



TELEHEALTH: BREAKING DOWN ADOPTION BARRIERS



Table of Contents:

Executive Summary:	XX
Introduction:	XX
• Slow & varying telehealth adoption	XX
Telehealth adoption barriers:	XX
Recommendations: Measures to foster lucrative growth in telehealth adoption:	XX
Enablers that can revitalize telehealth adoption:	XX
Telehealth Success stories:	XX
• Infosys Value proposition:	XX
Conclusion:	XX
List of abbreviations:	XX
References:	XX

Executive Summary:

"It is not the strongest of the species that survives, nor the most intelligent that survives, but the one that's is most adaptable to change"- Charles Darwin

Across the globe countries are looking for optimal healthcare solutions to create an efficient health ecosystem. Due to ever rising healthcare costs and widening incapacities in existing healthcare models, telehealth is promising to be a sustainable healthcare delivery model

much capable of achieving healthcare's triple aim of providing improved patient outcomes, enhanced access to care and substantial cost savings. However, many adoption barriers including but not limited to- financing the technology, practice structure, Licensure complexity, reimbursement policies and acceptance among patients etc. present challenges for implementing and sustaining telehealth for office-based physicians(physicians). In this

paper we are covering in detailed manner some of these barriers affecting telehealth acceptance on larger scales and in the end we have presented our recommended solutions that could enhance the adoption of telehealth across complete value chain. Additionally, we have tried to capture some of the enablers that we foresee will play an important part in promoting telehealth services among the end users.



Introduction:

In totality, telehealth has at least theoretically shown tremendous potential in fulfilling the Triple Aim of Healthcare which in essence promotes improving the patient care experience through better quality and satisfaction, improving the health and treatment outcomes of populations, and reducing the per capita costs in doing so.

Despite this promise, telehealth applications have achieved varying levels of success. In less developed and developing countries, telehealth has yet to be consistently employed in the healthcare system to deliver routine services. In developed economies like US, EU telehealth is still lagging primarily due to multitude of barriers diluting the adoption rates among physicians, patients and other stakeholders. For reference in US (in 2015) only 80,000 of the total doctors' visits were e-visits which is less than 1% of total doctors' (930 million) visits. As per American Medical Association approx. 75% of all doctors' visits could be handled through telehealth, clearly suggesting the low penetration levels.(1) Telehealth implementation in outpatient facilities grew at a meagre 5% from 2017 to 2018 (44.8 percent to 49.4 percent). (2) Although 90% of the physicians in US see the benefits of telehealth technologies however only 14% have video visit capabilities available with them.(3) However, on the positive outlook telehealth (specifically adoption of video visits) has witnessed staggering growth by 340% in the last few years (from 5% in 2015 to 22% in 2019).(4)

The scope of this paper is to analyze some of the key factors marring adoption rates of Telehealth and what necessary solutions we recommend that can foster a sustainable promising growth in adoption of Telehealth.



Factors affecting slow adoption of telehealth.

Even though telehealth looks lucrative for all the major stakeholders of patients, physicians, insurance providers, the adoption of telehealth has faced multitude of challenges across geographies. However, for our analysis we will keep our focus more on the US Telehealth landscape.

The key concerns impacting the slow adoption of telehealth can be further categorized as Technical barriers, Behavioral barriers, System barriers and Financial barriers

1. Technical Barriers: Lacking technical capabilities, knowledge, data privacy & interoperability

- 1a) **Lack of knowledge & access to technical capabilities:** currently most providers/PCPs lack technical knowledge & are less-trained in telehealth modalities thus slowing the overall growth of this sector
- 1b) **Reliability on account of medical errors possibilities via telehealth mode:** Independent studies are still being conducted to measure the success of telehealth services over the regular physician-patient model which still lacks a standardized view.
- 1c) **Data security & privacy issues:** People are not eager to store and share their medical data online because they fear that their personal information might be disclosed to third parties

- 1d) **Technical problems & network bandwidth issues:** Insufficient funding and poor investment in modern equipment for hospitals & other providers do not permit to bridge the gap between the innovative and advanced telehealth products/services and the existing infrastructure.
- 1e) **Low Interoperability- Lack of standards and guidelines:** The lack of widely adopted standards and procedures represents a further obstacle & limits trust in the quality and reliability of telehealth solutions. Interoperability is fundamental to avoid legal obstacles (various telehealth laws), operational obstacles (various methods for data collection) or language obstacles (various terminology or translation issues). As per one survey, interoperability of telehealth technologies is the most prominent factor (67%) desired to increase the adoption of telehealth across physicians. (5)

2. Behavioral Barriers: Hindrances pertaining to perception and mindsets

- 2a) **Physicians & patients' reluctance to adopt telehealth (resistance to change):** Lack of familiarity with the equipment, disruptions to the existing workflows, skepticism about new approaches, and changing roles

and responsibilities have kept both users reluctant to embrace new approaches.

