FACTORS INFLUENCING THE ADOPTION OF E-HEALTH SERVICES BY THE PATIENTS

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Abstract

In this study, an extended version of the technology acceptance model (TAM) was used to understand the factors that could influence the behavior of the patients. Besides the „typical" TAM variables (positive attitude or technological readiness), this study explores the role of social and individual benefits and COVID-19 anxiety on the willingness to try and intention to use and the actual usage and satisfaction in a country in the Central and Eastern European region. This extension and the chosen region add novelty to the research. The results of linear and logit regression analysis based on an online questionnaire show that the individual benefits and positive attitudes have a high impact on the trying and using intention, but the perceived social benefits do not have significant effect. These results highlight the importance of awareness campaigns that point out the personal benefits of e-health and dispel the general distrust of the technology.

Keywords: technology acceptance model, Covid-19, e-health, telemedicine, healthcare

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INTRODUCTION

The application of information and communication technologies (ICT) in healthcare services and the desire of the patients taking more attention to their health have changed the healthcare system in the 21st century. The appearance of e-health on one hand could improve the quality of patient care, reduce costs, and increase revenues, but on the other hand, it could satisfy the patient's need to be well informed about their health status [29]. E-health significantly improves the process of health care because health information can be assessed and exchanged through digital health systems [32], and this information (for example previous diagnoses, and prescriptions) is available anytime and anywhere through the Internet.

In the last years, during the pandemic, e-health is practically feasible and appropriate for the support of patients and health service providers [45], it provides the support to psychological problems caused by COVID-19 isolation and relieves the problem of assessing the health care services and solving patients' needs for information [41]. Cyberspace as a phenomenon reduces the relevance of distance which could be an important issue in the case of the healthcare system not only during a pandemic but also in general.

E-health includes content, connectivity, commerce, community, and clinical care [34, 56]. It can collect, organize, interpret, and use clinical data, and manage outcomes and measures of care quality, and E-health applications can simplify accessibility for users who do not have extensive computer experience as well as elderly patients [29].

Involving different stakeholders with diverse backgrounds, experiences, and values, e-health is a complex social system, and understanding the perspective of the users and patients is essential [48]. This study aims to understand the factors that could influence the adoption of e-health services by the patients. The technology acceptance models were used as a base of the research, but it was expanded with new factors such as the perceived social, personal, and individual benefits of the e-health services or the COVID-19 anxiety. The novelty of the research is the previously described extension of the technology acceptance models from the patient's point of view and the fact that this research concentrates not only on the willingness to try and actual usage but also on the long-term usage intention and satisfaction. Another added value of the study is the analysis of the antecedents of e-health adaptation in a country in the Central and Eastern European region, in which country e-health was not so popular and commonly used service before the pandemic.

LITERATURE REVIEW

Several theoretical models have been developed to predict and assess acceptance and behaviour in association with the use of technology, among them, one of the best known is the Technology Acceptance Model (TAM), which was developed by Davis in 1986. Based on behavioural intention, perceived usefulness, and perceived ease of use, with these three theoretical constructs, TAM is powerful for predicting and explaining user behaviour [13]. TAM is one of the most influential models that have been applied to test the acceptance of technology innovation across a variety of contexts [25, 6].

The TAM proposes that perceived usefulness (PU) and perceived ease of use (PEOU) of individuals' perceptions of technology are the key contributors to behavioural intention (BI) to use the technology [51].

Measures of behavioural intention may not accurately provide predictions of actual behaviour because behaviour intention cannot be translated into action every time, intentions could change before behaviour performance [44]. Existing between users' intention to specific behaviour and their actual behaviour, the intention–behaviour gap is defined as the degree of inconsistency [4].

Perceived usefulness is defined as „*the degree to which a person believes that using a particular system would enhance his or her job performance*" [13]. Perceived usefulness is expected to be influenced by perceived ease of use, because „*the easier a technology is to use, the more useful it can be*" [48].

Perceived ease of use is defined as „*the degree to which a person believes that using a particular system would be free of effort*" [13]. The research on the high intensity of the use of information technology shows that the system is easy to use if the technology can be used without more effort by the individual concerned, and then the level of acceptance of the technology will be high [42]. Perceived ease of use is a process of expectancy; perceived usefulness is an outcome of expectancy [46].

TECHNOLOGY ACCEPTANCE MODELS IN E-HEALTH

In the health services sector new technologies are widely being adopted [5], among them modern ICT has been understood to improve service quality in health service. TAM is the common model utilized to understand clinical staff and patients' technology adoption, and it has been extended and applied to health information systems development and implementation [43]. TAM is concluded as one of the most useful models for studying

patients' perceptions and behaviours on e-health [2], it's used to identify the factors influencing the adoption of information technologies in the e-health system [20]. However on the number of studies for each user group, physicians and nurses are the two main research objectives (32% and 25%), and the patients take only 13% of studies [43].

Under the e-health context, some scholars have raised their concern that TAM may not capture the unique contextual features of e-health, TAM is not a model developed specifically in or for the healthcare context [22]. The original TAM only considers two variables in determining behavioural intention [12], the basic constructs of TAM may not fully account for the e-health usage context [38], so it's necessary to extend and incorporate TAM with further constructs to enhance its explanation and prediction of acceptance behaviour [22]. To understand how e-health characteristics influence users' satisfaction, a consistent set of beliefs and attitudes should be measured, and appropriate mediating factors related to behavioural beliefs and attitudes specified in TAM should be examined [53]. Lai et al. [33] designed a new framework based on the modified TAM2 to study the acceptance of the Tailored Interventions for the management of Depressive Symptoms (TIDES) program. Liu et al. [37] focus on the acceptance of web-based personal health record system, they integrate the physician-patient relationship (PPR) construct into TAM. Despite the extensions, the perceived usefulness and perceived ease of use of TAM were the two most influential factors influencing the adoption of e-health [19].

