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Digitization in Healthcare

Assessment of Telemedicine Based on an Empirical Hungarian Research

Summary

Digital healthcare is constantly evolving, with more and more innovations emerging in the industry. This has been accelerated significantly with the emergence of the COVID-19 and the development of the pandemic situation. The relocation of healthcare to the online space, i.e. telemedicine services, has already emerged in the early 21st century, but it was undoubtedly the pandemic in 2020 that has provided new opportunities for companies in the sector to develop. The aim of our study is to explore the opinions and the knowledge of the Hungarian people about telemedicine services. Based on the results of an online survey (188 respondents), it can be said that a significant proportion of people do not know what exactly telemedicine is. The key benefits of telemedicine services are the less crowded hospitals and doctor's offices, faster administration, and recognition of severe symptoms. The respondents considered as main disadvantages were the unclear price-to-service ratio and the collection of misunderstood information and the services offered outside public financing. The telemedicine services that most people have already used are the e-prescription, booking of personal consultation and the e-referral. Looking to the future, the majority is optimistic and expects the development of digital healthcare. Based on the results, we have identified six possible digital marketing campaigns for the telemedicine companies, taking into consideration the goals, the content, and the target audience.

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Introduction

Digital healthcare is constantly evolving, with more and more innovations emerging in the industry. The control of the COVID19 pandemic and the treatment of patients with the virus became the priority for the hospitals and doctor's offices worldwide, thus putting other healthcare activities into background. Due to this, the demand for the possible relocation of the healthcare to the online space and telemedicine companies were established which provide various online healthcare services, supplementing the services of the conventional healthcare system. In addition to the search engines, the usage of the medical applications have also grown significantly during the period of the pandemic, globally by 65%, with the highest proportion in South-Korea (135%) and India (90%), and also in several European countries (Statista, 2021).

The availability, the equality and the cost-effectiveness are the key issues which the healthcare is facing both in the economically developing and developed countries. The modern information and communication technology (later as ICT) – the spread of computers, internet, and phones; revolutionalizes the way individuals communicate with each other, seek and exchange information and enrich their lives. Enormous potential is lying in these technologies for overcoming the obstacles present in the area of providing available, cost-effective, and high quality healthcare services both in the developing and the developed countries. According to Matolcsy (2020), the future will be simultaneously local, regional and digital, which may be the first step towards a fifth industrial revolution based on artificial intelligence and bringing fundamental changes to the social organization. The digital healthcare system uses these technologies to span the geographical boundaries and to enhance the availability of the healthcare services. This is particularly useful for the rural and the inadequately covered communities in the developing countries; for the groups which traditionally suffer from the lack of availability of the proper healthcare services. However, according to even the most pessimistic social scientists, the healthcare situation will improve (Lentner, 2020).

Telemedicine is the new paradigm of the healthcare, where the patient is still under medical supervision even between two visits (American Telemedicine Association (2013). According to Perednia (1995), the telemedicine, defined in a broad sense, means the use of the telecommunication technologies. All this is realized in order to provide medical information and services. The interest towards the industry grew dramatically in the 90's. Since then the application of telemedicine has been a rising trend (Kurjak–Kós, 2001). Its popularity is unquestionable in North America, Australia, South Africa and in the Scandinavian countries. However, its inland spread has not yet achieved major success. In the vast majority of the cases, the goal of the telemedicine is not to be a "small hospital", the home deployment of the professional equipment operated by the medical staff at the hospital, but the development of such protocols and medical devices which least impede the usual lifestyle of the patient, provides security for them, and sufficient data for the medical experts.

Nowadays the use of mobile phones is constantly expanding and this trend is expected to continue in the future. These devices use several different interfaces but the two platforms with the largest market share are the Android operating system and the iOS operating system.

By their widespread integration into the lifestyle of the users the mobile phones can support the individual activities anywhere, anytime. In addition, due to the several built-in sensors the devices are capable of measuring and analysing the various medical parameters.