- 2b) **Lack of Simplified integrated workflow & Interactive user experience:** Telehealth services are broadly extended using (internet of medical technology) IoMT-devices, screens & panels that are relatively new to both providers & patients. Although workflow may not be the most obvious barrier to adoption, yet it can be a significant barrier to usage. However, there still exists lack of standards, interoperability,
- 2c) **Potential for fraud and abuse:** There exists the risk of fraud & abuse in telehealth services too. Telehealth affiliation arrangements have the potential, with requisite intent to induce improper referrals, and trigger kickbacks. (6)

- 2d) **Patient awareness of and trust in virtual care quality offerings:** Patients globally have shown concerns about receiving an accurate diagnosis via telehealth or quality of care will not be the same or that health outcomes might suffer, although the proportion of such behaviors would greatly vary across geographies & structures- urban, suburban & rural areas.



3. HealthCare System Barriers: Legal & regulatory shackles, varying policies & services structure among states & players.

- 3a) **Lack of uniform reimbursement regulations across states:** To make telehealth adoption more complex there are variations across state and federal guidelines as to what all services constitute within the scope of telehealth reimbursements. As per the GAO report (April 2017) Healthcare providers in US aren't embracing telehealth and remote patient monitoring because they aren't being reimbursed (or reimbursed inadequately) for those services

Thus, non-transparent and complex reimbursement models confuse patients who are not able to understand which services are reimbursable and to what extent. According to one report uncertainty around reimbursements is ranked as the most prominent barrier (77%) for physicians to adopt telehealth. (7)

3b) **Complex licensing requirements & credentialing varying across states:**

Archaic licensure laws in the U.S. make practicing telehealth across state lines extremely cumbersome. Clinicians are required to become licensed in multiple states, with some clinicians maintaining licenses in all 50 states. This results in higher overheads for clinicians and thus results in slower adoption of telehealth services across all states uniformly.

3c) **Practice difference across states:**

Most state practice acts are silent or unclear on the use of telehealth and what all services are covered under it. This leaves providers with no choice but to practice telehealth at their own risks.

- 3d) **Liability concerns:** Legislations are not clear regarding liability and accountability of practitioners in telehealth. Therefore, physicians are reluctant to embrace telehealth since

they are worried about being made responsible for failing to act.

- 3e) **Varying insurance coverages for telehealth across payers:** Variations in the reimbursement structures vary from state to state which makes the telehealth landscape quiet complicated. This has induced varying insurance coverage for telehealth services offered by private players (insurance companies) thus further confusing the end subscribers.

- 3f) **Fragmentation between primary and secondary care:** The fragmentation between primary and secondary health care is also slowing down the adoption of telehealth solutions.