The adoption of e-health in Bangladesh shows that perceived ease of use is critical in the acceptance of e-health [24]. The study of the recognition of monitoring technology for diabetes also results that the perceived ease of use is a significant influencing factor in the acceptance of the technology [6]. The adoption of health service applications in developing countries resulted in the conclusion that perceived usefulness significantly affected a person to acceptance and use of the technology [18].

Reviewing the theoretical background on e-health and TAM, scholars propose new constructs according to the specific context, thus different extended TAM models have been applied to explore the acceptance of e-health.

THE E-HEALTH IN COVID-19

Under the global spread of coronavirus disease in 2019 (COVID-19), clinical practice care providers are simultaneously embracing e-health to replace face-to-face contacts to reduce the risk of infections, many clinical care providers in afflicted countries closed their

doors, and they tried to replace some of the face-to-face contacts with e-health for patients [52]. COVID-19 enabled wide-scale acceptance of e-health by health professionals and patients, which the e-health is creating a win-win situation for both. To combat the COVID-19 pandemic, many countries relaxed their e-health regulations, e-health services were launched to provide solutions for the screening, triaging and remote monitoring [16, 23, 41].

Elahi et al. [17] extended the traditional technology acceptance models with the construct of COVID-19 anxiety. The results show that the COVID-19 anxiety has a positive effect on the patient's attitudes toward the e-health services and on the intention to use the services, so the positive effect of the COVID-19 anxiety was proven.

METHOD

We conducted our online questionnaire survey with convenience sampling in autumn 2021 to study the factors influencing the use of e-health services in a Central-East European country. Our questionnaire was used to map the status and awareness of e-health in the country, respondents' ICT skills and opinions on the topic, and included demographic variables and fear of the COVID-19 pandemic among the factors investigated. The main characteristics of our sample are summarized in Table 1.

Table 1. Demographic characteristics of the sample (N = 302)

	Number of respondents (persons)	**Distribution of respondents (%)**
Gender of respondents		
Male	70	23.2
Female	232	76.8
Age group		
< 25 years	106	22.2
26-41 years	87	35.1
42-56 years	67	28.8
> 57 years	41	13.9
Income/financial situation		
Below average	21	7
Average	231	76.5
Above average	50	16.5

Have children?		
Yes	152	50.3
No	150	49.7
Place of residence		
Village	47	15.6
Town	63	20.8
City	84	27.8
Capital	104	34.5
Other	4	1.3
Education		
High school or less	131	43.4
University/college	162	53.6
PhD	9	3

Most respondents were female (76.8%), had at least a university degree (56.6%) and only 7 per cent lived at a below-average standard of living. The average age was 38.4 years, and the standard deviation was 15.1 years. Furthermore, 70.8 per cent of respondents had heard of e-health (Figure 1), but only 53 per cent had used the service.

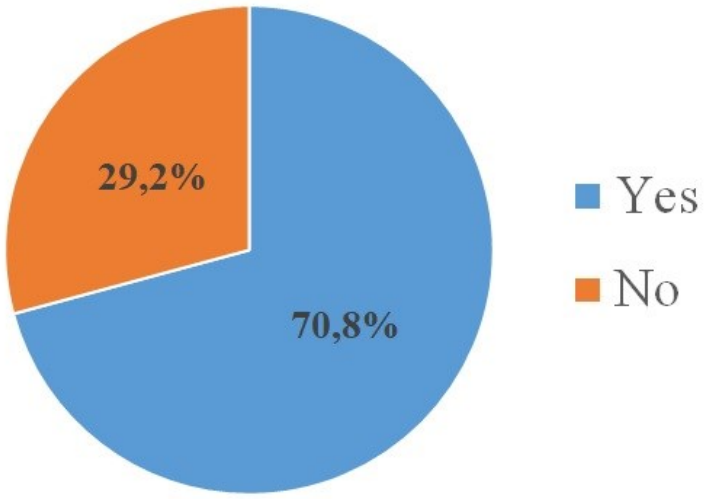

Figure 1. Awareness of e-health by respondents (N = 302)

The most popular services used were the Electronic Health Service Space (so-called EESZT; 71.7%), e-mail consultation (37.7%) and photo-enabled online consultation (32.7%).

Table 2. shows satisfaction with the most recent service used (1 - "not at all satisfied"; 7 - "completely satisfied").

Table 2. Satisfaction with the most recent e-health service used (N=160) (1 - not at all satisfied; 7 - completely satisfied)

Type of service	Obs.	Mean	St. dev.	Min	Max
Supported by photo	24	5.58	1.66	1	7
Video teleconsultation	9	5.56	1.59	3	7
E-mail consultation	24	5.83	1.37	3	7
EESZT	83	5.81	1.48	1	7
Digital device	7	5.57	1.51	3	7

The description of the model constructs is summarized in Table 3. Based on the responses obtained, the constructs to be tested were generated using the average score method, and empirical analyses were performed using linear regression and logistic regression.

