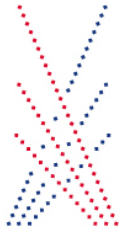

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Challenges and Opportunities of Healthcare Digitalization: Comparative Analysis of Patient perception in Lithuania and Turkey

Sandra Trinkuniene, Benson Nwaorgu, Jurgita Kiskioniene, Asta Pundziene
Kaunas University of Technology

Abstract

Patients as end users of innovative healthcare solutions are the main value beneficiaries of 'disruptive' digital technologies. Recent research has already confirmed that patients' inclusion in healthcare decision-making processes can make a significant contribution to healthcare outcomes. The aim of this paper is to assess patient perception of the added value of digitalization of healthcare services in Lithuania and Turkey. To assess the challenges and opportunities of healthcare digitalization, desk research was carried out. Eight cases were analyzed and results were divided and evaluated based on five main indicators: (1) current knowledge on adoption of digital healthcare services, (2) advantages and disadvantages of digital healthcare services, (3) barriers and motivators to adoption of digital healthcare services, (4) competencies and resources needed for digital healthcare services, and (5) added value of digital healthcare services.

Keywords: digital healthcare services, comparative analysis, case study, added value

Introduction

The quality and quantity of technological innovations are increasing in the digital healthcare sector. Despite this fact, not all technological innovations are successfully deployed in practice. Technological standards and consumer demands are the key determinants of innovation success. Moreover, ideas that look promising may finally fail and ideas that seem unreliable at first may eventually succeed. The time between the initial idea and the launch of the final product or service often exceeds expected time limits (Griffin, 1997; Hauser *et al*., 2006).

According to Hu *et al*. (1999, p. 98), 'digital healthcare is an IT-based innovation that has the potential to support and enhance physicians' patient care as well as to improve healthcare organizations' competitiveness'. A number of studies argue that digital healthcare solutions can improve the quality of communication between patients and their doctors (Win *et al*., 2016; Maarop and Win, 2012; Zuniga *et al*., 2010). Uniform adoption of telemedicine solutions in the healthcare system is expected to have the following long-term effects: enhanced life expectancy, improved quality of life, multiple and improved options for diagnosis and treatment, increased efficiency and cost-effectiveness of the healthcare system, and improved competitiveness in healthcare organizations (Kasemsap *et al*., 2018; Maarop and Win, 2012; Zuniga *et al*., 2010). Short-term advantages include, but are not limited to, the following: direct support for and enhancement of physicians'

roles in patient care, improved quality of communication between patients and their doctors, real-time data sharing, ease of use of personal healthcare records and improvements in capacities to share healthcare records with other hospitals and physicians if needed (Varkey *et al*., 2008; Hu *et al*., 1999; Omachonu and Einspruch, 2010; Blaya *et al*., 2010; Sabesan *et al*., 2014). Digital healthcare solutions can ensure the delivery of healthcare where it is needed most and remove barriers of distance, time and provider scarcity. According to Wu *et al*. (2011, p. 591), 'with an increasingly mobile society and the worldwide deployment of wireless networks, the wireless infrastructure can provide support for many current and emerging healthcare applications'. Despite the large number of technological innovations in the healthcare sector, the process of adoption of these innovations has been slow and difficult. Some of the barriers that prevent innovation in healthcare involve patients' general skepticism, difficulties in the implementation and usage and the lack of trust in digital healthcare services and new technologies.

According to Waarts *et al*. (2002, p. 414), factors affecting the adoption of innovations are 'perceived innovation characteristics, adopter characteristics, internal environment characteristics, [and] external environment characteristics'. All these components are important in evaluating healthcare ecosystems' technology readiness to adopt 'disruptive' innovations. Parasuraman (2000) argues that the definition of technology readiness refers to healthcare ecosystems' willingness and preparedness to accept and adopt information and communication technology (ICT)-based products and in daily practice.

The advantages of wireless technology have lead to rapid development and use of a variety of mobile applications. In recent years the use of mobile and smart devices has increased for both personal users and business management purposes. Telemedicine is changing traditional clinical practice through the adoption of disruptive mobile technologies, in other words 'the use of mobile computing and communication technologies in health care and public health' (Free *et al*., 2013, p. 2). According to Free *et al*. (2013, p. 2), these 'mobile technologies include mobile phones, personal digital assistants (PDA) and PDA phones, smartphones, enterprise digital assistants (EDA), portable media players, handheld video-game consoles, and handheld and ultra-portable computers such as tablet PCs'. The widespread use of these devices results in the steady increase of the technological readiness of healthcare ecosystem members. For this reason, mobile technologies in healthcare delivery can contribute to the reduction of the general skepticism of digital healthcare solutions.

