Policy Brief, 07/2020

EIAS European Institute for Asian Studies

Making e-Health Work in the EU: A Policy Perspective

Barbara T.S. Sénécaut
Junior Researcher, EIAS

Stefan Munk
Junior Researcher, EIAS

September 2020

Abstract

European policymakers have rightly recognized the potential of e-Health applications. The EU has brought forward key initiatives supporting the standardization, transfer and protection of data, with regards to healthcare and beyond. European policymakers should prioritize the rollout of an efficient and well-functioning 5G network and support the work of European companies in standard-setting bodies. Efforts to cooperate with and learn from other nations, especially countries in East Asia facing similar health challenges, should be encouraged at the institutional and corporate level as well as in the framework of economic cooperation agreements.

The next generation of wireless connectivity enables multiple major innovations in imaging, diagnostics, data analytics, treatment and management of healthcare. It is crucial to ensure the effective rollout of high speed 5G technology and add it to the existing healthcare architecture as this would greatly improve access, quality, reach of care, and health management, all while significantly decreasing costs. It is clear that the benefits and transformative power of 5G in the health sector are enormous and that the deployment of 5G infrastructure in the health sector is imperative to reap its benefits.

Chapter I

Towards an EU Digital Connectivity Strategy for e-Health Standards

Healthcare is a tightly regulated industry, which is why policy considerations are critical to achieve a successful modernization of the sector. This is particularly true for e-Health applications, which by definition involve the automation of extremely sensitive, even quite literally life-or-death services. Therefore, governments must ensure patients that the parties involved can be trusted, be it public providers, insurance companies or the doctor's office around the corner.

Overall, the European Commission has professed its ambitions in the digital realm in a plethora of strategic documents. Most recently the new Commission's 'Shaping Europe's Digital Future' vision was published, which includes a specific data strategy for the Union. Likewise, some landmark legislation has been enacted, the most prominent being the 2016 General Data Protection Regulation (GDPR).

In line with these developments, the potential of modern technology for the healthcare sector has not gone unnoticed. In 2018, the Commission drafted a communication outlining its objectives in the digital transformation of healthcare. Also, an 'eHealth Action' framework has been launched to coordinate efforts with Member States. These initiatives outline some general goals for the sector, such as increasing access to personalized care, meeting data security requirements, and sharing information across European countries. In which key policy fields can the EU, as well as Member State governments, advance the implementation of e-Health according to their stated objectives?

Industry Standards Setting

Industry standards play an important role for a functioning e-Health model in several respects. To allow for a fruitful exchange and handling of medical data, its transferability needs to be assured through a common format. This standardization of records has been one of the overarching themes in the European Commission's approach to healthcare digitalization.

More broadly, there is the technical standardization required to enable the components of a complex e-Health system to interact. This is closely related to the development of 5G infrastructure and its applications. The key forum for 5G standardization worldwide is the 3rd Generation Partnership Project (3GPP), an initiative uniting seven standard-setting bodies including the European Telecommunications Standards Institute (ETSI). Not only the main producers of 5G equipment are represented through these groupings, but also manufacturers of appliances dependent on this technology, including from the healthcare sector.

3GPP has already produced a first set of standards - the so-called "Release 15" - for 'standalone' 5G networks (which do not rely on previous generation cores and thereby allow for full exploitation of the benefits of the new technology). The next two phases, Releases 16 and 17, which include more application-focused determinations such as the internet of things, are scheduled for the coming 5 years. It is therefore a crucial time for European manufacturers to be involved in the process.

So far this has been done very successfully. As the Green Member of the European Parliament (MEP) Reinhard Bütiköfer put it, Europe has "been boxing well above its weight" in standardization. Some challenges to Europe's influence in this domain have recently surfaced

though. Partially, that is a natural side effect of emerging economies playing a greater role in the global technological sphere. More challenging is the development that standards are seen less as neutral enablers of globalization to be determined by technical expertise or competitive interest of large corporations, but increasingly as a tool of geo-economic influence. Such an orientation comes at the cost of technological efficiency and is not in the interest of any party. The EU thus has to strike a balance between assisting European bodies in this increasingly competitive environment, but simultaneously assuring that global fora for standardization do not give way to a more inefficient, fractured landscape. The promotion of European perspectives abroad is one way of doing so, which can be achieved for example through emissaries such as the Seconded European Standardization Expert for China (SESEC).