Table 3. Concepts used in the research and their operationalization

Concept (construct)	Source	Number of indicators
Technological readiness	[35]	4 indicators
Fear (mistrust)	Own construction	7 indicators
COVID-19 anxiety	Own construction	1 indicator
Individual benefits	Own construction	7 indicators
Intention to use	[9]	1 indicator
Usage of e-health	-	Dummy variable
Willingness to try	Own construction	1 indicator
Social benefits	Own construction	3 indicators
Positive attitude	[49]	7 indicators
Satisfaction	Own construction	1 indicator

Technological readiness is a general dimension indicating attitudes towards technology and smart devices, while *fear* measures the degree of technophobia. *A positive attitude* refers to the extent to which an individual is open to technological innovation and e-health in general [50.

We constructed the *Willingness to try* variable to expresses the extent to which the individual considers it feasible to try the service if telediagnostics is available, while the *Intention to use* indicates the extent to which the individual considers it feasible to switch completely to telediagnostics.

Individual benefits and *social benefits* were used to measure how much individual- and social benefit the respondent expects to receive from e-health services. *Satisfaction* is the subjective evaluation of the services by those who have already used e-health services, and *COVID-19 anxiety* expresses the extent to which e-health reduces an individual's fear of infection or spread of disease. The variables also include the dummy variable *usage of e-health,* which is measuring the awareness of e-health (based on the question "Have you ever used e-health services?") with an output of 0/1 (no/yes)).

Based on the constructs presented in Table 3., the following hypotheses are formulated:

H1: COVID-19 anxiety has a positive effect on willingness to try e-health.

H2: COVID-19 anxiety has a positive effect on the intention to use telediagnostics.

H3: COVID-19 anxiety has a positive effect on satisfaction with current e-health services.

Anxiety about the spread of coronavirus affects both performance expectations and intention to use e-health [40,50]. Since the COVID-19 anxiety variable is more related to avoiding infection, i.e. it includes both motivation to use e-health and confidence in avoiding infection, we hypothesize a positive association between COVID-19 anxiety and the attitudes toward e-health/telediagnostics [51, 29, 3].

H4: Fear of the services offered by online health care negatively affects willingness to try telediagnostics.

H5: Fear of the services offered by online health negatively influences the intention to use telediagnostics.

H6: Fear of the services offered by online healthcare has a negative impact on satisfaction with current e-health services.

Fear of the unknown is a perfectly logical reaction [7], and we expect that quasi-technophobia will negatively affect the expected performance of and intention to use e-health.

H7: Technological proficiency has a positive effect on the intention to use telediagnostics.

H8: Technological proficiency has a positive effect on willingness to try telediagnostics.

Technology proficiency indicates the amount of effort required by an individual to use a new ICT technology. Based on studies [30, 39, 50], technological proficiency, i.e. ICT skills are associated with perceived ease of use of the online health system.

H9: Perceived individual benefits have a positive effect on the intention to use and willingness to try telediagnostics.

H10: Perceived social benefits have a positive effect on satisfaction with service.

Based on the studies [1, 47, 50] we assume that the relationship between individual expected benefits (performance expectancy) and willingness to try/intention to use is positive. Furthermore, we created an analogous construct that attempts to assess the role of social benefits, i.e., whether perceived social utility plays a role in the perception of the service.

H11: Positive attitudes have a positive effect on the intention to use e-health.

H12: Positive attitudes have a positive effect on the willingness to try e-health.

H13: Positive attitudes towards the services offered by online healthcare have a positive effect on satisfaction with current e-health services.

Numerous studies have shown the relationship between positive attitudes and adoption/experience of new technologies [27, 36, 55]. We expect a similar effect between positive attitudes and intention to try and willingness to use telediagnostics, and we hypothesize that it will also have a positive effect on satisfaction.

RESULTS

Based on the previous chapter, we created the database. We used the average score method to create the constructs we wanted to test (based on the responses we received), and we included demographic variables. The dependent variables were as follows:

- *Willingness to try* (the higher the value, the more likely to try telediagnostics)
- *Intention to use* (the higher the value, the more likely you are to use telediagnostics regularly)
- *Usage of e-health:* Measured by the question *"Have you ever used an e-health service?"* (Yes-No - dummy)
- *Satisfaction* (the higher the value, the more likely the user was satisfied)

And the explanatory variables are:

- *Positive attitude* (the higher the value, the more open to e-health)
- *Technological readiness* (the higher the value, the more proficient in modern technologies)
- *Fear* (the higher the value, the more he/she is afraid of e-health)
- *Social benefits* (the higher the value, the more likely you are to consider e-health useful for society)

- *Individual benefits* (the higher the value, the more he/she considers e-health to be beneficial for him/herself)
- *COVID-19 anxiety* (the higher the value, the more likely he/she is to think that e-health reduces the chance of infection)
- Demographic variables: *Age*, *Gender, Child, Residence, Education, Income*[3].

The analysis of the results obtained was divided into three parts. In the first, we used an OLS model to investigate how the explanatory variables listed affect *willingness to try* and *intention to use.* In the second, a logit model was used to examine which factors played a key role for those who have already used an e-health service, while in the third, an OLS model was used to examine the effect of constructs and demographical variables on *Satisfaction*. The basic regression model was as follows (robust standard error was used for OLS regression models):

$$DependentVariable = \beta_0 + \beta_1 Attitude + \beta_2 TechnologicalReadiness + \\ + \beta_3 Fear + \beta_4 Ind.Benefits + \beta_5 SocialBenefits + \beta_6 CovidAnxiety + \beta_7 Gender + \\ + \beta_8 Age + \beta_9 Child + \beta_{10} Residence + \beta_{11} Education + \beta_{12} Income$$