The research question addressed in this study revolves around the question of how patients perceive the added value of digitalization of healthcare services.

The **aim** of this paper is to assess patient perception of the added value of digitalization in the healthcare sector based on a comparative case study in Lithuania and Turkey.

This paper contributes to digital healthcare and healthcare innovation management literature by applying the dynamic capabilities framework to identify specific aspects of value creation and exchange. On the practical side, this paper sheds light on the current digital healthcare situation in Lithuania and Turkey and helps to improve understanding of patient opinion of digital healthcare services and innovative healthcare delivery solutions. This will support the improvement of the quality of digital healthcare service and the speed of their adoption.

1. Adoption of disruptive digital technologies in the healthcare sector

The term '***disruptive innovation***' was coined by Clayton M. Christensen and Joseph L. Bower (Christensen *et al*., 2015). It has been more than two decades since this term was coined and the concept has informed explanations of how unique business models initially focused on low-end customers and then changed the market dynamics, e.g. mini computers. Disruptive innovation is used to explain most companies/products that have challenged traditional business models, but the prerequisites and conditions of 'disruptive innovation' might not be adequately met (Christensen *et al*., 2015). This literature review will identify the basic principles of disruptive innovation and if digital health services should be considered to be disruptive innovations in the context of traditional healthcare models.

Disruptive innovation: in need of better theory

Markides (2006) investigates Christensen's concept of 'disruptive innovation' and breaks it down into two specific types. The first type is a radical product innovation, i.e. something that the world has not witnessed before. The second type is an innovation that we are more acquainted with, i.e. that alters a traditional business model. Both these forms of disruptive innovation have various consequences for markets, various challenges for established businesses and various implications for managers.

During the course of the article, Markides (2006) introduces technological innovation as the third form. This innovation usually focuses on the automation of business processes. However, technological innovation may take decades to prosper; in the case of internet banking, it initially captured only 10–20% of the banking market. Markides concludes that by understanding the three innovation forms, key characteristics and implications for markets and existing players can be identified.

How useful is the theory of disruptive innovation?

King and Baatartogtokh (2015) reviewed the basic assumptions about Christensen's theory by interviewing experts of 77 companies mentioned in 'The Innovator's Dilemma' (Christensen, 1997) and 'The Innovator's Solution' (Christensen and Raynor, 2003). They identified four key elements of the theory:

1) incumbents show progress through the innovation's trajectory;
2) customer needs are exceeded when sustained innovation exists;
3) despite having the ability to respond, innovators fail to be responsive;
4) owing to disruptions, the incumbent's business is disturbed.

Their study presents multiple cases where differing points of views exist. In some cases, managers ignored the emergence of disruptive innovation and, in others, managers reacted by applying the same technology themselves and thereby introducing an innovation in their business. The reason for ignorance is usually the fact put forth by Christensen: disruptors often initially focus on low-end markets ignored by major market players.

Telehealth: a case study in disruptive innovation

Grady (2014) published a study that investigates the impact of disruptive innovation on telehealth. Telehealth is defined as 'the use of electronic information and telecommunications technologies to support long-distance clinical health care, patient and professional health-related education, public health, and health administration'. Grady explains that in-person consultations are the gold standard and how behavior towards

technology acceptance needs to be changed. Some telehealth innovations that Grady identifies are:

1) remote monitoring devices;
2) Mhealth (mobile health) devices;
3) peripherals supporting remote physical assessment;
4) mobile applications that record health.

There are a variety of devices, such as intelligent toilets, smart watches, and embedded biosensors, that support all the above objectives and their usage is steadily increasing. Grady (2014) also states that studies have shown that doctors/nurses with positive attitudes towards technology readily accept telemedicine and thereby benefit patients. In future, nurses will need to embrace telemedicine as an essential part of the health paradigm.

Disruptive innovation in healthcare delivery: a framework for business model innovation

Christensen and Hwang (2008) prepared a research study that focuses on how healthcare services can be made affordable to enable a larger population to benefit from them. The study is US based and targets the fact that rising healthcare costs and a complicated healthcare model mean that a significant portion of the population is deprived of quality services. To posit a successful business model for healthcare, they analyzed three existing business models: solution shops, e.g. general hospitals; facilitated user networks, e.g. Weight Watchers; and value-added business processes, e.g. MinuteClinic (Christensen and Hwang, 2008).