Concerns of Privacy Protection and Securing Sensitive Data

The creation of a network of health devices inevitably leads to some of the most sensitive data a person generates being uploaded and processed. The protection of such information is thus a key requirement for e-Health systems gaining societal acceptance and a field in which regulators must play a major role.

The Data Strategy that has been put forward by the new European Commission highlights the tightrope walk that is central to all of Europe's digitalization efforts: how to balance the protection of privacy with the need for the transfer of ever-larger amounts of data. European regulators have introduced initiatives on both fronts.

To some extent, the exchange of medical data is already possible through the European "eHealth Digital Service Infrastructure". It is so far only used sporadically for patient summaries and e-Prescriptions, but is expected to expand further. The ultimate aim, however, is not only to share data among the parties that are directly involved in the care of a specific patient, but also to use large volumes of (anonymized) information to allow for research and innovation. As laid out in the Data Strategy, the European Commission strives to create a space in which data is shared as freely as possible between businesses and governmental agencies. This is meant to increase the innovativeness and competitiveness of European companies, in particular for SMEs who would otherwise face the disadvantages of limited data pools.

As alluded to earlier, for this exchange to take place in an efficient manner, data needs to be standardized within the EU and beyond to an extent that allows interoperability of systems. In 2019, the Commission issued a recommendation for a common European exchange format for health records and has since worked with Member States towards that goal.

These objectives need to be pursued while not violating the right of each citizen to dispose of his or her data. Therefore, high privacy standards must be maintained. With the adoption of the aforementioned GDPR, the EU has been able to move to the forefront in this crucial policy field. One means that can be used in order to guarantee individual protection is to mandate transparency on what data will be used for, paired with the option for individuals to opt (partially) in or out. Another key aspect is to manage the transfer of personal data internationally, which affords the efficiency of a global innovation environment but may also increase concerns about privacy enforcement. The GDPR strikes a balance by allowing foreign operators access to European data, but only if the same privacy standards as within the EU are fulfilled. So-called 'adequacy decisions', which the EU has so far only issued to a handful of countries, are a powerful tool in that respect. They certify that a country's data protection

level satisfies European standards and thus allow for the free flow of information to entities within that jurisdiction.

International Cooperation

In a globalized innovation environment, collaboration across borders is essential to achieve the best solutions. There is ample room to learn from other countries' approaches and experiences, but for E-Health in particular there are additional benefits to be gained from using common standards and exchanging data, as explained above. There is some particular room for cooperation between Europe and East Asia, both of which host the world's most sizeable ageing societies which naturally have a high demand for healthcare. This is true with respect to countries that already have a similar age distribution as Europe, such as Japan and South Korea, but also China which is rapidly moving in that direction.

Japan has taken some important steps on the e-Health front in the past few years. The Japanese Ministry for Health, Labour and Welfare published a report on their vision for healthcare in the year 2035 which emphasizes the role of information infrastructure. In 2017, the Japanese Diet passed a law concerning the pooling of anonymized medical data for R&D efforts. Moreover, the European Commission has adopted an adequacy decision on Japan's data protection standards based on the GDPR, which allows for a free flow of data between the two partners, marking an important step for e-Health as well as other data-based innovations. An additional incentive for cooperation is that healthcare in Japan and many EU countries, including Germany and France, is organized along the lines of what can be referred to as the "Bismarck" model – named after the German Chancellor that initiated the first such system. In this approach, private insurers and care providers operate in a heavily regulated environment. This commonality is relevant since the implementation of e-Health systems would thus face similar challenges, such as the fact that health data would have to be handled by private entities and therefore regulated accordingly. The problem would be markedly different in an entirely government-run system like the British NHS.