EFFECT OF CONSTRUCTS ON WILLINGNESS TO TRY AND INTENTION TO USE

In this section, we looked at how the created constructs and demographic variables influenced respondents' willingness to try and intention to use the telediagnostics. Since several variables were not significant - hence the demographic variables *location, education, income,* and the variable of *social benefits* were not included in any of the final models. Furthermore, *gender* and *technological readiness* were not significant for *willingness to try,* while *fear* was not significant for *intention to use.* The final models thus:

$$WillingnessToTry = \beta_0 + \beta_1 Attitude + \beta_2 Fear + \beta_3 Ind.Benefits + \\ + \beta_4 CovidAnxiety + \beta_5 Age$$

and

$$IntentionToUse = \beta_0 + \beta_1 Attitude + \beta_2 Ind.Benefits + \beta_3 CovidAnxiety + \\ + \beta_4 TechnologicalReadiness + \beta_5 Age + \beta_6 Gender$$

[3] Average gross income in the analyzed country in the summer of 2021: ~1.100 euros (KSH 2021

The results are shown in Table 4.

Table 4. Regression results. Dependent variables: *Willingness to try and Intention to use*

Independent variables	**Willingness to try**	**Intention to use**
Positive attitude	0.341***	0.370***
	(0.074)	(0.087)
Fear	-0.28***	-
	(0.07)	
Technological readiness	-	-0.163**
		(0.077)
Individual benefits	0.371***	0.473***
	(0.077)	(0.080)
COVID-19 Anxiety	0.160***	0.173***
	(0.043)	(0.043)
Gender (dummy)	-	0.580***
		(0.18)
Age	0.011***	0.015**
	(0.004)	(0.006)
Constant	1.366***	-1.126**
	(0.465)	(0.489)
N	302	302
R^2	0.6023	0.5342
Standard errors	Robust	Robust

Note: *p < 0.1; **p < 0.05; ***p < 0.01

The model clearly shows that avoiding infection with coronavirus is a strong motivating factor to increase the willingness to try. In this context, age also became a significant factor: although one might expect that the older generation is the more distrustful of modern technology, the coronavirus has left a deep imprint on the older generation. As COVID-19 could be with us for a long time, it is understandable that older people would be more inclined to try telediagnostics. Presumably, this is why technological readiness is not significant for the willingness to try. The experience so far suggests that in the long term the use of telediagnostics will not be primarily a matter of technological proficiency, but will probably be the only option available. For example during the pandemic it was very rare to even go to a doctor in person, the results of antigen and antibody and PCR tests could only be

accessed via EESZT, just as vaccination/immunity cards and digital EU Green Passes could only be downloaded via EESZT.

The situation is similar for positive attitudes and individual benefits: a unit increase in both variables increases the willingness to try ceteris paribus. The fear variable for technophobia also gave the expected result, i.e. a strong negative effect on willingness to try, which is understandable: if someone for example is afraid of data theft, it is less likely to try the telediagnostics. Overall, then, we can say that those who are open to the service and expect significant personal benefits (and who tend to belong to the older generation) are more likely to try telediagnostics and that the more sceptical and distrustful they are of e-health, the more likely they are to be less likely to try it.

We obtained very similar results for the other model we used to test intention to use: those who are open to e-health and expect to gain significant personal benefits are more likely to make the full switch. However, for permanent use, technophobia was removed from the equation, while gender (men are more open to switching) was included with a positive effect and technological proficiency with a negative effect. The latter is probably due to social reasons, which will be discussed in the discussion section.

FACTORS INFLUENCING THE ACTUAL USAGE OF E-HEALTH

A logit regression model (with robust standard error) was used to examine which of the explanatory variables - the constructs and demographic variables - encouraged individuals in actual usage of the currently available e-health services. However some demographic variables were not significant, so the final model did not include *Location, Education, Age* and *Income, Social benefits, Individual benefits, COVID-19 Anxiety* and *Positive attitude* also were not significant. The final model is the following:

$$Logit(Usage) = \beta_0 + \beta_1 TechnologicalReadiness + \beta_2 Fear + \beta_3 Gender + \beta_4 Child$$

where *Logit(Usage)* is the dependent variable ("*Have you ever used an e-health service?" - Yes/No*). The results are shown in Table 5.

Table 5. Regression results (dependent variable: *Have you ever used an e-health service?*)

Variables	**Odds ratio**
Technological readiness	1.472*** (0.151)
Fear	0.750*** (0.081)
Gender (dummy)	2.306*** (0.667)
Child (dummy)	2.367*** (0.637)

Constant	0.112*** (0.085)
N	302
Standard errors	Robust

Note: *p < 0.1; **p < 0.05; ***p < 0.01

The odds ratio compares the odds of two events. Odds ratios greater than 1 indicate that the probability of the event occurring increases as the predictor increases. Odds ratios less than 1 indicate that the probability of the event occurring decreases as the predictor increases. Based on the results obtained, we can say

1. Familiarity with the technology increased the chances that an individual has already tried an e-health service.
2. Men were more likely to try an e-health service than women.
3. Parents are more likely to try an e-health service than those without children.
4. Lack of confidence in technology and e-health reduces the likelihood that an individual will try an e-health service.

It should be noted here that although the questionnaires were completed during the pandemic, this does not mean that the individuals who tried e-health services only encountered e-health during the pandemic. Whereas the questions on telediagnostics (willingness to try and intention to try) were future-oriented and largely reflected the pandemic, the questions on trying currently available services were more about the pre-pandemic period.

This is also indicated by the fact that neither *COVID-19 anxiety* nor *Positive attitude* was not a significant factor for those who tried e-health services, while *Technological readiness* was. The EESZT system has been available since 2017 and the photo- or video-supported teleconsultation facilities and digital medical devices included in the questionnaire for longer, and can be used to, among other things, track test results and trigger prescriptions. However, it is not trivial to use: before the pandemic the trial of telemedicine services - thanks to the complexity of using them - could be more a matter of technical proficiency than a positive attitude.