Telemedicine is yet in its early stages, and though there are high hopes in it, in order to maximize profit, its analysis is required. The ICT may be quite costly, just as the programs related to it. Actually, most often mentioned restriction to the introduction of the global solutions of telemedicine is the high costs (Botrugno–Zózimo, 2020). In the 2010 survey of the WHO, 70% of the countries stated that they needed more information on the cost and cost-effectiveness of the telemedicine solutions, and 50% of them requested more detailed data on the required infrastructure for the incorporation of the telemedicine solutions. Further information on the clinical use of telemedicine was requested by 60% of the countries. While the developing countries see the problems that can be related to the resources – such as the high costs, underdeveloped infrastructure and the lack of technical expertise – as the limiting factors of the telemedicine, the developed countries must consider the legal obstacles – such as privacy and confidentiality (WHO, 2010; MacHado et al., 2021).

Enormous quantity of valuable insights, procedures and technologies become available in the field of healthcare every year. However, only a small portion of these methods and technologies becomes accepted and used in the everyday treatments. Difficulties often occur in the introduction of the innovative technologies. The incorporation of new insights and developments into the healthcare may be only partially successful or sometimes entirely unsuccessful, but several innovations have been already incorporated (Grol et al., 2013). Medical science took its direction towards a more humane version based on partnership and joint decision making.

The aim of our study is to explore the opinions and knowledge of the Hungarian people about telemedicine services. We aimed to answer the following research questions: how informed the people are about the telemedicine, what they think of the benefits and disadvantages of the telemedicine services, or how willing they are to use them and what they think about the future of the digital healthcare. After the literature review, the results of an online quantitative research will be described. Our research took place in spring of 2021 in April, during the 3rd wave of the COVID-19 pandemic in the time of the stricter governmental actions and restrictions.

Literature Review

In the 90's the personal computers became widely available and the e-health also emerged. When these computers were connected to form a network, the telemedicine services began to appear. The emergence of the community media provided room for the medical science and healthcare 2.0, while the penetration of smartphones gave rise to the mobile health applications (Akter–Ray, 2010). According to Van De Belt (2010) there is no relevant difference between the medical science and the healthcare 2.0. Eysenbach (2001) agreed with this statement but added that the medical science 2.0 is a wider concept which includes the consumer-oriented medical science. Another concept which emerged in the literature of medical

science and healthcare 2.0 is the so-called "patient authorization 2.0". The concept can be described as the active participation of the citizen in their own medical situation using the information and communication technology (Van De Belt, 2010). It can be assumed that the medical science and healthcare 2.0 leads to the patients' authorization because the patients can access the health-related information more easily thus will be capable of making more conscious decisions.

The new phenomenon which is called digital healthcare, brought changes in the provision of the treatment of patients and the application of medical science. The digital healthcare is the cultural transformation of how the disruptive innovation (technological innovation transforming entire industries and markets) provides continuously available digital and objective data for both the experts and the patients. It leads to such doctor-patient relationship in which the participants make decisions jointly as equal parties (Meskó et al., 2017). Since the technological innovations became inseparable from the healthcare system the change of paradigm is inevitable for it will become financially unsustainable worldwide,

With the COVID-19 outbreak putting an enormous load on the institutions, accelerated the measures taken so far and promoted the emergence of new means. In the pandemic situation people try to avoid personal visits to doctors whenever possible, so it is necessary to offer some remote solution the doctors can use for secure communication with their patients via the Internet (Szatmári, 2021a).

In the 21st century, the number of patients with chronic diseases and the cost of modern healthcare are growing more and more, the life expectancy is higher, and as a result of this, globally the system lacks several millions of doctors, nurses, midwives and other medical professionals. Globally, 75 countries have less than 2.5 medical professionals for a population of 1000 people (Meskó et al., 2017, Aluttis et al., 2014). The development of the technology offered several new possibilities in the healthcare. In addition to the joint decision making, the active participation in the recovery processes and the monitoring of the patients' own condition using sensors from their home are such services which are not only demanded but are also possible by the technique used. In the conventional healthcare the patients were not involved either into the decision making or the disease management concerning their own health. The professionals were to undertake full responsibility for the medical decisions and their consequences. The patients became fully dependent on the processes, infrastructure, information and the decision making of the healthcare employees. This uncertainty and vulnerability provided the primary motivation to provide patients with a greater influence, and more information.