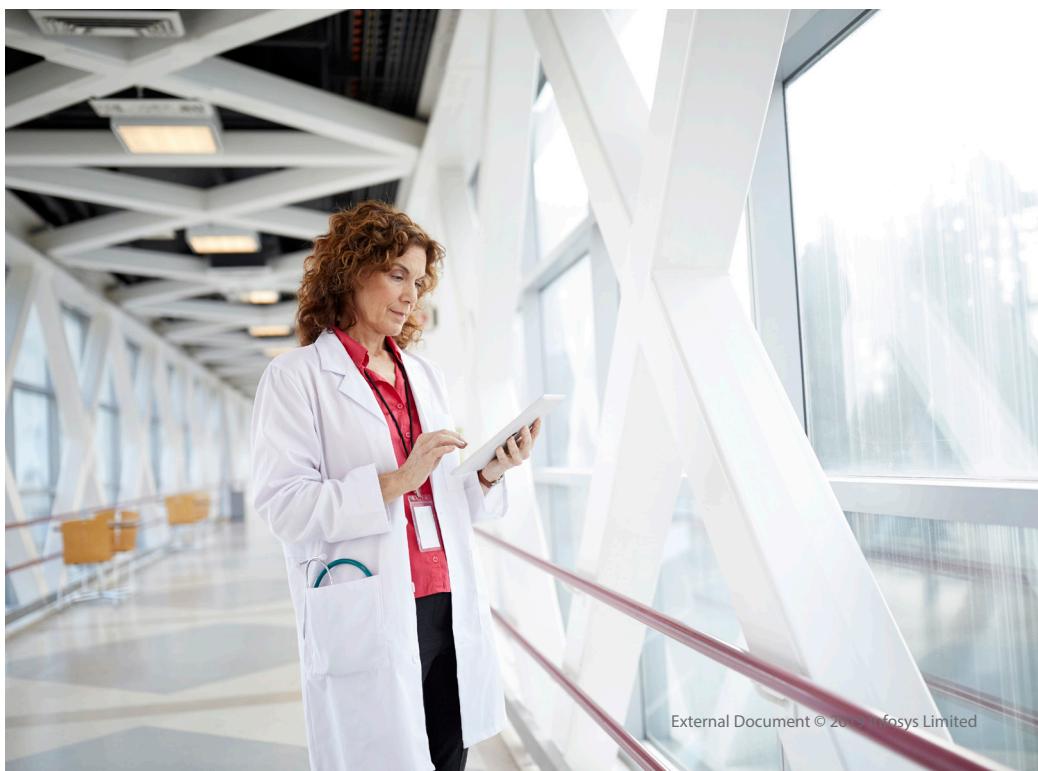
There is a lack of coordination between primary and secondary care professionals, who shift the blame onto each other regarding the slow deployment of telehealth

- 3g) **Fragmentation of the solutions:** The solutions developed by the various companies are generally fragmented & not interoperable enough in relation to how data is structured, stored, transmitted and accessed. As a consequence, the telehealth solutions implemented in a country's hospitals or regions might be completely ineffective elsewhere

4. Financial Barriers:

- 4a) **High initial set up costs of delivering telehealth:** A major obstacle to telehealth uptake is the prohibitive upfront costs to hospitals, healthcare providers, and individual patients, including the investment in expensive equipment, costly network infrastructure, intricate maintenance requirements, dedicated technical skills, and specialized training.

- 4b) **Cost of availing telehealth & the need of monetary incentives:** Multiple independent surveys suggest that patients would need some extra monetary level incentives, certainly at initial stages, to try out the services covered under telehealth in place of availing in-person medical services. On the contrary, the providers would need either good volume of users to justify their additional initial investments made for extending telehealth services or financial subsidies from government. Most countries however are still lagging behind on their strategic fronts to propel a sustainable growth trajectory for telehealth sector.



Recommended solutions to enhance telehealth adoption:

To ensure that engagement in telehealth is a long-term trend as opposed to a short-term fad, healthcare stakeholders across whole value chain will have to address and overcome these challenges adopting a uniform telehealth strategy.

Actions to overcome behavioral barriers

Triggering pressure from the demand side:

- With the mobile technologies becoming ubiquitous it is inevitable that more and more newer users are open to try out healthcare services via telehealth modalities.
- Another important hook could be incentivizing both users & providers in some way to accelerate the growth of telehealth adoption. For an end user there has to be some monetary incentive to try out telehealth services to defeat the initial hiccups, similarly providers would also need some subsidization at the macro level to invest in telehealth delivery mechanism. The payers could also have built-in special discounts to attract more utilization of telehealth benefits covered in health plans.

Launch appropriate awareness campaigns

- Another way to overcome this barrier is to set up suitable communication programs to raise awareness of telehealth benefits as an integral part of national healthcare strategies. Some of the critically important nodes for spreading awareness about such programs could be using the educational institutions of schools & colleges.

Creating a trust across value chain-

- Healthcare organizations must cultivate trust by educating patients on offerings and what they can anticipate during virtual visits. Independent reports by the accredited agencies on the telehealth sector covering key aspects of current statistics, results of any pilot programs, trends etc. should be published publicly to foster more adoption & acceptance.

