
THE ROLE OF TELEMEDICINE AND DIGITALIZATION IN THE PARADIGM SHIFT OF MEDICAL SERVICES IN ROMANIA

Polixenia Aurora Roman (Pareșcura)

Bucharest University of Economic Studies, Marketing Faculty, Bucharest, Romania

polixeniaparescura@yahoo.com

Abstract: *The article outlines the role of telemedicine within the entire medical services in Romania, and aims to highlight the benefits and limitations of this type of interaction, its current market size, its growth potential and the top ten private players involved. In order to achieve the goals set in the European Digital Strategy 2030, Romania must continue to adopt measures that include raising public awareness of the benefits involved by telemedicine, the support of large-scale projects that may test and evaluate telemedicine, as well as legislative acts to eliminate the barriers against the use of telemedicine. As digital medicine gains importance, several paradigms involving the doctor-patient interaction, prophylaxis, healthy human medicine, and the family doctors will also change. Both qualitative and quantitative data has been analysed in the research process. The former includes articles and surveys published by the specialist press. The quantitative data has been taken from reports published by the European Commission or by the World Health Organisation. With regard to the concept of „personalized medicine” and to the National Health Strategy 2021-2027, the author has consulted the State of Innovation 2020 report, elaborated by the Centre for Innovation in Medicine.*

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JEL Classification: *I11, I18, I30, M31, O33*

Motto

“It has become increasingly clear that universal health coverage (UHC) cannot be achieved without the support of eHealth” (WHO, 2016)

1. Introduction

In the context of the coronavirus pandemic, the strengthening of prophylactic measures and the need to ensure public access to primary healthcare in general, and to telemedicine in particular, have sped up the implementation of new policies and public health programmes in many countries around the world. The Romanian authorities are to adopt the Operational Health Programme 2021-2027, which is considered to be the most ambitious and complex modernization programme of the health system. According to „Healthcare, a priority in the new policies 2021-2027”, an event hosted last year by the Ministry of European Funds, an estimated 6 billion euro is due to be invested in healthcare (MIPE, 2020b).

Although Romania has been among the first countries in the world to use telemedicine in emergency medical interventions, the public health system has not fully exploited the potential of such practices. The private healthcare system has responded more promptly to the advantages of telemedicine, by launching an online platform as early as 2016 - such as Atlas, funded by Dr Mihai Bran (NN Asigurări, 2020) The turning point in the global development of telemedicine is represented by the sanitary crisis related to the COVID-19 pandemic. Telemedicine made more progress within one month than in the ten years before, with France at the forefront: early March 2020 there were 10k teleconsultations a day, and by the end of the month this number increased 100 times, reaching 1 million a day (EC, 2021: 11). These facts highlight one of the paradigm shift related to telemedicine: in over

70% of the typical primary healthcare services, the patient can interact with the doctor without being together in the same room.

2. The healthcare of the future is based on prevention and on individual responsibility

The Romanian national strategy for sustainable development 2030, adopted by the Romanian Government in November 2018, stipulates that “*the improvement of healthcare services and of the access to quality healthcare is essential for a sustainable patient- and prevention-centred society*” (DpDD, 2018: 31).

Considering that healthcare services represent the most dynamic sector of the national economy (Gheorghe, 2018: 20), the strategy aims to achieve by 2030 “*the full digitalization of the healthcare system and the elimination of paper documents in order to maximize the efficiency of medical interventions and to ensure the population’s quick access to healthcare services*” (DpDD, 2018: 35). The implementation of the three eHealth pillars – Big and Smart Data, Artificial Intelligence and the Internet of Things – will change the national healthcare system for ever (INOMED, 2020).

Future of healthcare • The 4P Healthcare

- *Healthcare is participative*: medical data is produced and monitored directly by the patient, assisted by an ever growing number of connected sensors. The doctor is no longer the sole source of medical information and as a result the patient-doctor relationship is transformed.
- *preventive*: the patients who periodically collect information regarding their health become ever more aware of the need to maintain good health, which paves the way towards *prevention*-based healthcare;
- *personalized*: the ongoing collection of private data – increasingly accurate and diverse – allows an increasingly personalized healthcare;
- *predictive*: technological progress, which enables the digitalization of every individual’s complete genome, paves the way towards an increasingly predictive healthcare (CESE, 2017).

