Overview:

The current healthcare landscape, especially after the crisis that resulted from the COVID-19 pandemic, could lend itself to major changes, both in terms of technology and market capitalization. We could write an entire book on all the opportunities that healthcare could offer in the next decade. One of these is *Telemedicine*, which, driven especially in recent years by technological advances, but even more so by the recent healthcare crisis, has highlighted the importance of a modern, cutting-edge healthcare system. Telemedicine services have already been tested for years by healthcare professionals, who are now able to offer care to a patient directly from the comfort of their homes, using video chat systems. A patient can now get unlimited medical information with a sequence of keystrokes, making it fast and convenient. Telemedicine is aiming at fostering improvements in quality, efficiency, cost and provide much more equitable access to care. It has grown in almost every primary care application, such as *Teledermatology, Telepsychology, Telepharmacology* and more.

In this report, we'll look at the many benefits of the technology, the current problems this sector faces, the potential role it could play in the near future, and finally, we'll introduce a company that could become and important leader in the sector in the coming years. Obviously, telemedicine will never be able to completely replace traditional medicine, as patient contact in so many cases is of paramount importance, but we think this technology has all the potential to work alongside and improve so many aspects of healthcare.

The **Global Virtual Healthcare Market** could grow at a **CAGR** of between **20% and 25%** over the 2021-2027 forecast period, with higher growth especially in Asia-Pacific, although in North America the market is already quite mature, as treating chronically ill patients constitutes 70% of U.S. healthcare spending. The key factors that will drive the growth of this market are population growth, the need to expand access to healthcare as well as improve the quality of healthcare.

What is Telemedicine?

Telemedicine is the set of medical and computer techniques that enable the treatment of a patient, or generally the provision of health services, at a distance. It empowers doctors to make diagnoses on patients who are not physically in the same place, thanks to the use of diagnostic tools and wearables by the patient through which it can send remotely collected data. This can be extremely useful for people suffering from chronic diseases, such as diabetes, which require continuous monitoring of some vital parameters. In fact, in most cases, the only thing that is 'tele' is the monitoring of the patient's condition, the analysis of some data coming from the machines, the change of a therapy, but all this after having visited the patient physically at least once. All this is particularly advantageous especially for those subjects who have difficulty in moving, so the use of these tools should be considered as support to the work of the doctor. Recently, the role of information technology, especially *EHRs*, or *Electronic Health Records*, has received a lot of attention as a means to improve healthcare performance by reducing redundant and unnecessary medical tests, decreasing medical errors, and improving decision making.

It is evident how this technology can bring countless benefits to society, such as:

- **Equitable access to care:**

  It would allow more isolated and poorly connected areas to be reached, thus decreasing geographic, socioeconomic and cultural disparities.

- **Spending Containment:**

  It would allow a drastic reduction in healthcare costs if well used, as there would be a radical decrease in hospitalization of chronically ill patients, who in this way could be directly monitored in local environments.

- **Quality and continuity of care:**

  Because patients can be continually telemonitored, there is a benefit to both the physician and the patient, who will likely have an improvement in quality of life over continual hospitalization. One of the most important attributes of telemedicine is connectivity, which transcends the barriers of time and space, and advances in technology allow for the acquisition, processing, and retrieval of a wealth of information such as biometrics, medical records, and images in a very short span of time.

Therefore, we can say that appropriate telemedicine systems could face problems of access, cost and quality, but this will depend on the ability to build local, regional and national telemedicine networks: in an ideal situation, in fact, the patient is able to receive the right care, in the right time, at his home and from the right doctor.

The goal of telemedicine is not only to reduce the use of the traditional health care service through monitoring mechanisms, but also to direct patients to appropriate sources of care from the outset based on the patients' needs, as there is broad agreement that routine, self-limiting medical problems can be effectively managed by nurse practitioners or primary care providers, and therefore specialist intervention in most of these cases would be inappropriate. It is also important to emphasize that

telemedicine systems are not intended as substitutes for the traditional healthcare system, but rather as tools that if well implemented can allow traditional healthcare to operate with greater efficiency and organization.

Key Drivers:

One of the main reasons that is driving greater day-to-day adoption of platforms offering telemedicine services is the COVID-19 crisis, which shifted the focus to the need to provide care without risking further contagion. In fact, COVID-19 only accelerated the adoption process because the limitations of traditional healthcare had long been known, such as:

1. **Fragmentation of care:**

   Care is often spotty, without the necessary connections between patients and physicians, and there is not good coordination.