Actions to overcome technical barriers

Training for healthcare professionals

- Integrating technologies in doctors' in-service training would enable the workforce to become more familiar with telehealth and thus to be more

confident in using it in the care delivery. This can be enabled by:-

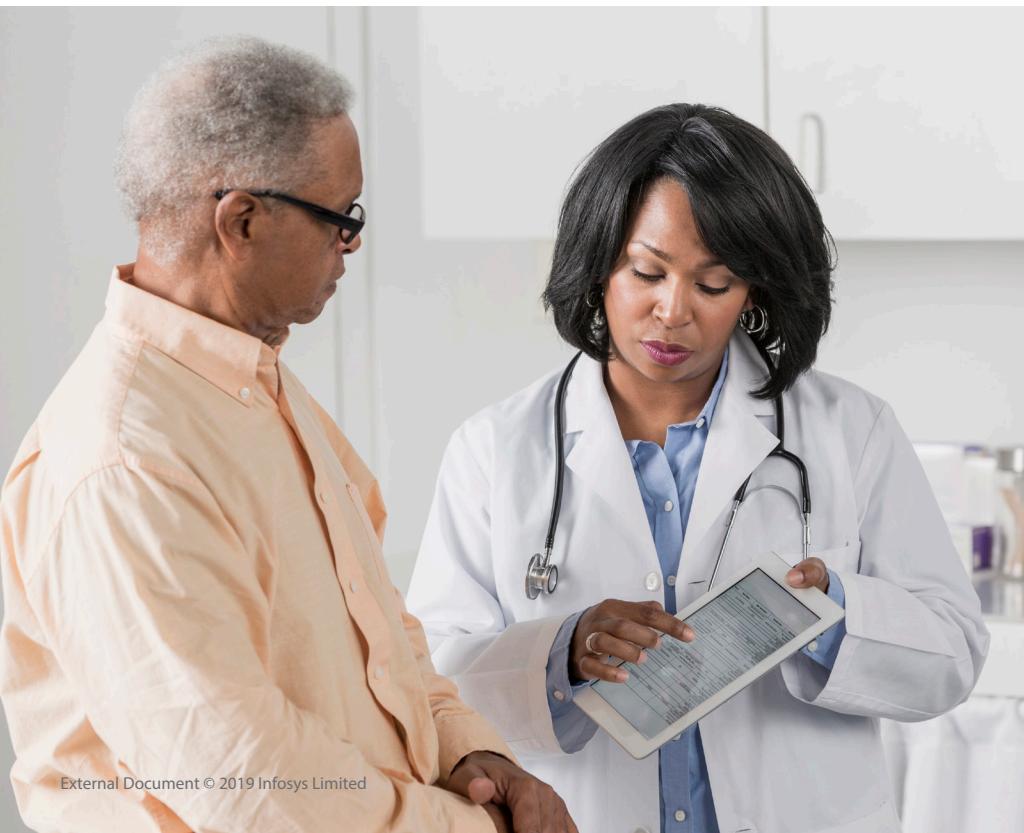
- Integrate practical training in the curricula of medical schools to ensure an acceptable degree of technological skills development.
- Strengthen human capital so that the medical workforce meets the current telehealth requirements.
- National & International healthcare agencies (CMS, CCHP, WHO etc.) need to promote scientific-based evidence of telehealth benefits through the right communication channels to reach the entire population.
- Governments should plan funds meant for additional training courses in telehealth for GPs who are the main contact points for patients and thus are able to convince the latter to use telehealth solutions to treat their diseases.

Introducing 5G broadband to tackle technical problems & network bandwidth issues-

- A uniform and standardized IT infrastructure would provide network synergies and bring significant improvements in information and resource flows. Thus, importance of favorable macro policies at government level is critical for improving the broadband access uniformly, more importantly to rural & remote geolocations. Adding a high-speed 5G network to existing architectures can help quickly and reliably transport huge data files of medical imagery, which can improve both access to care and the quality of care.

Integrating new age IoTs & powerful computing:

- With the rise of cloud computing and obvious ubiquity of high-speed mobile devices one foresees the higher possibilities of implementing low cost and easy-to-use mobile healthcare solutions. Integrating these solutions in the existing telehealth services could only enhance adoption on larger scale.



Increased interoperability & standardization, enhanced data security & regulations:

- As with any other IT implementations, thorough security protocols and routine audits should be put in place to guard against the real-time exposure of protected health information (PHI). The Member States must allow effective collection, storage, processing and sharing of health data and set up a clear data protection legal framework & governance mechanism, with a simple and workable patient consent procedure.
- Government could establish funding eligibility criteria: projects that show significant advances towards interoperability must receive assistance in priority.

