients who are asymptomatic or who have only mild symptoms are monitored and cared for through teleconsultations and home care visits as required.
- LiveDoc: This live consultation app connects patients to a highly certified doctor.
- Connect 2 my doctor: Connect 2 my doctor App allows healthcare providers expand their range of medical services by offering patients teleconsultation services from the comfort of their home.
- Abu Dhabi Telemedicine Center (ADTC): It is one of the first medical teleconsultation centers in the UAE run by medical professionals, to offer high quality, convenient and confidential medical consultations over the phone, in both Arabic and English.
- Okadoc is the region's largest telemedicine platform, with 130 healthcare providers already signed on to provide instant access to their doctors.

Moreover, healthcare platforms are being developed in the UAE, most under the banner of:

- Homepital TeleHealth: Service comprised of artificial intelligence (AI) and a virtual healthcare platform and could be used as a standalone or integrated system to provide healthcare options to patients at home and to facilitate the provision of health services to healthcare providers.
- E-ICU: Critical care tele-ICU program that combines A/V technology, predictive analytics, data visualization and advanced reporting capabilities.
- Trudoc 24/7: Leading 24x7 population health management provider. The solution combines next- generation telemedicine and telemonitoring to provide immediate access to highly trained healthcare professionals via voice and video calls for healthy, acute, and chronic condition management.
- Etisalat Digital is the business unit of Etisalat driving digital transformation by enabling enterprises and governments become smarter through the use of the latest technologies like Cloud, Cyber Security, Internet of Things (IoT), Omnichannel, Artificial Intelligence, and Big Data & Analytics.

Opportunities

Although there is supposed to be a unified federal body regulating and implementing healthcare initiatives, in actuality, it is fragmented between the different Emirates and their corresponding local bodies. This results with a siloed situation on the ground not just between the various Emirates but also within the different bodies in each Emirate. This is a challenge, there is no "national wide standard" in which all the solutions are benchmarked against, but also creates various opportunities. On top of that, COVID-19 highlighted the needs to digitize and seamlessly exchange data and information between the public entities within themselves as well as the public to private entities. With social distancing in play, eHealth will need to fill in the gaps in the patient interface and many opportunities have come to the forefront as a result.

In figure 9, the most relevant identified eHealth opportunities and local players in the UAE are presented.