The authors highlighted that the confluence of value-added processes and facilitated user networks can work together to provide lower-cost healthcare of the same quality. They describe challenges to these healthcare solutions, including regulatory barriers, reimbursement, fragmentation of healthcare and non-existent retail markets. The authors conclude by saying that facilitated user networks and value-added business processes must work in harmony and reduce the burden on solution shops. Instead of altering hospital environments, an initial health diagnostic can pave the way for service provision by retaining two models.

2. The role of patients in the adoption of disruptive digital technologies in the healthcare sector

Patients as the end users of innovative solutions in the healthcare sector are the main value beneficiary of disruptive digital technologies. According to Elvyn *et al*. (2000), inclusion of patients in healthcare decision-making processes can make a significant contribution to healthcare outcomes. Popadiuk and Choo (2006), analyzing Dutton (1986), highlighted that innovation is related to three kinds of variable: '(a) the distribution of ***knowledge***: the depth and diversity of knowledge and extent of exposure to information obtained from external sources; (b) attitudes of the organization's management: the ***value*** they place on change; [and] (c) organizational structure: effects of the centralization upon ***adoption behavior***'. Innovative solutions, especially those related to sensitive areas such as healthcare, require clear knowledge and understanding of advantages and disadvantages. A number of studies argue that adoption of digital healthcare solutions has the following long-term impact: enhanced life expectancy, improved quality of life, multiple and

improved options for diagnosis and treatment, and increased efficiency. This can also help to achieve better cost-effectiveness and/or create competitive advantage for healthcare institutions (Kasemsap *et al*., 2018; Maarop and Win, 2012; Zuniga *et al*., 2010). Short-term advantages include, but are not limited to, the following: direct support and enhancement of physicians' roles in patient care; improved quality of communication between patients and their doctors; real-time data sharing; ease of use of personal healthcare records and improvements in capacities to share healthcare records with other hospitals and physicians if needed (Varkey *et al*., 2008; Hu *et al*., 1999; Omachonu and Einspruch, 2010; Blaya *et al*., 2010; Sabesan *et al*., 2014). Digital healthcare solutions can ensure the delivery of healthcare where it is needed most and remove the barriers of distance, time and provider scarcity. Despite all these advantages, patients' skepticism of and conservatism towards new technology is in many cases related to the lack of knowledge and uncertainty about relevant competencies and resources needed for the use of disruptive digital technologies. According to Caruana and Fenech (2005, p. 246), there are four main directions of value from the customer perspective: '(1) value is low price, (2) value is whatever I want in a product, (3) value is the quality I get for the price I pay and (4) value is what I get for what I give'. Despite the fact that ICT is proliferating very fast, patients may not easily accept digital healthcare services owing to an apparant lack of value or inconvenience in dealing with it.

Proposition 1: *Explicit knowledge on how digital healthcare services affects patients' perception of the value of digital healthcare solutions.*

Proposition 2: *Lack of explicit knowledge on digital healthcare services is substituted by prejudices about advantages and disadvantages of as well as barriers to and motivators for adoption of digital healthcare services.*

The potential to use different innovative communication channels for healthcare increased with the proliferation of online and mobile tools and interventions designed to assist users in lifestyle changes and chronic disease self-management. However, these tools are only helpful if patients are ready to use them, meaning that they have both the attitude and readiness to utilize the resources (Koopman *et al*., 2014). According to Koopman *et al*. (2010, p. 17), 'the ability to assess this in potential users may help developers and researchers design and investigate the utility of these tools'. Readiness and determination to use innovative solutions is an integral and preliminary step in the successful implementation of digital healthcare solutions in existing healthcare systems. Successful adoption of innovative solutions is inseparable from the development of the competencies and resources needed for accustomed use of them from the perspective of all host ecosystem members. This also requires patients to be prepared and willing to adopt the innovations and the enhancement of existing competencies and resources.

Proposition 3: *To reveal the added value on the digital healthcare services, relevant competencies and resources are needed.*

3. Methodology, sample and criteria for case selection

Methodology

To assess the challenges and opportunities of healthcare digitalization, desk research was carried out, assessing existing healthcare system review and digital healthcare delivery and comparing these results in two countries: Turkey and Lithuania. These countries were chosen for the case study owing to the similarity of their healthcare systems.