Actions to overcome healthcare system barriers

Uniform reimbursement

- Need of this hour is to bring in innovative payment models which are formulated under laws. Few changes have been proposed already but much is still needs to be done to bring in uniformity and transparency on telehealth reimbursements models applicable for each states.

Streamlining the licensure requirements across states

- One major issue marring the growth of healthcare accessibility is the limitation of practice of health professionals which restrict professionals to not cater to population outside their licensed territory. This problem however has its' possible solution in the form of licensure compact which allows clinicians' interoperability to work in another state without the need to obtain licensure in that state.

Standard practices across states:

- The good news is that more states (US) are addressing this important practice barrier. Additionally, in April 2015, Federation for State Boards of Physical Therapy (FSBPT) issued a policy

document for states to use as guidance. The solution for this particular barrier is a grass roots movement by therapists of bringing this to their Chapter's attention.

Actions to overcome financial barriers

- To get healthcare professionals involved in the development of telehealth, countries could implement pay-for-performance (P4P), value for outcomes schemes to reward doctors (bonuses, add-on payments) when they meet

patient satisfaction benchmarks in telehealth.

- Governments should steer suitable investment to relevant initiatives in order to guarantee cost-effectiveness and sustainability. States need to favor multi-source financing and public-private partnerships to spread the initial financial burden and the risk of investment associated with the development of new telehealth solutions.



Enablers to our recommendations:

Blockchain technology at the helm:

As healthcare systems continue to face roadblocks in the exchange of healthcare data, blockchain technology seemingly offers several solutions for the protection and management of patient information. Blockchain technology and smart contracts in a sense remove the third-party, empowering more of the direct to consumer philosophy, just like telehealth.

Cloud Computing: Alleviating the initial set up cost barriers: Cloud computing offers transparent service, good scalability and elasticity, support for the pay-as-you-go service model, omni-accessibility, and other features. This paradigm not only lets users enjoy convenient, versatile, efficient services but also relieves them of maintenance. Integrated with smart mobile devices, the telehealth cloud is a promising approach to pervasive and cost-effective health services.

The rise of Artificial Intelligence:

Telehealth coupled with AI certainly looks like a match made in healthcare heaven as both aimed at cutting costs and diagnosing illnesses faster and more accurately. Some of the critical areas where AI can add more value in telehealth would include:-

- Making better diagnoses:** Clinicians using current technologies are able to diagnose, monitor and treat diabetic retinopathy via telehealth which can further be enhanced utilizing machine learning.
- Recommending accurate treatments**
Another aspect of utilizing AI & machine learning is that going forward intelligent

analytical platforms could be relied on recommending accurate treatments with more accuracy and less human effort.

- Tackling logistical challenges:** One key area where AI finds its utility is reducing hospital wait times & improving efficiency in other administrative workloads. For example- The time to nearest ambulance services, routing patients to the available providers optimally basis outcomes, assigning beds to patients, managing complete patient inflow management would all be improved utilizing AI. Predictive analytics will be able to recommend doctors for telehealth needs of patients more efficiently.

- Preventing burnouts of doctors:** On an average most physicians usually spend approx. 40-50% of their time completing the documentation formalities for EMR (8). Much of this time can be saved using the AI powered devices used in telehealth that is capable self-documenting EMRs as per defined formats. The amount of time saved can be judiciously utilized in better engagements with patients and fulfilling a better health outcome for patients.

Medical drones: The application of medical drones (both autonomous flying and driven) has gained a huge momentum in the last few years with many independent agencies successfully testing their prototypes. The key areas where drones find their applications in telehealth services would include but not be limited to-Search & rescue operations, disaster

response ambulances, logistical support for delivering medical supplies-medicines, Blood products, supplies, laboratory samples, remote patient monitoring & nursing and possibilities of a mobile telehealth polyclinic.

M-Health & IOT penetration in telehealth:

M-health applications in telehealth range from a simple single purpose per user applications like tracking diet, wellness and exercise which later progressed into social m-health health initiatives keeping the users & connected community engaged via gamification, competitions integrated through other social media channels. This allowed further integrations opportunities within existing healthcare systems extending telehealth services of storing & sharing e-health information between patients & providers, tele-monitoring health data specifically useful for chronic care management using these smart m-health devices, smartphones.

Virtual reality & Augmented reality:

VR/AR finds great potential in healthcare industry in aspects of healthcare professionals' training, patient education & treatment. Although, applications utilizing VR/AR are still in nascent stages however the huge potential specifically once AI, bio-sensors etc gets integrated could be immense.