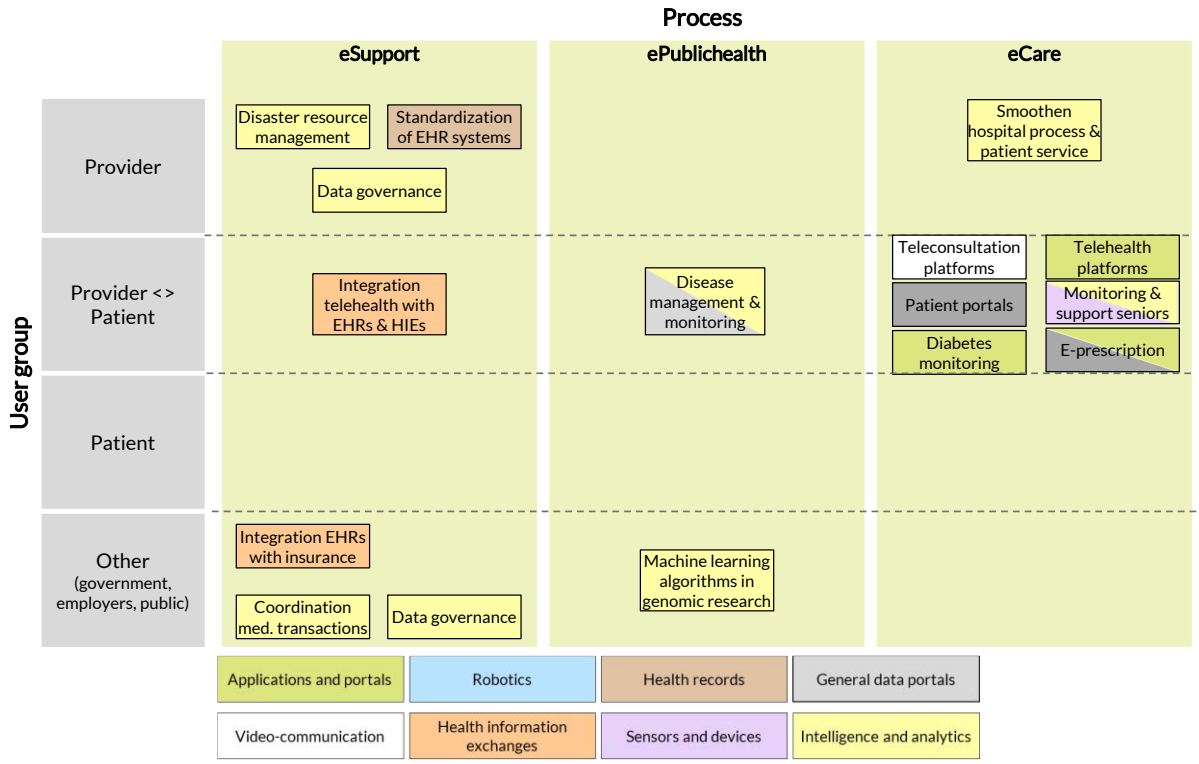

Figure 9 Overview of eHealth opportunities in the UAE.

Roughly, there are 5 major eHealth opportunities identified that Dutch eHealth SME's can engage with as their entry points into the UAE eHealth sector:

- **Electronic Health Records (EHR)**
  This is supposed to be the bedrock of all the federal and emirate level entities. The opportunity here is to provide EHR solutions that will speed up the process of compiling the EHR of every citizen and resident in the UAE but will also integrate seamlessly with the current EHR operative systems and cross talk the HIE with all existent EHR implementations. In the process, the EHR solutions need to successfully address data protection and governance and their various offshoots. There is also a shortage of local skilled workforce who can manage this transformation; this opens up an additional opportunity for SME's with eHealth EHR staff training solutions.
- **Health Information Exchange (HIE)**
  As the EHR are compiled and uploaded they need to be integrated with both private and public healthcare providers. Here, there are 3 public programs involved responsibility for integrating the HIE within their geographic areas. These programs are “Malaffi, Nabidh & Riayati”. By successfully integrating the HIEs, the aim is to reduce re- admission, medical errors, duplicate testing and improve diagnosis. Once again, the opportunities lie in system integration, with platforms that are linked with each other in public and private healthcare providers including the all-important health insurance providers and brokers as well as integrating billing (eHealth financial services). In the process the solutions need to successfully address data protection and governance and their various offshoots. There is also a shortage of local skilled workforce who can manage this transformation; this opens up an opportunity for SME's with eHealth staff HIE training solutions.
- **Teleconsultation Platforms (TP)**
  The recent countrywide lockdown due to the COVID-19 pandemic has highlighted the need and increased the demand for teleconsultation platforms incorporating video conferencing between

physicians and patients and physicians with physicians as well as physicians in the presence of a patient with another physician online. Again, the common opportunity is data protection, integration, governance and a lack of trained skilled workforce.