Strengthening the co-producer patient’s sense of responsibility

The beneficiary has an active role in healthcare services, with a direct participation in every stage of the service delivery, as a *co-producer* (Purcărea, 2017: 95). The consumer’s full involvement makes it possible to apply the preventive healthcare principles, as well as enables the implementation of personalized behaviour and treatment programmes. The patient’s consent to private data processing represents the communication foundation within the eHealth system (CESE, 2017). It is up to the user to accept or decline eHealth services, as per article 5 in Annex 2 to the Government Resolution passed on 26th February 2021 (H.G.).

Placed at the centre of all marketing activities, the user imposes their place within the marketing mix. The e-patient will be periodically monitored and notified – especially through online and direct marketing channels – by the healthcare service suppliers. To increase its attractiveness, the marketing actions will be reinforced by publicity, public relations and promotions both within mobile applications and on social media pages. The reception of such messages depends however on the permissions granted within the initial contract with the supplier, as well as on the e-patient’s level of interest (Gay, Charlesworth, Esen, 2009: 249).

Increasing the personalization level in healthcare services

In September 2017, the European Economic and Social Committee insisted on the challenge regarding an *overburdening* of the citizen with the responsibility of *self-managing* their health

condition. The digital transformation, the access to knowledge and innovating personalized healthcare services may allow each e-patient to become an active participant in their own health maintenance, but also to contribute – as a *collaborator*, information *producer* and data *supplier* – to improving other citizens' health condition (CESE, 2017).

In a FutureProofing Healthcare report (2021) regarding the European Personalized Health Care Index, Romania is located on the 32nd position out of the 34 evaluated countries. The study analysed primarily the healthcare systems from within the EU and our country has to fill the gaps in 4 major fields: the knowledge training level in the healthcare system, the digital infrastructure, medical services and treatment access and digital technologies.

The new multidimensional ecosystem of healthcare services

Composed by the so-called „multiple stakeholders”, the *healthcare ecosystem* lies at the intersection point between the citizen, the medical and paramedical staff, on the one hand, and a multidimensional host of entities such as hospitals, health insurers, the pharmaceutical industry, big investors, regulating bodies and governments, on the other hand. In such a complex grid, healthcare marketing requires an integrated approach, connecting all the 3P actors – patients, payers, and prescribers – in a perspective that converges towards the entire population's health and welfare as a major goal (Purcărea, Hostiuc 2020: 92). The concept of an interest-based ecosystem convergence is underlined by Ion Petroval, coordinator of EIT health center in Romania: *"If technology is going to aid us all, as patients, doctors and administrators, the people funding, those establishing the rules, with the users and with the suppliers must reach an unanimous agreement"* (CASPA, 2021).

2.1. What is telemedicine?

Telemedicine represents all distance healthcare services, delivered without the simultaneous, physical presence of the doctor and the patient, for diagnosing, treatment prescription, ailment monitoring or prevention purposes, in a secure way, by means of information technology and electronic communication (O.G.196, 2020) Telemedicine is very likely to become the *healthcare of the future* because it saves lives, is time-effective, substantially reduces the number of rehospitalizations and improves the citizens' welfare (Radu, 2017: 180).

Main benefits of telemedicine

One of the key benefits, with a great social impact, is related to the improved access to primary healthcare of all consumer categories. By eliminating the need for physical mobility, telemedicine can improve *access to treatment* in areas with a shortage of specialists or with difficult access to healthcare (FutureProofing Healthcare, 2021). According to the census on 30th September 2020, this also concerns the over 854.965 disabled people in this country (ANDPDCA). The second major benefit regards *telemonitoring*, which can improve the chronic disease patients' quality of life, thus reducing the number of hospitalizations (COM 689, 2008). Another benefit concerns the facilitation of ongoing healthcare and of the access to healthcare services. According to the findings of a survey published early 2020, based on over 10.000 respondents in 8 Romanian towns, 85% of the persons in need of healthcare assistance usually postpone the medical visit or cancel it altogether. This fact generates substantial health risks for millions of citizens, health-related work absences and a lower quality of life. It also directly affects employers' productivity and revenues, as many employees take time off work for reasons that might be avoided by an early medical check (Săndulescu, 2020).