South Korea's healthcare system, just as Japan's, has an excellent reputation for its universal, high-quality care. Since the early 2000s, it is organized around a single-payer model, in which virtually all citizens are covered by a nationally-run insurance scheme. The Ministry of Health and Welfare promotes personalized and preventive care through 'Internet and Communications Technology' (ICT) as a key to address the country's demographic challenges. Simultaneously, the tech-savvy private sector pushes initiatives in this domain, a well-known example being the Samsung Health App launched in 2013.

China is still developing its healthcare system and the sector has thus been growing at double-digit rates in recent years, making China already the second largest spender worldwide. Its current healthcare strategy, called 'Healthy China 2030' (健康中国2030), sets a variety of priorities conducive to the development of e-Health. That includes both the focus on innovation, but also the aspiration to focus on 'prevention first' (预防当先). Consequently, the Chinese government has been encouraging the provision of online services by healthcare providers. Moreover, as reported by Deloitte, the behavior of patients has also begun to 'digitalize', as they spend considerable time accessing health-related information online and thereby moving beyond their physician as their sole information source. All of these developments indicate that China will become a major market as well as an innovation hub for eHealth providers.

Policy Considerations

All in all, European policymakers have recognized the potential of e-Health applications and are committed to supporting this technological vision. The EU has brought forward key initiatives supporting the standardization, transfer and protection of data, with regards to healthcare and beyond. Especially with regards to the former two – finding standardized formats and allowing for transferability – more support by the Member States is needed to speed up the process. Furthermore, an efficient and well-functioning 5G network is a key requirement for e-Health applications to become a reality. European policymakers should thus prioritize the rollout of this technology and support the work of European companies in standard-setting bodies. Lastly, efforts to cooperate with and learn from other nations, especially countries in East Asia facing similar health challenges, should be encouraged both at the institutional and corporate level. Due to the comparability of Japan's and South Korea's approaches to healthcare, the focus here should be on sharing best-practices and data. Meanwhile, China has large potential as an innovation hub and market for e-Health solutions, thus privileging B2B ties. Policymakers should support European healthcare businesses in these efforts, for example in the framework of economic cooperation agreements, including the EU-China Comprehensive Agreement on Investment set to be concluded this year.

Stefan Munk, Junior Researcher, EIAS

Chapter II

Linking Health and Tech: Potential 5G e-Health applications

The healthcare industry and its ability to provide adequate treatment in a time-sensitive manner has been the centre of debate over the past few months due to the COVID-19 pandemic. The sector has witnessed a fair share of innovations generated by scientific discoveries and technological advancement, and is now on the brink of what will likely be a transformative revolution. The adoption of digital tools in healthcare has seen an exponential and rapid growth, giving rise to terms such as e-Health, Digital Health and telemedicine. The sector currently accounts for approximately 30% of the world's data flow and this number is exponentially growing. Evidently, data and digital connectivity are key to this revolution. The arrival of 5G, while still in its initial stage, has the potential to drastically transform healthcare delivery and help resolve the challenges and flaws exposed by the current epidemic .

5G is the newest generation of cellular wireless technology. 5G networks have an extremely low latency, a high capacity and are remarkably reliable. This means that even as data flows are increasing exponentially and the network footprint of the healthcare industry is expanding every year, 5G networks are able to handle these data streams without slowing down or lagging the process. With incomparable connection power and fast speeds, 5G can eminently boost e-Health capacity. In the majority of cases, it will be the convergence of technology - 5G backbone, ever-miniaturised sensors and large data simulations such as artificial reality - rather than simply the existence of 5G that will create this monumental shift. The three major aspects of healthcare that will be enhanced by 5G are: prevention, treatment and the management of health systems.