As a consequence of the COVID-19, several researchers (Botrugno–Zózimo, 2020; Julesz, 2020; Ricci et al., 2020) have studied telemedicine. Due to the social distancing and the remote services, thus remote healing came to fore. The patients' expectations have changed, the interest in the feedback of former patients has grown, in which, reading their feelings and experiences, patients are better informed when they visit their doctors. Patients use the search engines such as Google or Bing, to find health-related information. 5% of the searches on Google can be related to health. According to one study, 60% of the users look at the assessments of Yelp before visiting an expert (Szatmári, 2021b).

According to Eysenbach (2001), e-health includes more than just the technological development in the healthcare. E-health is an emerging branch in the intersection of medical science informatics, the public healthcare and the business, referring to the healthcare services and the information transmitted or enhanced on the internet and the related technologies. In a broader sense, it is not just a technical development but a way of thinking, attitude, commitment towards the global thinking in order to be able to develop healthcare locally, regionally and worldwide by the information and communication technology.

According to experts telemedicine is an effective and cost-effective method of healing; however it lacks the breakthrough in its introduction. The results achieved so far show without doubt that the larger extent of relocating healthcare into the online space can provide improvement in efficiency and effectiveness. The electronic transmission and remote assessment of the digital imaging examinations, the remote consultations, for example EKG evaluation by the cardiologist or a telepsychiatry remote intervention are common procedures today, but they can also include the interventions of remote surgery with an active or passive participant (Kurjak–Kós, 2001).

As for the doctor-patient telemedicine, the patient supervision, certain procedures and interventions do not require the constant and continuous existence of the direct physical doctor-patient relationship. The application of telemedicine on one hand, contrary to the conventional medicine, requires the involvement of fewer resources; on the other hand, it makes treatment available in space and time for the patient in several cases when conventional medicine cannot provide opportunity. Third, it allows even the continuous treatment and monitoring outside the doctor's office without the significant increase of the costs. By the application of telemedicine, therefore, the number of office visits can be greatly reduced, removing a part of the load from the overcrowded doctor's offices, which may improve the quality of life for the patients. It can be excellently applied to support self-care, provides possibility to check certain parameters at home, and the timely recognition of severe symptoms and conditions (Daragó et al., 2013).

The justification of telemedicine is unquestionable, yet several factors impede its wide-range introduction in our country, however, there is no doubt that the pandemic situation gave a further boost to its development (Julesz, 2020). Other problems do occur like the lack of information of patients, doctors and financers, their distrust in the new method, on the other hand the unclear circumstances related to the applicability and application, such as:

- *Data protection*: The hazard of unauthorized third parties getting into possession of sensitive information related to the patient's health condition (MacHado et al., 2021).
- *Health literacy*: Despite of the use of digital technologies, the development of healthcare depends greatly on the health literacy. Those with lower health literacy have lower general health conditions, visit doctors more often, use less of the preventive practices and in general they mean higher costs to the healthcare system (Csizmadia, 2016). Health literacy has a greater role in reshaping health conditions than the income, education or being part of any ethnic group. Patients with lower health literacy level are less likely to enjoy the possibilities provided by e-health (Meskó et al., 2017).
- *Technological deficiencies*: To use the digital healthcare, participants are to be competent

in using computers and the media. Healthcare is facing a great challenge: whether the technological transformation will improve health literacy or on not, will deepen the already existing digital gap?

– *Ethics*: Two key problems arise: on one hand the deterioration of the doctor-patient relationship due to the lack of personal contact, on the other hand, collection of misinterpreted information from the digital medical devices and unreliable online sources which may lead the patients to such decisions which do not incorporate the experts' opinion, thus jeopardizing their medical condition.