Summing up, here are the advantages of telemedicine both for the healthcare system and for the medical services suppliers and beneficiaries (Radu, 2017: 178):

- telemedicine meets the requirements of *personalized healthcare* (INOMED, 2020)

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- the absence of direct contact helps prevent the spread of contagious diseases
 - telemedicine offers geographical and demographic accessibility, eliminating the inequities of the public healthcare system
 - it eases the burden on the medical staff in Emergency Units and frees resources to the entire public healthcare system, especially by providing secondary and tertiary medical assistance
 - it reduces mortality through consultations in real time in extreme emergency situations
 - using the *Electronic Health Record*, the doctor can access the patient's medical history quickly, obtaining both a general and a detailed view of their health condition
 - it makes the diagnostic process faster and more accurate by facilitating communication within professional networks – the doctors obtain “a second opinion” on a specific case
 - it facilitates the citizens' access to “a second medical opinion” (Andriescu, 2021)
 - it reduces the pressure on the social insurance system by lowering the number of hospitalization and re-hospitalization days
 - it decreases the number of persons who refrain from a treatment due to lack of time to visit the practice (AMA Digital Accelerator, 2021)
 - it disciplines the activity of both prescribers and patients, by supporting the appointment flux, and ensuring that the disease is monitored and the treatment plan is respected (Medic Hub, 2021)
 - it offers a sustainable alternative that spares time, energy, fuel, materials etc. (AMA Digital Accelerator, 2021)
 - if supported by effective marketing, the telemedicine platforms may become channels to promote a healthy lifestyle, creating user communities that provide orientation to other consumers (Gay & all, 2009: 396).

Main barriers to telehealth adoption

According to a PwC report for the European Commission, the main barriers to a large-scale adoption of telemedicine in the EU are the absence of a legislative framework for billing telemedicine services and the inadequate IT infrastructure, especially the lack of terminals required to access eHealth services, or connectivity problems (Fortune Business Insights, 2021). Further hindrances are related to the policies on the security, protection and processing of electronic medical records and of general health data.

2.2. Objective rationale for adopting telemedicine

It is of utmost priority to implement telemedicine as it addresses the limitations of the public healthcare system, considering Romania's rate of mortality, avoidable both by prevention and by treatment, among the highest in the European Union. Only four of the most significant deficiencies of the healthcare services in this country are listed bellow (OCDE, 2019):

- The public healthcare sector is underfunded – Romania's healthcare budget is among the lowest in the EU both per capita (1 029 EUR, compared to the EU average of 2 884 EUR), and as a percentage of GDP (5% compared to 9,8% in the EU)
- Prevention is not seen as a priority – investment in prevention lies under the EU average. In 2017, the budget for prevention represented only 1,8% of the overall health budget in Romania (the EU average is 3,2%).
- Workforce shortage – the number of doctors and nurses is among the lowest in Europe
- The insufficient use of primary healthcare places a strain on hospital and emergency services.

2.3. Catalyzing factors for telemedicine development in Romania

2.3.1. SARS-CoV-2 Pandemic

Despite over 3.23 million victims worldwide (WHO, 2021) and being a global source of insecurity, the COVID-19 pandemic has given prominence to healthcare and to prophylactic measures. The need to fight the spread of the virus by physical distancing has accelerated the adoption of telemedicine, which is a considerably more suitable and safe way to advise and monitor individuals, whether for cases of light or chronic disease (AMA Digital Accelerator, 2021).

2.3.2. The healthcare legislation review

The COVID-19 pandemic has aggravated the sanitary crisis in Romania, pressing the authorities to adapt to the new realities and paving the way towards new, faster modalities to supply healthcare services (Presidency, 2020). The Romanian Government issued in November 2020 the Emergency Ordinance no. 196 supplementing Law no. 95/2006 regarding the healthcare reform (O.G., 2020). On 26th February 2021, it passed the Government Resolution which stipulated the six types of telemedical services accepted in Romania: tele-consultation, tele-expertise, tele-assistance, tele-radiology, tele-pathology și tele-monitoring (H.G., 2021).

2.3.3. Rising digital literacy among the population

The Digital 2021: Romania report confirms that, in January 2021, there were 15.49 million internet users. Last year, the number of social media users rising over the past year by 1 million (+9,1%) and reaching 12 million persons, representing 62,6% of the total population. (see **Figure 1**)



Figure 1. Digital 2021:Romania Report
Source: Datareportal, 2021

2.3.4. Digital healthcare facilitates access to the second opinion

In the current process of healthcare digitalization, the access to information acquires new significance, as the patient often wishes a second opinion on a certain medical condition. The rationale of any telemedicine application is the need to obtain quick access to a credible source of information, independent of territorial location or service fee (Andriescu, 2021).