2. **Lack of promotion of disease prevention:**

   In fact, medical intervention is not the only determinant in the health of the collective, but also the choices that people make in their daily lives and the environment in which they live have a direct impact on their health. With a media focus on healthy diets, physical activity, and the impact of smoking, there would definitely be an improvement in the overall health care system.

3. **Demographics:**

   The aging of the population, resulting in more chronic diseases has also increased the demands on care. In fact, it is estimated that 75% of healthcare costs are attributable to chronic diseases, many of which are preventable if caught early.

4. **High costs:**

   In many parts of the world, technological advances are increasingly beyond the reach of low- and middle-income people due to their high cost.

5. **Advances in Technology:**

   One of the biggest advances put into place by telemedicine will be *Remote Patient Monitoring* (*RPM*), which allows a patient to wear a device that sends information to the patient's phone and helps them, with a simple graphical interface, monitor their health. Obviously, it will be critically important for the public to adapt to the technology, although according to several surveys, two-thirds of patients would be willing to wear RPM devices if it will help improve their quality of life and make fewer trips to the doctor.

Also very important is the technological progress of *Artificial Intelligence* software, which can detect trends in patient outcomes and prompt the patient to perform certain actions before symptoms can even manifest themselves in a serious way. Continued improvements in these types of technologies should increase the usability of apps and improve access to care for a wide audience.

What are the risks?

Although it seems clear that technology has all the potential to be, in the not too distant future, part of our everyday life, it is also necessary to talk about the barriers that telemedicine presents, some of which actually seem to be very difficult to overcome, but we will also try to give possible solutions.

In the era of smartphones and 5G networks, information travels from one part of the world to another in a matter of seconds. Technology breaks down the barriers of time and space. However, using a smartphone as a telemedicine tool (to send pictures of an injury, or to make a video call with the doctor for example) raises some noteworthy considerations, such as:

- **Image and audio quality:**

  Not everyone has a state-of-the-art smartphone and a high-performance internet connection, so there may be communication issues between patient and physician.

- **Medical-Legal Risks:**

  There are indeed potential legal risks for physicians, particularly if the patient cannot be taken to an office or hospital, so caution is advised in physician judgment. The most common allegations from patients who have been harmed by negligent physicians are: delay in diagnosis, poor or absent documentation, misdiagnosis, inadequate communication, and untrained or unqualified staff. In fact, a patient who is asking for help may be harmed instead of helped when the responding staff is not properly trained, so the fact that the physician may not even be directly involved makes little difference if a malpractice suit follows, as the supervisor of the staff to whom tasks have been delegated, the physician is primarily responsible, thus a likely addition to the list of defendants.

- **Patient-physician relationships:**

  Another common concern is the potential degradation of the relationship between the physician and patient, as building a relationship through video or phone is different than face-to-face, so it also takes training on the part of the physician to improve virtual relationships with patients.

- **Cybersecurity:**

  One of the biggest risks in the next few years, in every area of life, is precisely that of cybersecurity. Central banks such as the ECB and FED have already warned that the next systemic risks could be caused by Cybersecurity issues if not managed well. Reason being, an industry like medicine, which stores sensitive patient data and images, must pay close attention to this issue. Users receiving telemedicine are most likely elderly or residing in remote areas, and most of them have never received cybersecurity training, so they easily attract security threats related to device misuse, weak passwords, phishing and more. So, the array of cybersecurity issues associated with telemedicine services requires the implementation of proper security measures, as the industry is extremely prone to cyber attacks. There is a risk that a patient's life could be affected by a cyber attack, altering information normally prescribed in a computerized medical record. Thus, further research will be needed to address the many challenges that cybersecurity poses in the medical paradigm.

But maybe there’s a solution...

We believe that, in all likelihood, the greatest risk component for telemedicine is precisely the last point outlined, i.e., that related to IT security:

How much damage could attacks aimed at stealing, or worse yet, modifying, such sensitive patient data do?

Medical information is even more important than credit cards, and they could use it to request amounts from insurance companies, or to purchase drugs with patients' identities, and consumers will be able to detect these thefts long after the fraudsters have used their identities. This could undermine trust in the system.