– *Law*: Currently the issue of the scope of responsibility of the healthcare provider providing care, thus - understandably - they are reluctant to use it. In case of the application of telemedicine there is no actual professional directive which could provide clear protection for the physician in case of judicial procedure and it is also unclear what guarantee or warranty claim can a patient apply in connection with the care.

– *Financing*: Since the health insurance has not adopted the telemedicine services under public financing, their financing is outside of its scope. In case of employees it can be accounted as a part of occupational medicinal activity or the telewellness as cafeteria.

The application of telemedicine requires various sensors, other telecommunication devices and services, but at the same time its application can save costs on certain basic and specialty care both on the part of the patient and on that of the society. By sharing responsibility, the specialists share the burden and the consequences of the choice of the appropriate therapy with their patients. The paradigm shift may bring about such advantages as the relief from the recurrent tasks of the job position, which would enable the doctors to spend more time with their patients and to devote more focused attention for them. Those skills which are hard to fulfil, such as empathy, care for the community and the human touch, may become the essential elements of the healthcare.

The use of digital healthcare requires teamwork, so the era of "lone hero doctors" would end. The success of healthcare is based on the cooperation, empathy and joint decision making. What is needed for this is a newly defined cooperation between the doctor and his patient. The well functioning doctor-patient relationship is still an essential part of the recovery process. Introduction of new approaches, views is needed in the medical education, including the college years where the students acquire such skills which prepare them to work with the technology (Meskó et al., 2015). The today's generation grows up using technology; some become so-called "digital natives". It is inevitable for them to seek a digital solution for any medical problem. Therefore, if we are unable to integrate the digital healthcare into the conventional one appropriately and safely, we expose the new generations to a great risk (Prensky, 2009).

Methodology

In the empirical part of the study we set the objective of the study to discover how much informed the people are in connection with the telemedicine:

– What do they think about the advantages and disadvantages of the telemedicine services?

- How willing they are to use them?
- What they think about the future digital healthcare?

The objective of our research is to determine what is required to be communicated by the marketing specialist of a telemedicine company towards the potential consumers. Thus we aimed to discover the benefits and disadvantages telemedicine services. This reveals the benefits the company has to communicate and the disadvantages for which alternatives are to be found or compensation offered.

In the questionnaire on which the *quantitative research* is based, we used non-metric and metric scales.

- The measurement of the knowledge of telemedicine was based on self-declaration and was done on a nominal scale (yes; no and not heard about it; no but heard about it).
- *9 advantages* – (1) nonstop availability, (2) faster administration, (3) consultation form the comfort of home, (4) less crowded hospitals and doctor's offices, (5) transparency of the medical data, (6) continuous monitoring, (7) support self-care, (8) timely recognition of severe symptoms, conditions, (9) less resource involvement from the part of the state – and 8 disadvantages – (1) distrust towards the system, (2) collection of misinterpreted information from the digital medical devices, (3) deterioration of doctor-patient relationship due to lack of personal contact, (4) inadequate data security, (5) lack of professional control, (6) services out of public funding, (7) no clear price-to-service ratio, (8) technological deficiencies – were examined. The evaluation of the scale was done on an interval scale with the endpoints 1: not at all important – 5: very important.
- For the *willingness* to use 11 aspects were examined - booking appointment for personal consultation, online consultation, electronic medical prescription, electronic referrals, nonstop availability of specialists, continuous monitoring of medical parameters, data storage for the individual and his family, setting medical goals, prevention practices and tips, health insurance packages for individuals, health insurance packages for companies, which were handled as categorical variables, respondents were able to choose one of five options (would not use, perhaps would use, would use, have already used, I don't know what is this service).
- The respondents could choose from 3 options regarding the *future of digital healthcare*: (1) The system remains undeveloped, people will keep on relying on the conventional healthcare. (2) Further innovations can be expected until the end of the pandemic, digital solutions will spread, however, people will return to the conventional healthcare after the end of the pandemic. (3) The digital healthcare evolves further and will be widely implemented. Consultations, care and treatments will be done in the online space as possible. The conventional healthcare will continue to provide services which cannot be performed digitally. They also had the opportunity to express their own opinions.
- The *socio-demographic characteristics* (gender, type of residence, occupation, educational level) are variables measured on a nominal scale.