Besides desk research, this project involved a multiple case study based on in-depth interviews with patients from Lithuania and Turkey. The multiple case study approach was chosen to gather the in-depth qualitative data to meet the research aim. The use of the multiple case study approach allows:

1) the differences and similarities between the cases to be examined (Baxter and Jack, 2008);
2) analysis to be made both within and across cases (Yin, 2017);
3) the research results to be stronger and more reliable (Baxter and Jack, 2008).

The constructs under assessment include national requirements for the process of adopting digital healthcare; the social, cultural, and economic factors locally affecting adoption of digital healthcare in Lithuania; global factors that influence the process of adopting digital healthcare in the country; common advantages that encourage digital healthcare adoption in the country; and the major limiting challenges that tend to slow down the telemedicine adoption process. These research constructs were broken down into sub-constructs. Each sub-construct was further broken down into items derived from aspects of the sub-construct topic. The items were stated as suggestive propositions. The constructs were measured through respective sub-constructs in terms of the level of acceptance or agreement of these items/propositions derived from research questions. The propositions were suggestive, requiring agreement or disagreement from the respondents. The level of agreement from many participants, from the extreme negative to the extreme positive, were evaluated to determine the role played by each factor or research construct in the study topic.

Eight cases were analyzed: four cases in Lithuania and four cases in Turkey. It was anticipated that in-depth case studies from these two countries would provide new insight into tendencies in patients' value perceptions of digital healthcare services as well as adoption of remote and mobile technologies. Case study research was carried out using semi-structured interviews.

The criteria for cases selection and data collection

The selection of cases for case study is a task of critical importance (Stake, 1995). Out of the two methods of case selection most commonly used, i.e. random-selection and information-oriented selection, the latter is more compatible with this case study design because its utilization results in demonstration of a characteristic or attribute of interest (Flyvbjerg, 2006). The random selection of the cases has not been adopted in this scenario because randomly selecting cases from all available options, i.e. hospitals and patients, might result in the selection of a cas, that is not related or relevant to this study. Initially, the study had targeted a sample of 20 respondents but only eight people were available for in-depth interviews.

In this case, researchers evaluate patients as the main beneficiaries of digital healthcare solutions who create demand for innovative healthcare delivery services. Patients were selected as interviewees for the case study from two hospitals: Anadolu Saglik Merkezi Hospital in Turkey and Utenos Hospital in Lithuania. The main goal was to reach the patients who have already used digital healthcare services in these two institutions.

Data were processed and analyzed based on five main indicators: (1) current knowledge on adoption of digital healthcare services, (2) advantages and disadvantages of digital healthcare services, (3) barriers and motivators to adoption of digital healthcare

services, (4) competencies and resources needed for digital healthcare services, and (5) added value of digital healthcare services.

4. Data analysis and findings

4.1. Review of healthcare ecosystems in Lithuanian and Turkey

'Compulsory health insurance provides a standard benefits package for all beneficiaries in Lithuania. There is no positive list of health services provided in state financed health-care facilities. Emergency care is provided free of charge to all permanent residents irrespective of their insurance status. For pharmaceuticals, drugs prescribed by a physician are reimbursed for certain groups of the population (e.g. children, pensioners, the disabled) as well as for patients suffering from certain diseases. All other insured adults must pay the full cost of both prescribed and over-the-counter drugs out of pocket' (Murauskiene *et al*., 2013, p. 19).

In Turkey, the healthcare system is very similar. The purchasing aspect of healthcare services has been dominated by the Social Security Institution (SSI), also known as Sosyal Guvenlik Kurumu: a monopsonic power funded by employer and employee payments and, in times of budget deficit, the government too. The second aspect, i.e. healthcare provision, is performed by the Ministry of Health (Saglik Bakenligi) and its countrywide facilities provide primary, secondary, and tertiary services. Universities also contribute tertiary services and, since provision of services to SSI has been allowed, the private sector has become highly active.

Some of the notable reforms in healthcare since 2003 include improvement in citizens' health status, the implementation of a provider-purchaser framework in healthcare, the nationwide introduction of family practitioner scheme, ownership transfer of most public hospitals to the Ministry of Health and the Ministry's hospitals using a performance-based payment system. Comparative data is presented in Table I.