Big data & Analytics: Big data analytics processes data collected from telehealth modality including both objective data (e.g. vital signs, ambient environment) and subjective data (e.g. symptoms, patient behavior) along with historical data to enable risk prediction and management. Big data Analytics integrated with mobile health devices, wearables and other non-conventional sources of data collection could help design a far more powerful & effective wellness programs. These programs will help provide better outcomes catering to all group of individuals specifically including the high risk individuals prone to chronic ailments.



Telehealth success:

1. **The Los Angeles county department of Health services** implemented a primary care-based telemedicine screening project (2013-2015) for diabetic retinopathy that helped reduced the waiting times for screening by 90% (earlier 8 months or longer to about 17 days). Among the 21,222 patients who participated in this program, almost 70% of patients had normal results and did not require specialist referral (Approx 14,000 visits to eye care clinics were now not needed anymore). (9)
2. **Patient centered care for VA's (US Department of Veterans Affairs) via telehealth:** VA extended telehealth

services (2012) to approx. 150,000 beneficiaries as a part of its' journey towards patient-centered care program which resulted in a 25% reduction in number of bed days of care and 19% reduction in hospital admissions across all patients using the telehealth services. VA estimated an approx. savings pf \$6,500 per patient accumulating to nearly \$ 1bn in system-wide savings. (10)

3. **Children's Health School Telehealth Program (Dallas, Texas):** This School based Telehealth Program which started in 2013 with two preschool pilots, reached 97 schools by 2017 and 112 schools in 2018. The program currently treats children in schools with upper

respiratory infections (influenza and strep throat); allergies; asthma; cuts and scrapes; fever; earaches; pinkeye; rash and skin irritations; and head lice Based on parent/caregiver satisfaction surveys reported in 2017 by Children's Health School Telehealth Program Texas (CHST), Over 70% of the caregivers reported savings of upto 4 hours with this program and further 67% reported savings of upto 25 miles of travel resulting in \$13.75 on monetary value.(11)

Infosys value proposition & expertise in telehealth:

Infosys developed a web-based patient management tool for US based university to help extend healthcare access to rural and underserved patients. The initiate being a part of project ECHO (Extension for Community Healthcare Outcomes) allows real-time flow and access of interoperable clinical data among participating health providers.

Initially the program was created (started in 2004) for treating patients with chronic hepatitis C virus (HCV) infection covering 205 Hepatitis-C knowledge network clinics and 2316 consultations for patients. This program has expanded (as on Dec 2018) to 254 sites representing 577 distinct programs addressing one or more of 66 health conditions and now has a goal to reach lives of One billion people by 2025.

At Infosys we are continuously redefining the healthcare ecosystem for our clients worldwide in their journey towards digital transformation. Leveraging from our domain & business solutions expertise we possess dynamic capabilities to custom-built innovative digital telehealth solutions and offerings to help provide strategic differentiation and operational superiority to our customers.

Conclusion

The Telehealth industry is at the cusp of economical, structural, cultural and financial changes that will revolutionize the way in which we access and provide healthcare. Lawmakers at the federal and state levels have an opportunity to expand coverage, remove restrictions and standardize regulatory requirements so that providers, patients and other key stakeholders are incentivized to make the shift toward Telehealth. Those inside the Telehealth industry also need to help facilitate this change by educating providers and patients about the benefits of Telehealth and the number, scope and

scalability of available solutions. Data management solutions and intelligence-based, predictive engagement tools, when married with evidence-based medicine, wrapped under an effective holistic user experience design integrally integrated with the new age digital solutions & secured by decentralized & transparent frameworks like Blockchain are certainly the Telehealth's Holy Grail. Players applying the above mentioned core telehealth strategies can hope to see an enormous adoption of their telehealth offerings & become the leaders in healthcare value-chain with an unassailable sustainable competitive advantage.



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List of Abbreviations

ICT	Information and Communication Technology
GP	General Practitioner
CCHP	CENTER FOR CONNECTED HEALTH POLICY
IOT/IOMT	Internet of (Medical) Devices
VR	Virtual Reality
VE	Virtual Environment
AI	Artificial intelligence
ML	Machine Learning
PCP	Primary Care Physician
CMS	Centers for Medicare & Medicaid Services
CCHP	Center for Connected Health Policy's
WHO	World Health Organization
VA	US Department of Veterans Affairs

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