For the answering of the research questions we chose the single cross sectional survey from the primary research methods. The planned sample size was 200. The empirical survey took place in April 2021 in the form of an online self-administered questionnaire. University students and the authors took part in the polling, having collected the responses with Facebook in a week, using snowball sampling technique. Finally, 188 persons were reached, 28% of men, 72% of women. In the research we focused on the adult population, that is, on those between the age of 18 and 80. The average age of the respondents is 37.4 years, the standard deviation is quite high (15.4 years), the mode is 23 years, and the median is 34 years. The groups of youth, middle-aged and elderly were separated by transcoding. Based on the further demographic criteria the sample illustrates the following distribution (Table 1).

Table 1: Demographic composition of the sample

Age	young (18-34 years)	middle-aged (35-60 years)	elderly (61-80 years)		
	51.1%	38.3%	10.6%		
Place of residence	village	municipality	city	county-seat	capital city
	11.1%	14.3%	25.5%	39.4%	9.7%
Occupation	student	employee	entrepreneur	unemployed	pensioner
	19.1%	67%	4.8%	1.0%	8.1%
Level of education	technical school	GCSE	professional qualification of higher education	degree (BA, MA)	
	2.7%	33%	9.0%	55.3%	

Source: Own edition, n=188 persons

Before the presentation of the result we consider important to highlight that the sample is not representative, does not consider the entire Hungarian population, the young age group, those living in a county seat and those having a degree are overrepresented in the sample. At the same time, we assumed that this group has deeper knowledge regarding the subject examined. To answer the research questions, we used single variable statistical methods; the data processing was done using the Excel program. The results are presented with regard to the demographic background variables.

Results

At first we examined the knowledge on telemedicine. Only 33.5% of the respondents stated to know its meaning. 46.8% had never heard the expression and 19.7% have heard about it but cannot tell us what it is. The more educated the person is, the more known to them is the

concept of telemedicine. Only 24.2% of those with a GCSE, 29.4% of those with a degree and 40.4% of those with a diploma claimed to have known the meaning of the concept of telemedicine. The average age of those knowing this concept is 39.9, those having never heard the expression are younger, their average age is 34.7 years old and those having heard but do not know what it means are 39.5 years old on average.

Benefits and Disadvantages of the Telemedicine Services

With regard to the benefits of telemedicine services nine aspects were examined (Table 2), which the respondents assessed on a 5-point Likert scale. The key benefits of the services are the less crowded hospitals and doctor's offices, faster administration and recognition of severe symptoms. The least important benefits are the lower resource involvement, the continuous monitoring and the support of self-care, however, the latter two aspects received an evaluation above 3.5, so they are rather considered important benefits. The less crowded hospitals, doctor's offices, the support of self-care and the less resource involvement from the state were marked more important by women than by men. The younger the age group, the more important are the less crowded hospitals and doctor's offices and the faster administration benefits. For the middle aged, the least important are the lower resource involvement and the consultation from the comfort of home, and the support of self-care is the most unimportant for the elderly. The benefits are considered most important in the capital city. In addition to those living in the capital, the recognition of severe symptoms is very important for city dwellers, and the less crowded waiting rooms is the most unimportant for those living in the municipality/village.

Table 2: Benefits of the telemedicine services

Benefits	Average	Standard deviation
Less crowded hospitals and doctor's offices	4.37	0.89
Faster administration	4.34	0.93
Timely recognition of severe symptoms and conditions	4.25	0.96
Transparency of health data	4.02	1.03
Consultation from the comfort of home	3.93	1.09
Non-stop availability	3.92	1.19
Support of self-care	3.79	1.04
Continuous monitoring	3.68	1.12
Lower resource involvement from the part of the state	3.45	1.19

Source: Own research, n=188 persons

The faster administration is the most important for students and for the pensioners it is the least essential. In addition, the consultation from home and the support of self-care is the least important for pensioners. For the entrepreneurs, the transparency of the medical data is the most important; the least important is the non-stop availability. The less crowded hospitals and doctor's offices are equally important for the students and employees, and the lower resource involvement is the least essential for the employees. The non-stop availability, the faster administration and the support of self-care is equally important for all educational levels. It is only the consultation from the comfort of home which is more important for those having a higher education degree, the other benefits are more important for those with a GCSE.