This is in absolute agreement with the fact that men who were more technologically proficient were significantly more likely to have tried an e-health service. It is also logical that parents were more likely to opt for e-health services than those without children: overall it is much easier to download a prescription from the Cloud via EESZT or to consult a doctor via email than to do it in person while looking after the children.

THE EFFECT OF CUNTRUCTIONS ON SATISFACTION

In the following, we investigate how the constructs and demographic variables influenced the satisfaction *(Satisfaction)* of respondents who had already used e-health services. As before, several variables were not significant, so no demographic variables were included in the final model, nor were *Social benefits*, *Individual benefits* and *Technological readiness*:

$$Satisfaction = \beta_0 + \beta_1 Attitudes + \beta_2 Fear + \beta_3 CovidAnxiety$$

The results are summarized in Table 6.

Table 6. Regression results (dependent variable: Satisfaction)

Independent variables	**Satisfaction**
Positive attitude	0.348*** (0.077)
Fear	-0.223** (0.086)
COVID-19 Anxiety	0.115** (0.051)
Constant	4.252*** (0.525)
N	160
R^2	0.3511
Standard errors	Robust

Note: **p < 0.05; ***p < 0.01

The model suggests that satisfaction was positively influenced by having a positive attitude towards the trial (logical) and by believing that this would make them less likely to catch the coronavirus (this is probably an after-effect, but also logical). On the other hand, uncertainty about the services had a strong impact on the evaluation of the service, which is also logical, since those who do not trust the system are unlikely to be convinced by the complex and difficult-to-use EESZT.

DISCUSSION

The results suggest that COVID-19 anxiety has a positive effect on willingness to try telediagnostics, intention to use it and satisfaction with currently available e-health services, thus confirming hypotheses H1, H2 and H3. However, it is worth noting that the negative effect of distrust of e-health and technology has also been demonstrated (hypotheses H4 and H6), and the coefficient is higher in both cases, i.e. fear of coronavirus alone is not sufficient to overcome technophobia.

Hypothesis H5 must be rejected, as distrust of technology and e-health does not affect the intention to use. This is presumably because the intention to use implies a complete switch to telediagnostics, while the intention to try is essentially a one-off, requiring a completely different level of commitment. In the former case, the personal contact with the doctors would be virtually foregone, which could make the process impersonal, and the patient-doctor bond and trust would be lost. Several studies [8, 20, 31] have highlighted the importance of the latter: appropriate doctor-patient communication, friendliness, emotional support or even explaining the results of tests in a simple, easy-to-understand way have greatly improved patient satisfaction.

Therefore, likely this is the reason why distrust of e-health and technology was not significant and why technological readiness had a negative impact on intention to use. This question does not focus on the technological shortcomings of the services, but on whether the individual would forego the traditional, yet intimate, a doctor-patient relationship that has a major impact on satisfaction. In fact, for those who were more technology-savvy and had more experience with Hungarian e-health services - the logistic regression model clearly showed that they were more likely to have tried services such as EESZT - technological proficiency was associated with a negative sign, i.e. they were even less willing to give up the personal doctor-patient relationship. Hypotheses H7 and H8 must therefore be rejected, as technological proficiency has no positive effect on either intention to use or willingness to try.

As expected and in line with the literature, positive attitudes had a significant positive influence on intention to use and willingness to try telediagnostics, as well as satisfaction with the services tried, and thus hypotheses H11, H12 and H13 can be accepted. The positive effect of individual benefits on intention to try and willingness to use (H9) also confirmed expectations, while the expected social benefits were not significant in any of the models (H10 is thus rejected). This is unsurprising in the way that perceived social benefits as a relevant factor have not been much reported in the literature so far, in contrast to, for example, social pressure [11, 26, 54] – it will be useful to include the phenomenon of perceived social pressure in future research on e-health.

It is clear that the uncertainty and fear caused by the pandemic had a positive impact on the perception of e-health and may increase the willingness to try new technologies. However, it is unlikely to be enough on its own to achieve widespread acceptance of e-health. Distrust of the technology seems to be a more relevant factor in the results, and positive attitudes and perceived/perceived individual benefits seem to have a greater positive impact. Therefore, it would be useful to launch awareness campaigns that point out the personal

benefits of e-health in an easily understandable and clear way and dispel the general distrust of the technology.

It is also worth noting that the sample is not representative of the society of the analysed Central European country, hence there are of course limitations. The survey used arbitrary sampling, which meant that our sample consisted mainly of young people with an average/above average standard of living. Presumably, this is the reason why several demographic variables (education, income, place of residence) did not reach significance, and it would be desirable to repeat the data collection in the future with a representative sample by gender, age and region. Alternatively, it would be more useful to look at the effects of perceived social pressure rather than social benefits, and it may be interesting to see how e-health and the perception of available services have changed in almost one year since we took our sample and the pandemic restrictions were lifted.

REFERENCES

[1] Abd-Alrazaq, A. A., Alajlani, M., Alalwan, A. A., Bewick, B. M., Gardner, P., and Househ, M. (2019). An overview of the features of chatbots in mental health: A scoping review. *International Journal of Medical Informatics*, *132*, 103978. https://doi.org/10.1016/j.ijmedinf.2019.103978

[2] Ahlan, A., and Ahmad, B. (2015). An overview of patient acceptance of health information technology in developing countries: A review and conceptual model. *International Journal of Information Systems and Project Management*, *3*(1), 29-48.