- **HealthCare Platforms (HP)**
  There are currently a wide range of HP's being used by different healthcare providers with various degrees of penetration. None have emerged a clear winner.
  The opportunity lies with providing a platform that will integrate with HIE, EHR and TP platforms that are currently being used. Or technology that helps integrate the platforms with each other. Once again, the opportunity is to provide solutions for data protection, integration, governance and up skilling the local workforce.
- **Health Research & Analysis (HRA)**
  Here perhaps lies the greatest opportunity for innovation. AI depends on data, and the quality of the data used to train AI models or used in AI- based analysis directly affects the quality of downstream tasks. Another way in which Dutch SMEs could substantially add value is by incorporating AI in their eHealth solutions:
    - Improving prostate radiation therapy: AI- based software to support prostate cancer radiation treatment planning.
    - Reasoning on medical knowledge: AI to develop a description knowledge classifier that can be used on ontology's, to reason about medical knowledge.
    - Supporting ageing in place: AI to develop a low-cost, non-invasive sensor, monitoring and support system to support senior citizens living in individual homes or supported-living communities.
    - Making genomic research faster: Use of an efficient ML algorithm on high dimensional genomic data.
    - Understanding virus evolution: Using a technology to make sense of a pathogen's evolutionary drift, by visualizing the genomic fingerprint unique to virus isolates sequenced around the world. In the UAE, there is research being done on the Covid-19 inactive vaccine by G42 in the Emirate of Abu Dhabi.

Challenges

Summarized, challenges of doing business in the eHealth sector in the UAE are the following:

- There is no single public entity responsible for many of the eHealth goals. Instead, there are several public entities involved, each over a different geographic territory in the UAE. This siloed approach poses centralization and communication challenges.
- There is a lack of local skilled workforce to manage the integration and day to day operations of eHealth solutions.
- There is a limitation of technical resources by some healthcare providers.
- The applicable law concerning data protection (UAE is Federal Law No. 2 of 2019) is not always clear: According to this law, data has to be stored and kept in the UAE, unless an exception has been granted by the health authority in coordination with the Ministry.
- Teleconsultation platforms require a license by the Telecommunications Regulatory Agency (TRA) to ensure VOIP is not blocked.
- Selling prices/sales margins for innovative products and solutions should be calculated carefully. The market is very price-driven, and technology investments must pay off over the short to maximum medium term. Therefore, even solutions with considerable savings potential during operation should not create extraordinarily high initial investments.

e. The competitive landscape for Dutch companies in the GCC

Wherever known and relevant to the identified eHealth opportunities, competitors for the Dutch companies have been mentioned as local players in the table that maps the opportunities, and/or in the four eHealth sector studies for the individual countries conducted in 2020. We can group competitors for the Dutch companies interested in doing business in the GCC roughly into three categories.

Local initiatives

Various local eHealth initiatives have been established in KSA, Kuwait, Qatar and UAE over the past years. Examples are Droobi, a privately owned start-up that has been started to promote care for diabetes, originated in Qatar (https://www.droobihealth.com/) and Sihati, that brings together telehealth, health information systems, remote patient monitoring and a keen awareness of regional public health needs, originated in Kuwait (https://sihaty.com/). Local initiatives often have a website and can be found online, but occasionally the website is in Arabic. Another way to assess local competitors is to engage with local stakeholders in the particular eHealth field, they are usually aware of their existence. Moreover, there are organizations like Sesam Connect that promote trade and manage conferences within the Gulf States that might know more.

Multinationals

Most of the large multinational companies active in healthcare information technology are present in the GCC. Think of IBM, Philips, GE, Siemens or Medtronic, which sell many kinds of healthcare IT products, but also Cerner, Epic, Orion Health and InterSystems in the area of Electronical Medical Records and Samsung, Apple and Fitbit in the area of digital health apps.

The competitive market for eHealth is big and growing. Many companies that used to sell equipment and devices as their core business, now enter the healthcare IT space; for example, providers of monitoring devices shift to telemonitoring solutions (e.g. Philips, GE, Medtronic) and providers of more basic products like wound dressings now also provide IT solutions to advise nurses which dressings to use in which situation (e.g. BSN Medical).