Regarding the disadvantages of telemedicine services nine aspects were examined which the respondents assessed on a 5-point Likert scale. (Table 3) The respondents considered as main disadvantages were the unclear price-to-service ratio, the collection of misunderstood information and the services offered outside public financing.

Table 3: Disadvantages of the telemedicine services

Disadvantages	Average	Standard deviation
No clear price-to-service ratio	3.34	1.05
Collection of misinterpreted information from the digital medical devices	3.11	1.09
Services outside of public funding	3.06	1.1
Lack of professional control	3.06	1.14
Deterioration of doctor-patient relationship due to lack of personal contact	2.82	1.23
Inappropriate data security	2.79	1.26
Technological deficiencies: insufficient competence to use computers and the media	2.79	1.34
Mistrust towards the system	2.76	1.27

Source: Own research, n=188 persons

For women, the strongest disadvantage is the unclear price-to-service ratio, the misinterpreted information and the lack of professional control. Men highlighted most the unclear price-to-service ratio, the services offered outside public financing, and the misinterpreted information as disadvantages.

The middle-aged people consider the drawback factors as the weakest. Among the listed disadvantages are the misinterpreted information, the unclear price-to-service ratio and the technological deficiencies are the least strong factors. From the age groups, the elderly marked the services offered outside public financing the weakest and the deterioration of doctor-patient relationship as the strongest disadvantage.

It can be stated on those living in the capital city that for them the misinterpreted information and the technological deficiencies are the strongest drawbacks while the lack of

professional control is the weakest aspect. The deterioration of doctor-patient relationship is the strongest disadvantage for people living in the cities and in the municipalities/villages.

The lack of trust and the deterioration of doctor-patient relationship means stronger drawback for those with a GCSE, while the lack of professional control, the unclear price-to-service ratio and the inadequate data security is stronger for those having a degree. In addition to the unclear price-to-service ratio and the misinterpreted information, those with a GCSE marked the deterioration of doctor-patient relationship; those having a degree marked the lack of professional control as the strongest disadvantage. Contrary to this, the data security, the lack of professional control and the technological deficiencies for those with a GCSE, while for those having a degree the deterioration of doctor-patient relationship, the lack of trust and the technological deficiencies were the weakest of disadvantages.
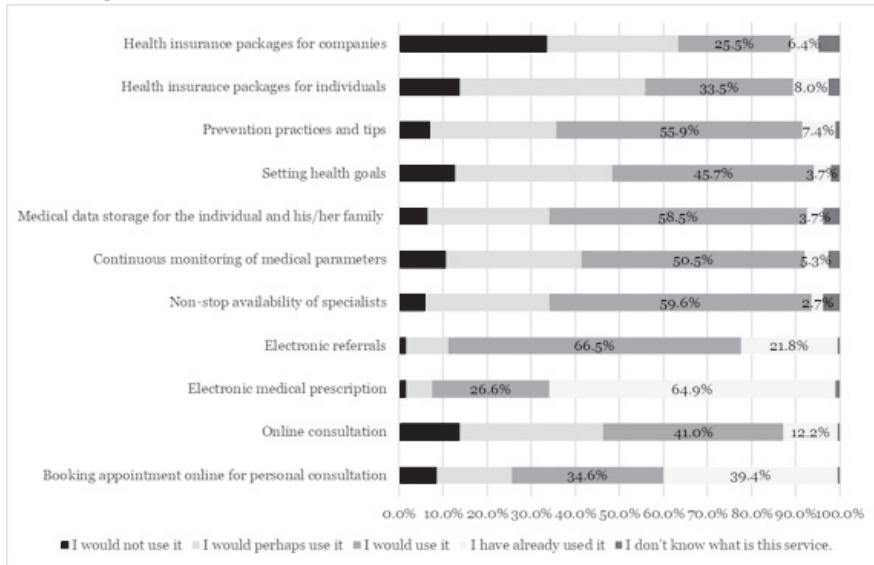
The misinterpreted information for the students, the deterioration of doctor-patient relationship for the pensioners and for the entrepreneurs the services offered outside public financing is the strongest factor. The weakest disadvantage for entrepreneurs and pensioners is the lack of professional control, and for the employees it is the technological deficiencies.