As we were describing this market risk, it immediately occurred to us that we would need a decentralized system that can put information into totally transparent blocks, where every transaction is tracked in a ledger within a system that is difficult to attack.

This is a great idea, I'll call it Blockchain! What, it already exists?

Jokes aside, the blockchain technology (yes, the very one of Bitcoin, and no, there is not only Bitcoin), has many advantages and is used in many projects, including governmental ones, where you cannot afford to run the risk of some information being leaked. In fact, this system is practically immune to cyber threats because of its nature, and it has much more secure and affordable storage process costs than traditional cloud data storage. The blockchain helps in transmitting data only to authorized users, and can be incorporated to manage security in every transaction, it does not have a central control or a central administrator to manage sensitive information, but is in fact totally decentralized.

The best way to apply telemedicine to the blockchain is to pair it with so-called *Smart Contracts,* via networks such as Ethereum, which can regulate the interaction between various participants, eliminating the need for a third-party authenticator or administrator and ensuring an authentic and secure framework. It is important to understand how and why this is considered more secure, without getting too much into technicalities, also because we would most likely not be able to and I might say something that could rightly annoy some Cryptography experts.

Everything is based on the concept of Smart Contract, literally a contract with the terms of the agreement between buyer and seller (in our case, patient and doctor) written directly in lines of code, which controls and verifies that the execution of transactions is traceable and irreversible. They therefore enable reliable transactions and agreements between different parties without the need for a central authority. The patient's approval to publish the information in question is based on the so-called hash (a unique code) of the document stored on the original smart contract: If the original hash stored in the smart contract matches the one sent by the doctor, for example, to view that particular medical record, then the smart contract approves the doctor's request, who will be able to view it safely. On the contrary, if the smart contract does not recognize the hash in question, the request will be sent back to the sender to update the correct details and make the request again.

Obviously the process just described is very simplified, in reality everything is much more complex. We invite you, if you are a cryptographic expert among our readers, to write in the comments or to write directly to us if there are obvious inaccuracies in the process just described. In conclusion, we can say with certainty that blockchain technology could really revolutionize the healthcare sector, and even more specifically that of telemedicine. So, in addition to keeping an eye on the technological advancement of the technology that is the subject of this report, it is equally necessary to keep up to date on potential applications of blockchain in healthcare.

Selected Companies

Teladoc ($TDOC)

Profilo aziendale:

- *HQ:* New York
- *Market Cap:* $23 Bln
- *Stock Price*: $150

Teladoc is a telemedicine and virtual health company based in New York City. Core services include telemedicine, medical consultations, artificial intelligence, and uses telephony and video conferencing software. Founded in 2002, from its early days the business model allowed patients to consult remotely with state-licensed physicians, and had 1 million members as early as 2007. Over the past 6 years, the company has evolved aggressively, acquiring companies and launching several healthcare segments. In fact, in 2017, Teladoc invested $440M to purchase Best Doctors, a medical consulting company. The company boasts a network of 55,000 experts and more than 50 million paying users.

From a debt perspective, the company is well covered, but cash flow and revenues are not yet positive, as the technology is still in the early days of adoption. Analyzing this type of company from a purely financial and balance sheet point of view could leave a lot to be desired, since an analysis that focuses on the technology at the heart of the company is much more important. In addition, it is very interesting to note that in the last 4 years the market capitalization has increased from $4 Bln to $23 Bln, with a continuous growth in research and development and a great attention to information security. Revenues in the last 4 years have also grown, especially after the COVID-19 pandemic, which led more and more facilities to rely on Teladoc's services, and the technology has performed very well. During the last year, in fact, the share price had even reached $300, mainly due to the monetary policies used by the Fed, but then stabilized around $150.

Conclusions

I feel very confident in saying that this technology will be a great support for global health to improve access to healthcare in a more equitable and effective way. Although it has many limitations, we believe that, especially after the focus on distancing caused by COVID-19, the technology will have more and more capital available for research and applications. Growth in this area will depend primarily on patient adaptation to technology, and especially improvements in privacy and sensitive data sharing technologies.

Conclusions

None of the information presented above can be intended in any shape or form as investment advice or advice to buy or sell any type of security or tokens.

Curated by

Fabrizio Tantillo

Analyst

algocapital@protonmail.ch

Algo Capital

www.algocapitalfinance.com