Usually, these multinational companies define global priority regions where they launch their innovative products and start to roll out, implement, test, and improve, and the GCC is often not the first region they select. However, considering the market is less mature than many markets in the US and Europe, most of these companies are open to the opportunities (since opportunities can be bigger than in a mature market) and, depending on the marketing and sales strategy of the local branch, they could be active in the market. Information on their local strategy is usually not publicly available. They do however always have a local website where available products and solutions are showcased. Within the GCC these companies usually prioritize UAE, since this market is most mature, and KSA, since this market is large and the number and size of opportunities is enormous. But since Qatar is quite far in defining their vision, strategy and roadmap and therefore makes it easier for the multinational players to map their products on the opportunities, Qatar is definitely also in the picture.

Small medium enterprises (SMEs) from other countries

To assess the competitive landscape in one of the relevant countries for a specific eHealth product, Google is the best medium to use. Especially the SMEs usually want to be found online and therefore have a clear and often both Arabic and English website. Moreover, most often these companies are known and sometimes even supported by their respective embassies.

UAE & Qatar have a free zone that makes doing business in the respective countries easier. These free zones usually have company registries in which you can find information on companies active in the

market. In KSA and Kuwait the SMEs require a local partner and therefore have the same advantages that the local initiatives have.

We do believe there is room for the small medium enterprises in the eHealth market in the GCC, provided that they have many solid international proof points and a clear presence on the ground and considering the unique selling points of competitors:

- Local initiatives have many advantages when entering the market in terms of local knowledge and support, most stakeholders in the healthcare sector in the GCC countries are a relatively small group of people that often know each other and have strong bonds. Besides, having a localized product, in the Arabic language but also adapted to local customs and traditions, certainly has a higher chance of success in the Gulf region. However, these initiatives do not always have the knowledge and experience or capacity to provide for the entire market.
- Multinationals have a strong brand and with that a reputation that provides buyers with trust and confidence, which is appreciated in the region. Moreover, they have many proof points which is almost always a requirement for doing business in the GCC. On the other hand, the GCC region is becoming more and more sensitive to price, and the larger multinationals do sometimes have a reputation of being more expensive. Besides, localization and extensive local implementation support is of key importance to most healthcare stakeholders in the GCC, and multinationals often delegate that to a local partner which is not always appreciated by the buyers.

4. Conclusions

There are various opportunities for eHealth companies in the Gulf and there seems to be room for the small medium enterprises from The Netherlands in the eHealth market, provided that they have international proof points and a clear presence on the ground and considering the unique selling points of competitors.

Most GCC countries have ambitious plans to further implement and use eHealth initiatives.

The market in **KSA** is the largest and therefore the number and size of opportunities is enormous, with a lot of expectations for the coming years. The key to doing business in Saudi Arabia is to establish an effective contact network and to create personal, long-term relationships with decision makers.

In **Kuwait** it seems highly challenging to commence an eHealth business and opportunities are not concrete due to the maturity of the market, but with a strong local partner and a lot of patience there are possibilities and the size of those opportunities that do evolve seems large.

Qatar has built a strong foundation in terms of support systems that can serve eHealth services. Moreover, Qatar has ambitious plans to further implement and use eHealth initiatives and opportunities for Dutch companies are plenty. However, major healthcare stakeholders in Qatar do not seem interested in just buying a product, they require extensive implementation and operational support.

The **UAE** seems to be the most saturated market of the assessed Gulf countries. There are many active (local) players in the eHealth sector, but because implementation of most eHealth initiatives is fragmented between the different emirates and their corresponding local bodies, there is still room for more players.

About the authors

GS Health is a specialized and fast-growing healthcare strategy consulting firm servicing European and Middle Eastern countries. We unravel complex issues into practical solutions and innovative ideas. GS advises players from all pillars of the healthcare value chain on strategic and operational issues. Ever since we were founded in 2005, we have supported providers, payors, suppliers, governments, and financiers across Europe, and since 2019 also in the Middle East, on diverse topics. GS has a team of 35 experienced consultants with diverse backgrounds and a common passion to improve healthcare. In addition to our client work, we lead the industry by independent studies, regularly covered in the media.

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