The lack of trust and the deterioration of doctor-patient relationship means stronger drawback for those with a GCSE, while the lack of professional control, the unclear price-to-service ratio and the inadequate data security is stronger for those having a degree. In addition to the unclear price-to-service ratio and the misinterpreted information, those with a GCSE marked the deterioration of doctor-patient relationship; those having a degree marked the lack of professional control as the strongest disadvantages. Contrary to this, the data security, the lack of professional control and the technological deficiencies for those with a GCSE, while for those with diploma the deterioration of doctor-patient relationship, the lack of trust and the technological deficiencies were the weakest disadvantages.

Willingness to Use

In the case of telemedicine services, the majority (64.9%) have already used the electronic prescription, while the other services have been used less among the respondents. 39.4% of the respondents have already booked online a personal consultation appointment, 21.8% of them requested electronic referral. Regarding the usage of services, the highest openness can be experienced towards the electronic referrals, the non-stop availability of specialists and the medical data storage but more than 50% are interested in the prevention practices and tips. The health insurance packages and the online consultations are the least to be used. The telemedicine services are relatively known among the respondents. Least known are the health insurance packages and the continuous monitoring of medical parameters (Figure 1).

Figure 1: Willingness to use related to the telemedicine services

Regarding the use of telemedicine services, women are more open towards the services than men. Women would mainly use the e-referral, the medical data storage and the non-stop availability, men, on the other hand in addition to the online consultation, e-referral and the non-stop availability would use the prevention practices. There is no such young person among the respondents who would not use the e-referral and the e-prescription, moreover, it is the young age group which would use the setting of health goals and the prevention practices and tips the most, however, they would use the online consultation the least. The responses reveal that the younger the age group is, the more they would use the medical data storage, continuous monitoring and the booking of personal consultation services. It can be said of the elderly that they would use the e-prescription and the e-referral the least. In case of both the young people and the middle-aged the first three services which they would use most contain the medical data storage, the non-stop availability and the e-referral. The opinion of the elderly differs in that they would prefer the prevention techniques and tips to the medical data storage.

Those services which the respondents would most use differ according to the type of their residence. The biggest demand for the use of services is in the capital, but the online consultation would be used more in cities and municipalities/villages than in county seats and the capitals. Furthermore, the least demand for booking personal consultation and the continuous monitoring are in municipalities/villages, the setting health goals is least demanded in the cities.

The biggest demand for the use of telemedicine services is among students, the least is among pensioners which probably correspond to their attitude to technology and their

digital literacy. In addition, the booking of personal consultation and the health insurance packages for companies would be least used by the entrepreneurs, the online consultation would be least used by the employees. Furthermore, there is no student or entrepreneur in the survey who would not use the e-referral and the e-prescription. As for the pensioners it is worth mentioning that they know every service listed in the questionnaire. The sequence of the services most to be used is different for the groups but the marked services are the same: non-stop availability, medical storage and prevention practices. Among those with a diploma the demand for the services is higher. Furthermore, those having a degree in higher education would use mainly the e-referral, the medical data storage and the non-stop availability, while those with a GCSE would use the prevention practices in addition to the non-stop availability and the medical data storage.