2.3.5. Telemedicine • appreciated by doctors and reimbursed by insurers

The Emergency Ordinance no.196 (2020) confirms the validity of tele-consultation and includes it on the list of activities that can be reimbursed by public or private sanitary units, whether or not they have a contractual relation with the Health Insurance Agencies. As a legislative measure that had long been due, the ordinance was welcomed very warmly by the medical staff on all levels. In Alina Neagu's article (2020), Dr. Sandra Alexiu, President of Family doctors Association Bucharest-Ilfov, highlights an extremely dramatic aspect: *"In the past fifteen years, [...] we have not been allowed to be doctors. Instead of treating our patients, we have had to issue numberless reference notes and letters."* Ion Gheorghe

Petrovai, a doctor and co-founder of FreshBlood HealthTech, states that “*up to 70% of medical interactions can be carried out by distance*” (Neagu, 2020).

3. Telemedicine and healthcare digitalization in Romania

The healthcare digitalization is the sixth priority pillar of the Operational Health Programme (OHP) 2021-2027, with three major objectives: the re-design and modernization of the National Healthcare Insurance Agency's (NHIA) IT system, the development of the National Monitor for healthcare data and the internal and external digitalization of healthcare institutions, as well as the fluidization of information streams. The funds allocated to digitalization through the OHP 2021-2027 amount to 260 million euro (MIPE, 2020a).

3.1. The Electronic Health Record • the foundation in digitalizing healthcare services in Romania

Romania must respond to an ambitious challenge set by the Digital Strategy 2030. In its meeting on 9th March this year, the European Commission proposed a *Compass for the digital dimension* that might reflect its digital objectives. Referring to public services, point 4 stipulates that, by 2030, any European citizen should be able to access their own *Electronic Health Record* (CE, 2021).

Funded by an investment of about 18,5 million euro from the European Social Fund for Regional Development in 2014, the project “An integrated IT system for the Electronic Health Record” began to be implemented. According to the data provided by NHIA, the EHR includes the following sections (CNAS-DES, 2014):

- Summary of essential vital medical data - accessible in emergency situations
- Complete medical history – an overview of the general health condition
- Antecedents declared to the doctor by the patient during the consultation
- The archive of medical records stored chronologically
- Secure personal data that can be modified only by the patient.

3.2. The telemedicine market in Romania

According to doctor Ion Petrovai, almost 20% of the Romanian population turned to telemedicine (CASPA, 2021). KeysFin specialists estimate the value of healthcare services in Romania around 15 billion lei in 2020 (Voinea, 2021). The net result (profit minus net loss) of the *private healthcare services* suppliers rose by 30% from 2018 and was almost 37 times (+3.570%) higher than in 2010, reaching 2,6 billion lei in 2019, due to the conditions that Romanian patients find in private hospitals: the service quality, the high-performing equipment and the quality of the consultation, treatment and intervention rooms, according to KeysFin (Voinea, 2021). Philip Choban, CEO of Telios Care, one of the main suppliers of telemedicine services for employees in Romania, points out that about 65-70 million consultations, references and prescriptions are carried out or issued yearly in the family doctors and specialist practices, both public and private (Roșu, 2021).

Telemedicine in the public health system

Romania features among the pioneers in telemedicine, considering that the current State Secretary, Raed Arafat, managed, in Târgu Mureș in 2003, to connect the ambulance paramedics with specialist doctors in hospitals (Alexa, 2014). If major telemedicine projects were managed by the Romanian authorities with foreign support between 2008 and 2018 – the North-American finance agreement USTDA (MS, 2012) and the POSCCE 49472 project, on EU funding, covered the rural areas in the Tulcea, Galați and Brăila counties (MS, 2014) – the number of privately funded telemedicine applications has risen significantly in the past year. Following the digitalization process, hospitals in major cities have taken the e-Health

approach. For example, in December 2018, the “Dr. Carol Davila” Central Military Emergency University Hospital became a member of the International Society for Telemedicine and eHealth (ISfTeH) in December 2018 (SUUMC).

Speeding up the adoption of telemedicine in Romania

Improving the population’s digital literacy, the development of the telecommunications infrastructure – access to high-speed internet, number of mobile applications, etc – as well as the creation of legislation favourable contributes to new private operators emerging on the national telemedicine market (Telios Care, Atlas, Recomedica, Docbook, Medic Chat, Doclandia, Doxtar, MedicaI etc) which offer concrete solutions to a system that has long been ailing. The viability of telemedicine and the high growth potential of the private healthcare market are also proved by the collaborations between investment funds, insurers or banks and the telemedicine platforms:

- Smart Impact Capital and Telios Care - a first joint investment by three of the largest angel investor networks in Romania, amounting to 200.000 dollars (Săndulescu, 2020)
- Cleverage Venture Capital and Medic Chat (Andriescu, 2021)
- Cleverage Venture Capital and Recomedica (Abrihan, 2021)
- Roka X investment fund and MedicaI (Andriescu, 2020)
- Next Capital and DocBook (Profit, 2020)
- NN Asigurări and Atlas App – the campaign “Live from one day to the welfare!” (NN, 2020)
- Transilvania Bank and DataKlas eMedical (HTTS, 2020)

According to Raluca Radbata from ING Bank România, the polarization of the healthcare market reflects the growth potential of the private sector, taking into account the large difference between the numbers of those who use public healthcare services (70%) and of those who prefer private medical services (Mihalache, 2020).