Prevention

The capacity of 5G technology to handle a high number of devices and data plays a pivotal role in the prevention phase of healthcare. With the increased popularity of wearable technologies (fitbits, apple watches,…) that are gathering a continuous stream of data on an individual's vital signs, such as glucose levels and blood pressure, a detailed digital health profile of each individual is being created. The shorter intervals of measurement in real-time monitoring are currently limited by the capacity of the network. With 5G and its low latency, this insight into everyday health via patient-generated data can act as an early warning system and can be used to identify and address medical issues proactively and allow for more personalised care. This will greatly benefit patients suffering from chronic diseases such as cardiovascular ones, cancer, diabetes and asthma, as this automatic and constant monitoring can alert the individual or even their doctor upon deterioration of signs and the development of further symptoms. Wearables also increase patient involvement with their own health, thus decreasing the number of unnecessary doctor visits and subsequently decrease hospital costs.

Artificial intelligence (AI) has already started to be implemented in the health sector and holds impressive transformative promises. For it to be fully efficient, machine learning needs a large amount of active data-processing for rapid learning, which would require a fast and reliable network. The more data is used thanks to the capacity of 5G networks, the more accurate predictions and assessments can be made. This would allow for great steps forward in medical research and a better understanding of the pathology of a multitude of diseases. With more information and knowledge available in such relatively undiscovered areas, healthcare

providers would be able to single out and identify those who are more susceptible to contract specific diseases, or more likely to develop postoperative complications and help adapt their behavior to prevent it. This shifts the health sector intervention from being primarily reactive to an ever more proactive one.

Diagnosis and Treatment

The second aspect of the healthcare sector which would be greatly improved by 5G is to be found in the field of diagnoses and treatments. In order for health professionals to offer accurate analyses and diagnostics, they often require large imaging files such as MRIs and CT scans for which equipment may only be available in certain hospitals. Considering that any lag in data flow results in a delay to patient care, adding a high-speed 5G network can help to efficiently and reliably transport these large influxes of data to anywhere a specialist may be located. In fact, gigabyte imaging files can even be rendered into diagnostic animations using the 5G's millimeter wave spectrum. This, combined with much faster speed in delivery facilitated by 5G, would allow for more timely diagnostics, second (or multiplied) opinions and adjustable treatments.

Geographical limitations remain a major impediment to patients receiving appropriate care, particularly in time-sensitive situations. The advent of 5G networks would thus greatly increase coverage, especially in rural areas with limited medical staff available. With remote consultations done over real-time high quality video calls, thanks to the 5G's low latency, patients in remote areas, isolated far away from healthcare institutions can receive an adequate diagnosis and treatment, able to receive specialized care without physically travelling. During emergencies in particular, the delivery of effective treatment is critical. 5G creates an opportunity for paramedics to transmit images and data from ambulances, which grants crucial extra minutes for hospitals to adequately prepare for incoming critical patients.

Robotic surgery, where doctors perform surgeries with the help of robots, is becoming an ever more common global practice. While generally this is done in the same physical location, remote surgeries are appearing throughout the world. The reliability of 5G would ensure that time intervals are in sync to coordinate human-robot collaboration, even when being thousands of miles apart. This could also revolutionise treatment in complicated situations such as war or quarantine zones, while ensuring safety for the healthcare staff. This would further allow for the expertise of doctors and specialists to reach beyond physical distance and extend worldwide without requiring patients to travel.

Management of Health Systems

There is an ever expanding demand in medical services due to aging populations, an increasing severity of illnesses, inefficiencies and complexities of the system. Clearly, healthcare is facing a fundamental supply and demand problem, and this is tremendously increasing the cost of healthcare expenditure. While the implementation of 5G will demand important investments, it will greatly cut long-term costs in the medical field. This is particularly true in the case of remote consultations and surgeries as the transportation of patients is a rather high cost driver in the healthcare system in many countries which can be easily eliminated. The cost associated with a traditional care pathway which is made up from the cost incurred in physically seeing a patient would hence be greatly reduced.