The Future of Digital Hhealthcare

Finally, we were interested in the opinions related to the future of the digital healthcare. 24.5% of the respondents assume that the system remains undeveloped; people will use the conventional healthcare. Interestingly it is mostly the youth who identify with this scenario. The decisive majority is optimistic, 36.7% thinks that further innovations can be expected until the end of the pandemic, digital solutions will spread, however, people will return to the conventional healthcare after the end of the pandemic. According to 37.2% the digital healthcare evolves further and will be widely implemented. Consultations, care and treatments will be done in the online space as possible. The conventional healthcare will continue to provide services which cannot be performed digitally. Proportionally more people chose this option from the elderly age group than from the youth. The other response option was chosen only by three persons who were pessimistic: "Very many people are far from the digital health future regarding both preparedness and trust." "It requires a lot of development; I do not think it will spread within five years. This needs the improvement of informatics and competence." and expressed their dissatisfaction with the system.

Conclusions

The objective of this study was to assess the awareness of the Hungarian population related to telemedicine, using an exploratory empirical research. A significant portion of the respondents do not know what telemedicine is or have never encountered this concept, or have encountered it but do not know its exact meaning or content. The key benefits of telemedicine services are the less crowded hospitals and doctor's offices, faster administration, and recognition of severe symptoms. The least important benefits are the lower resource involvement, the continuous monitoring and the support of self-care. The respondents considered as main disadvantages the unclear price-to-service ratio and the collection of misunderstood information and the services offered outside of public financing. The telemedicine services that most people have already used are the e-prescription, booking of personal consultation and the e-referral. The services which would be least used are the health insurance data packages both for companies and individuals, the on-line consulta-

tion and setting health goals. Most do not know the health insurance packages for companies, the medical data storage, the non-stop availability and the setting of health goals services. Looking to the future, the majority are optimistic and forecast the development of digital healthcare.

Based on the results, we have identified five possible digital marketing campaigns for telemedicine companies, taking goals, content, and target audience into consideration. In case of (1) brand building the objective is the more intensive use of the service, the branding and the promotion of the brand's visibility, and the increase of commitment. Regarding content, the presentation of the company and its services should be highlighted. The emphasis of the benefits and of the services is also important here but the main issue is that the brand, the company should be known by as many people as possible. The target audience in this case may be the youth, those living in the capital, those having a higher education degree and the students.

In case of (2) substitute services the objective is to present the substitution services to the conventional healthcare system which are the telemedicine services. During communication, those services are to be focused on, which offer better, more efficient solutions for the problems arising at the conventional services. In this case the target audience of the campaign is the women, those having a higher education degree and the students.

In connection with the (3) complementary services it is to be demonstrated that which other services can the telemedicine companies offer. These, combined with the conventional ones, the users get a more comprehensive overview about their health situation. In this case the emphasis is on those services which offer some surplus in addition to the conventional ones and the possible combinations with the conventional ones and the information thus obtained. Target audience is the middle-aged and those with a GCSE.

Creating (4) educational contents would also be important. It would be important to concentrate on dispelling the impeding factors to reduce the recognition of the disadvantages. The detailed presentation of the disadvantages in which counter-arguments, possible compensations or explanatory/educational contents are given for the greater acceptance,and the target audience in this case is the women and those having a higher education degree.

For the (5) description of the services campaign the objective is to describe the palette of telemedicine services to those groups where the services are less known or the number of the already used services is relatively low. Regarding content, the listing of the telemedicine services, their complete presentation, the description of their use and availability would be in focus, and the target audience would be the men.

Finally, the (6) increase of usage intensity would also be important. The aim is to increase the willingness to use telemedicine services, by describing and emphasizing the key services and benefits. In this case, the target audience would be the elderly, and pensioner men.

This research paper is not without limitation. First of all, we would like to highlight the relatively small sample size, and the non-representative sapling technique since the respondents were contacted from our own acquaintance. In the future we would like to run the research on a larger sample, even in an international outlook since telemedicine started to developed dynamically in the developed countries due to the pandemic. Due to the spread and the newer and newer waves of the virus it would be worth to conduct a longitudinal research and to compare the results with respect to the extension of services.

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