[3] Bandura, A. (1986). Social foundations of thought and action. Englewood Cliffs, NJ, 1986(23-28).

[4] Bhattacherjee, A., and Hikmet, N. (2007). Physicians' resistance toward healthcare information technology: a theoretical model and empirical test. *European Journal of Information Systems*, *16*(6), 725-737. https://doi.org/10.1057/palgrave.ejis.3000717

[5] Blackwell, G., and Blackwell, G. (2008). The future of IT in healthcare. *Informatics for Health and Social Care*, *33*(4), 211-326. https://doi.org/10.1080/17538150802598860

[6] Borges Jr, U., and Kubiak, T. (2016). Continuous glucose monitoring in type 1 diabetes: human factors and usage. *Journal of diabetes science and technology*, *10*(3), 633-639. https://doi.org/10.1177/1932296816634736

[7] Çelik, H. (2011). Influence of social norms, perceived playfulness and online shopping anxiety on customers' adoption of online retail shopping: An empirical study in the Turkish

context. *International Journal of Retail and Distribution Management*. https://doi.org/10.1108/09590551111137967

[8] Chandra, S., Mohammadnezhad, M. and Ward, P. (2018). Trust and Communication in a Doctor-Patient Relationship: A Literature Review. *J Healthc Commun,* Vol.3 (3:36). https://doi.org/10.4172/2472-1654.100146

[9] Chang, H. H. and Huang, C. Y. and Fu, S.Ch. and Hsu, M. T. (2017): The effects of innovative, consumer and social characteristics on willingness to try nano-foods: Product uncertainty as a moderator. *Information Technology and People,* 30 (3), 653-690. http://dx.doi.org/10.1108/ITP-10-2015-0266

[10] Chen, S., Guo, X., Wu, T., and Ju, X. (2020). Exploring the online doctor-patient interaction on patient satisfaction based on text mining and empirical analysis. *Information Processing and Management,* 57(5), 102253. https://doi.org/10.1016/jipm.2020.102253

[11] Choi, G., and Chung, H. (2013). Applying the technology acceptance model to social networking sites (SNS): Impact of subjective norm and social capital on the acceptance of SNS. *International Journal of Human-Computer Interaction*, *29*(10), 619-628. https://doi.org/10.1080/10447318.2012.756333

[12] Choi, H., Kim, Y., and Kim, J. (2010). An acceptance model for an internet protocol television service in Korea with prior experience as a moderator. *The Service Industries Journal*, *30*(11), 1883-1901. https://doi.org/10.1080/02642060802627178

[13] Davis, F. D., Bagozzi, R. P., and Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management science*, *35*(8), 982-1003. https://doi.org/10.1287/mnsc.35.8.982

[14] Davis, F., 1986. *A technology acceptance model of empiricallí testing new end -user information system: Theory and result.* Massachusetts Institute of Technology.

[15] Demiris, G., Finkelstein, S. M., and Speedie, S. M. (2001). Considerations for the design of a Web-based clinical monitoring and educational system for elderly patients. *Journal of the American Medical Informatics Association*, *8*(5), 468-472. https://doi.org/10.1136/jamia.2001.0080468

[16] Duan, L., and Zhu, G. (2020). Psychological interventions for people affected by the COVID-19 epidemic. *The lancet psychiatry*, *7*(4), 300-302. https://doi.org/10.1016/S2215-0366(20)30073-0

[17] Elahi, M. Z., Liang, G., Malik, M. J., Dilawar, S., and Ilyas, B. (2021). Fear of Covid-19 and Intentions towards Adopting E-Health Services: Exploring the Technology Acceptance Model in the Scenario of Pandemic. *International Journal of Business, Economics and Management*, *8*(4), 270-291. https://doi.org/10.18488/journal.62.2021.84.270.291

[18] Faqih, K. M., and Jaradat, M. I. R. M. (2015). Mobile healthcare adoption among patients in a developing country environment: Exploring the influence of age and gender differences. *International Business Research*, *8*(9), 142. http://dx.doi.org/10.5539/ibr.v8n9p142

[19] Gagnon, M. P., Desmartis, M., Labrecque, M., Car, J., Pagliari, C., Pluye, P., ... and Légaré, F. (2012). Systematic review of factors influencing the adoption of information and communication technologies by healthcare professionals. *Journal of medical systems*, *36*(1), 241-277. https://doi.org/10.1007/s10916-010-9473-4

[20] Garavand, A., Mohseni, M., Asadi, H., Etemadi, M., Moradi-Joo, M., and Moosavi, A. (2016). Factors influencing the adoption of health information technologies: a systematic review. *Electronic physician*, *8*(8), 2713. DOI: 10.19082/2713

[21] Gilok, Ch. and Hyewon, Ch. (2013). Elaborating the technology acceptance model with social pressure and social benefits for social networking sites (SNSs). *Proceedings of the American Society for Information Science and Technology,* 49(1), 1-3. https://doi.org/10.1002/meet.14504901376

[22] Holden, R. J., and Karsh, B. T. (2010). The technology acceptance model: its past and its future in health care. *Journal of biomedical informatics*, *43*(1), 159-172. https://doi.org/10.1016/j.jbi.2009.07.002

[23] Hong, Y. R., Lawrence, J., Williams, D., Jr, and Mainous III, A. (2020). Population-Level Interest and Telehealth Capacity of US Hospitals in Response to COVID-19: Cross-Sectional Analysis of Google Search and National Hospital Survey Data. *JMIR public health and surveillance*, *6*(2), e18961. https://doi.org/10.2196/18961