While AI is already starting to be implemented in numerous niche areas of the health sector, 5G would allow to take it much further thanks to the increase in data it can process and learn from. With an ever growing incoming amount of data, this would allow for a better system to understand the demand for medical supplies, protective equipment or even hospital beds in healthcare facilities across and within countries.

The implementation of 5G would improve the use of artificial reality (AR), virtual reality (VR) and other spatial computing. These spatial digital simulations would expedite remote learning and training, enhancing surgery practice platforms and allowing for the simulation of complex medical scenarios. These types of spatial computing are also impacting those receiving care, while there are various experiments ongoing involving physical therapy over 5G connections.

The EU financially supports a wide range of research and innovation projects in this field. In this regard, it would be imperative to progress cooperation with the European ICT industry under the 5G Infrastructure Public Private Partnership (5G PPP) so as to continue the development and innovation in healthcare. Leading European companies such as Phillips and Siemens are already at the forefront of pioneering in advancing technologies and platforms to improve healthcare and e-Health in particular.

Looking Ahead

While the idea of telemedicine and remote robotic surgeries might seem something of the distant future or a sci-fi movie, it is already upon us and shaping our future. The first remote surgery occurred in China, where, thanks to 5G, doctors were able to implant a brain simulation device in a patient located miles away, using robotics. Moscow has witnessed its first laparoscopic surgical procedure through the application of 5G, which resulted in the successful removal of a cancerous tumour. Korea has implemented a 5G enabled digital pathological analysis system, while Thailand is testing a pilot project in Siriraj Hospital for a self-driving 5G enabled vehicle that allows for contactless delivery of medical supplies. The potential of the transformative power of 5G in e-Health is crystal clear.

The next generation of wireless connectivity enables innovations in imaging, diagnostics, data analytics, treatment and management of healthcare. It also provides incentives to patients to become more involved in their own health management, obtain early preventative care and precipitate interventions, offering an extensive variety of options. Adding a high speed 5G network to the existing healthcare architecture will greatly improve the access, quality and reach of care. Information previously difficult to acquire is now easily accessible, enabling a better analysis of the performance of health institutions and a quicker identification of opportunities to improve clinical practices. While 5G and e-Health have enormous potential, it will, however, not fully eliminate face-to-face consultations.

It is crucial to ensure an effective and efficient rollout of innovative wireless technology. This will highly and positively impact patient experience, medical professionals' working conditions, and health management, all while significantly decreasing costs. Medical budgets are paramount and a highly debated topic of discussion. Yet, it may be more important to address healthcare efficiency. Without additional cost to the public, efficiency can be delivered by increased patient engagement via 5G technology. Digital transformation is the lifeline for our health systems, helping them to ensure they remain sustainable and able to cope with changing demographics and diseases.

Despite the promise of abundant and life changing benefits, as with every new technological advance, there are always concerns arising as well. Fear of possible negative health effects due to 5G networks use of higher energy millimeter-wave radiation has been voiced by critics around the world. However, to date, there has been no conclusive research proving a causal link between these networks and health hazards. In fact, 5G remains non-ionising in nature - a type of radiation that is perceived as harmless in general due to its lack of potency - and there are many technologies already in use involving a higher measurable risk.

In March of this year, the European Parliament released a briefing on the "Effects of 5G wireless communication on human health", which came to the conclusion that there is no indication that there are adverse effects of 5G technology. Nevertheless, there should be the guarantee of continued R&D to ensure the rollout of 5G networks to be developed in compliance with international standards. The benefits and transformative power of 5G in the health sector is enormous and the deployment of 5G infrastructure in the health sector is imperative to reap its benefits.

Bárbara T. S. Sénécaut, Junior Researcher, EIAS

European Institute for Asian Studies – EIAS a.s.b.l.
26 Rue de la Loi, 10th Floor
B-1040 Brussels

Tel.: +32 2 230 81 22
E-mail: eias@eias.org
Website: www.eias.org

LinkedIn: European Institute for Asian Studies
Facebook: EiasBrussels
Twitter: @EIASBrussels