3.4. HelloGreen – an innovative personalized healthcare concept

HelloGreen is a *personalized medical management* application targeted at a responsible audience, as it involves both prevention and therapy. HelloGreen supports the healthy human medicine, namely individuals who want to maintain their healthy condition, but also the treatment of patients who want to have priority access to the best doctors and to personalized treatment plans that reduce the risks associated with their disease (Besmax, 2021). In a recent interview published by the Avantaje magazine (2021), Florin Hozoc, founder of Besmax and application author, points out an essential aspect that changes the perception of classical medicine: „*HelloGreen sets out from the premise that you are wealthier if you are healthy.*” The second premise says that *personalized healthcare* can offer better, safer and more effective services, improving both life expectancy and quality of life.

HelloGreen offers an innovative telemedicine solution that represents a distance communication instrument in the doctor-patient relationship, ensuring a 360° monitoring of the subscribers. The HelloGreen application is in the test phase and is due to be launched at the end of May 2021. Personalized healthcare services will be offered on a monthly subscription plan between 0 and 30 euro, with over 80 medical specialties.

3.4. Top 10 local telemedicine operators

The operators mentioned in **Tabel 1** excel in specific parts of telemedicine. For example, Telios Care grants access to a second opinion in a maximum of 24 hours, with an average response time of 2 hours. The Doclandia infrastructure allows the simultaneous processing of 100000 videocall sessions. MedicaI digitises medical imaging in a cloud storage, where it stocks over 100.000 files (Niță, 2021).

Table 1. Top 10 Romanian telemedicine operators

Nr crt	Application name	Launch year	Founder	Doctors	Subscribers / accounts	Specialties
1	Atlas	2016	dr Mihai Bran	1000	200000	N/A
2	Medic Chat	2017	dr Emilian Rădoi	223	30000	40
3	Telios Care	2018	Philip Choban	N/A	75000	21
4	Doxtar	2019	Cătălin Chiș	100	50000	40
5	Recomedica	2019	Eduard Cioroagă	326	30000	N/A
6	Concierge Medical	2019	dr Wargha Enayati	N/A	N/A	N/A
7	Medicentrum	2019	dr Horațiu Ioani	300	N/A	49
8	Doclandia	2020	Matei Țiboc	120	N/A	N/A
9	ArcadiaLine	2020	Dan Fiterman	100	N/A	40
10	MedicAI	2020	Mircea Popa	1300	100000	N/A

Source: author's research

4. In conclusion

In order that telemedicine achieves the success it is imperative that all actors involved adapt to the new digital context in the healthcare services provision (COM 689, 2008). The healthcare digitalization generates several paradigm changes, one of which associated with telemedicine: in 70% of the cases, the client no longer travels to the medical practice for the face-to-face consultation. Market research carried out in the United States in 2016-2019 reveals the fact that about 67% of the doctors prefer telemedicine for the efficiency of teleconsultations (AMA, 2020). The second paradigm change regards the new position of the family doctor. Within primary healthcare, the family doctor becomes the *manager of a cross-disciplinary team*. The new digital realities require the healthcare service beneficiary to become an active *co-producer* of their own health condition. Personalized healthcare involves two further paradigm changes related to a new e-patient conduct, namely the transition from *ill patient medicine* to the *healthy human medicine*. In relation to the classical "one size fits all" approach, personalized healthcare undertakes to provide *right* patient with the *right* prevention and treatment, at the *right* time and from the first moment.

This aspect was highlighted by Prof. Nick Guldemon at the fifth Personalized Medicine Conference, organized online in September 2020, in Bucharest: „*A paradigm change is needed towards healthcare centred on the person. The patient will be seen as a partner in the effort of maintaining or improving their quality of life by means of a personalized treatment plan. It will require an integration and co-operation between services and a change in the roles and responsibilities of the decision-makers in the system. It is simple on a conceptual level, but difficult to implement systematically*” (Voinea, 2020).

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