[24] Hoque, M. R., Bao, Y., and Sorwar, G. (2017). Investigating factors influencing the adoption of e-Health in developing countries: A patient's perspective. *Informatics for Health and Social Care*, *42*(1), 1-17. https://doi.org/10.3109/17538157.2015.1075541

[25] Hu, P. J., Chau, P. Y., Sheng, O. R. L., and Tam, K. Y. (1999). Examining the technology acceptance model using physician acceptance of telemedicine technology. Journal of management information systems, 16(2), 91-112. https://doi.org/10.1080/07421222.1999.11518247

[26] Huijts, N. M., Molin, E. J., and Steg, L. (2012). Psychological factors influencing sustainable energy technology acceptance: A review-based comprehensive framework. *Renewable and sustainable energy reviews*, *16*(1), 525-531. https://doi.org/10.1016/j.rser.2011.08.018

[27] Hussein, Z. (2017). Leading to intention: The role of attitude in relation to technology acceptance model in e-learning. *Procedia Computer Science*, 105, 159-164. https://doi.org/10.1016/j.procs.2017.01.196

[28] Juanjua, W. and Sanga, S. (2021). Older Adults' Online Shopping Continuance Intentions: Applying the Technology Acceptance Model and the Theory of Planned Behavior. *International Journal of Human-Computer Interaction*, 37(10), 938-948. https://doi.org/10.1080/10447318.2020.1861419

[29] Jung, M. L., and Loria, K. (2010). Acceptance of Swedish e-health services. *Journal of multidisciplinary healthcare,* 3, 55. https://dx.doi.org/10.2147/JMDH.S9159

[30] Keszey, T., and Zsukk, J. (2017). Az új technológiák fogyasztói elfogadása. A magyar és nemzetközi szakirodalom áttekintése és kritikai értékelése. *Vezetéstudomány-Budapest Management Review*, 48(10), 38-47. https://doi.org/10.14267/VEZTUD.2017.10.05

[31] Korsch, B. M., Gozzi, E. K., and Francis, V. (1968). Gaps in doctor-patient communication: I. Doctor-patient interaction and patient satisfaction. *Pediatrics*, 42(5), 855-871. https://doi.org/10.1542/peds.42.5.855

[32] Kwankam, S. Y. (2004). What e-Health can offer. Bulletin of the World Health Organization, 82(10), 800-802.

[33] Lai, T. Y., Larson, E. L., Rockoff, M. L., and Bakken, S. (2008). User Acceptance of HIV TIDES—tailored interventions for management of depressive symptoms in persons living with HIV/AIDS. *Journal of the American Medical Informatics Association*, *15*(2), 217-226. https://doi.org/10.1197/jamia.M2481

[34] Lee, S. A. (2020). Coronavirus Anxiety Scale: A brief mental health screener for COVID-19 related anxiety. *Death studies*, *44*(7), 393-401. https://doi.org/10.1080/07481187.2020.1748481

[35] Leung, L., and Chen, C. (2019). E-health/m-health adoption and lifestyle improvements: Exploring the roles of technology readiness, the expectation-confirmation model, and health-related information activities. *Telecommunications Policy*, *43*(6), 563-575. https://doi.org/10.1016/j.telpol.2019.01.005

[36] Lin, J. S. C., and Chang, H. C. (2011). The role of technology readiness in self-service technology acceptance. *Managing Service Quality: An International Journal*, 21(4), 424-444. https://doi.org/10.1108/09604521111146289

[37] Liu, C. F., Tsai, Y. C., and Jang, F. L. (2013). Patients' acceptance towards a web-based personal health record system: an empirical study in Taiwan. *International journal of environmental research and public health*, *10*(10), 5191-5208. https://doi.org/10.3390/ijerph10105191

[38] Liu, X. (2010). Empirical testing of a theoretical extension of the technology acceptance model: An exploratory study of educational wikis. *Communication Education*, *59*(1), 52-69. https://doi.org/10.1080/03634520903431745

[39] Melas, C. D., Zampetakis, L. A., Dimopoulou, A., and Moustakis, V. (2011). Modeling the acceptance of clinical information systems among hospital medical staff: an extended TAM model. *Journal of biomedical informatics,* 44(4), 553-564. https://doi.org/10.1016Aj.jbi.2011.01.009

[40] Meuter, M. L., Ostrom, A. L., Bitner, M. J., and Roundtree, R. (2003). The influence of technology anxiety on consumer use and experiences with self-service technologies. *Journal of Business Research*, 56(11), 899-906. https://doi.org/10.1016/S0148-2963(01)00276-4

[41] Pappot, N., Taarnhøj, G. A., and Pappot, H. (2020). Telemedicine and e-health solutions for COVID-19: patients' perspective. *Telemedicine and e-Health*, *26*(7), 847-849. https://doi.org/10.1089/tmj.2020.0099

[42] Purwanto, E., and Budiman, V. (2020). Applying the technology acceptance model to investigate the intention to use e-health: a conceptual framework. *Technology Reports of Kansai University*, *62*(05), 2569-2580.

[43] Rahimi, B., Nadri, H., Afshar, H. L., and Timpka, T. (2018). A systematic review of the technology acceptance model in health informatics. *Applied clinical informatics*, *9*(03), 604-634. https://doi.org/10.1055/s-0038-1668091

[44] Sheeran, P. (2002). Intention—behavior relations: a conceptual and empirical review. *European review of social psychology*, *12*(1), 1-36. https://doi.org/10.1080/14792772143000003

[45] Smith, A. C., Thomas, E., Snoswell, C. L., Haydon, H., Mehrotra, A., Clemensen, J., and Caffery, L. J. (2020). Telehealth for global emergencies: Implications for coronavirus disease 2019 (COVID-19). *Journal of telemedicine and telecare*, *26*(5), 309-313. https://doi.org/10.1177/1357633X20916567

[46] Sun, N., and Rau, P. L. P. (2015). The acceptance of personal health devices among patients with chronic conditions. International journal of medical informatics, 84(4), 288-297. https://doi.org/10.1016/j.ijmedinf.2015.01.002

[47] Tavares, J., Goulão, A., and Oliveira, T. (2018). Electronic health record portals adoption: empirical model based on UTAUT2. *Informatics for Health and Social Care*, 43(2), 109-125. https://doi.org/10.1080/17538157.2017.1363759

[48] Tebeje, T.H. and Klein, J. (2020). Applications of e-health to support person-centered health care at the time of COVID-19 pandemic. Telemed JE Health [Internet]. 2021 [cited 2021 Aug 8]; 27 (2): 150-8. DOI: 10.1089/tmj.2020.0201

[49] Venkatesh, V., and Bala, H. (2008). Technology acceptance model 3 and a research agenda on interventions. *Decision sciences*, *39*(2), 273-315. https://doi.org/10.1111/j.1540-5915.2008.00192.x

[50] Venkatesh, V., Morris, M. G., Davis, G. B., and Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 425-478. https://doi.org/10.2307/30036540

[51] Wilson, E. V., and Lankton, N. K. (2004). Modeling patients' acceptance of provider-delivered e-health. *Journal of the American Medical Informatics Association*, 11(4), 241-248. https://doi.org/10.1197/jamia.M1475

[52] Wind, T. R., Rijkeboer, M., Andersson, G., and Riper, H. (2020). The COVID-19 pandemic: The 'black swan'for mental health care and a turning point for e-health. *Internet interventions*, *20*. DOI: 10.1016/j.invent.2020.100317

[53] Wixom, H., and Todd, P. A. (2005). A theoretical integration of user satisfaction and technology acceptance. *Information systems research*, *16*(1), 85-102. https://doi.org/10.1287/isre.1050.0042

[54] Wu, J., and Song, S. (2021). Older adults' online shopping continuance intentions: Applying the technology acceptance model and the theory of planned behavior. *International Journal of Human–Computer Interaction,* 37(10), 938-948. https://doi.org/10.1080/10447318.2020.1861419

[55] Yang, H. D., and Yoo, Y. (2004). It's all about attitude: revisiting the technology acceptance model. *Decision support systems*, 38(1), 19-31. https://doi.org/10.1016/S0167-9236(03)00062-9

[56] Yusif, S., Hafeez-Baig, A., and Soar, J. (2020). An exploratory study of the readiness of public healthcare facilities in developing countries to adopt health information technology (HIT)/e-Health: the case of Ghana. *Journal of Healthcare Informatics Research*, *4*(2), 189-214. https://doi.org/10.1007/s41666-020-00070-8

APPENDIX

Short code	Description	N	Mean	Std. Dev
Positive attitude				
PA_1	I support the digitisation of medical services.	302	4.73	2.24
PA_2	I am the first in my circle of friends to try out new technologies.	302	3.42	1.99
PA_3	I often keep up with the development of technologies that interest me.	302	4.31	1.95
PA_4	I think I will like telemedicine.	302	4.14	2.14
PA_5	I think e-health is good overall.	302	4.26	2.12
PA_6	If I need to see a doctor, e-health could be an ideal solution for me.	302	3.88	2.15
PA_7	I believe I can trust the accuracy of the information I receive in the telemedicine system	302	4.47	1.84

Social benefits				
SB_1	E-health could make it easier for people with disabilities to access medical care.	302	5.05	2.04
SB_2	E-health could make it easier for people in remote small towns to get medical care.	302	5.17	1.99
SB_3	E-health could help elderly people get better access to medical care.	302	3.81	2.21
Individual benefits				
IB_1	E-health services – such as electronic medical records that are available online – can be useful to me.	302	6.13	1.52
IB_2	E-health improves the quality of healthcare.	302	4.78	2.03
IB_3	I will have easier access to healthcare professionals thanks to telemedicine.	302	4.77	2.05
IB_4	I will enjoy using telemedicine services.	302	4.22	1.94
IB_5	E-health will help me to shorten the waiting time at the hospital/clinic.	302	5.10	2.04
IB_6	E-health will help me to get to medical care more quickly.	302	4.72	2.09
IB_7	E-health will make it easier for me to plan when I go to the hospital/clinic.	302	4.90	1.92
Technological skills				
TS_1	I am not challenged by the use of digital technologies.	302	5.14	2.04
TS_2	I learn to use new technologies easily.	302	5.38	1.81
TS_3	It is not challenging for me to use a mobile phone, computer or tablet.	302	6.32	1.46
TS_4	The telemedicine system will be easy for me to use.	302	5.37	1.75
Fear of e-health and new technologies				
F_1	I fear that my data stored in the e-health platforms will be leaked.	302	2.96	2.08
F_2	I am wary of telemedicine services.	302	3.31	2.12
F_3	I fear that my data stored in the e-health system will be misused.	302	2.87	1.98
F_4	I fear getting the wrong diagnosis through the e-health system.	302	4.03	1.98
F_5	I think there is a risk to enter my data into the e-health system.	302	3.44	2.06
F_6	I think my data will not be treated confidentially in the e-health system	302	2.90	1.80
F_7	I think it takes too much time to learn how to use telemedicine services.	302	2.43	1.60