Criteria	**Lithuania**	**Turkey**
Population in 2018	2 million, 808 thousand inhabitants	80 million, 810 thousand inhabitants
Health expenditures as a share of GDP, 2017	6,3 % of the GNP in 2017 (OECD, 2018)	4,2 % of the GNP in 2017 (OECD, 2018)
Life expectancy, 2016	Women 80,1 years; men 69,5 years; average 74,8 years	Women 80,7 years; men 75,3 years; average 78 years
Financing	The health insurance model is based on the principles of universality and solidarity. Permanent and temporary residents of Lithuania (LT citizens and foreigners) legally working under employment contracts or otherwise engaged in active economic activity, pay a compulsory social security (CSS) tax to finance the healthcare system. The budget collected from this tax - the Compulsory Health Insurance Fund (CHIF) - finances hospitals, outpatient clinics and their staff, reimburses medicines and other medical devices, and provides	From 2008 in Turkey, there is the Universal Health Insurance (UHI) scheme and the SSI (a single-payer insurance agency). UHI is obligatory and has universal coverage. UHI is valid for all Turkish citizens, refugees and foreigners, residing legally in Turkey for more than one year and uninsured in another country

	healthcare services in case of an insured event. If a person does not pay the abovementioned healthcare fee, he/she has to pay the full price	
Structure	The Ministry of Health is developing health policy, setting standards and requirements, and approving long-term investments. Its subordinate institutions issue licenses to service providers and healthcare professionals. The National Health Insurance Fund (NHIF) administers the distribution of funds through 5 regional divisions. Healthcare is done at 3 levels: Primary healthcare is organized by municipal executive bodies in accordance with the procedure established by the government. Secondary healthcare is organized by municipal executive institutions in accordance with the procedure established by the government. Third healthcare level is organized by the Ministry of Health	The Ministry of Health coordinates all healthcare and related welfare activities. There is no information in the English language about detailed healthcare system after reform
Private healthcare	In Lithuania, there is a large private healthcare sector. Most private hospitals have contracts with various insurance companies that reimburse expenses of healthcare services. There are only a few private hospitals that provide hospital treatment.	The private healthcare sector is rapidly growing in Turkey. It offers faster accesses to the physician, higher quality of services. There also is private insurance, that could be applied in private healthcare institutions
Main challenges	The healthcare system's main problems are: rising costs, increasingly aging society, decreasingly young specialists, never-ending system reforms, irrational use of funds, and uneven distribution of medical specialties. In particular, there is a lack of nurses, poor communication with educational institutions in the preparation of specialists in the required areas, lack of objective data on situation analysis, poor management of patient flows, and the importance of data quality being ignored. The standardization of services is slowly being implemented to ensure the quality and availability of services regardless of location	Today, Turkey has still not reached the expected quality, especially in most of the state hospitals in smaller cities. There is poor health service in the countryside and rural areas. In contrast to Lithuania, in Turkey the number of nurses, health officer and physicians is increasing. Medical schools and universities contribute to this. Also, in Turkey it is permitted to hire foreign physician
E-Health	The Ministry of Health is responsible for e-health supervision and implementation. The state electronic healthcare and co-operation infrastructure system is funded by the state and is used by state and private medical institutions, which receive compensation from the state budget for healthcare provided to the patient. The system does not work at full capacity for a variety of reasons – high latency, low operating reliability, and gaps in personal data security	The Ministry of health (T.C. Sağlık Bakanlığı) has a highly complex structure. 'The Ministry of Health (MOH), universities and the private sector are the e-health service providers in the Turkish health system' (T.C. Sağlık Bakanlığı, www.e-saglik.gov.tr, 01.20.2019).The Ministry is responsible for the establishment of the e-health structure and a decision support system and acceleration of data flow among e-health stakeholders to increase resource efficiency and productivity, by coordinating and supervision all e-health initiatives and processes in Turkey

Table I: Review of Healthcare ecosystems in Lithuanian and Turkey. Sources of data: OECD, 2018. *Health at a Glance: Europe 2018;* OECD, 2018. *Reviews of Health Systems: Lithuania 2018;* OECD Health Statistics, 2017; Lėka, 2018; Law of the Republic of

Lithuania on the Health System, 1994; GÜRSOY, K., 2015*; www.e-saglik.gov.tr;* Özdeniz, 2011).

Despite the large difference in the size of the countries, the healthcare systems in Lithuania and Turkey are similar. Nowadays, an ageing society is one of challenges that digital health is trying to solve. Better healthcare delivery and faster services, accessibility, time and money saving are the main advantages of digital healthcare. Patients are seeking healthy lifestyles and doctors are seeking to diagnose accurately and treat patients instantly. Both countries are developing, innovative digital healthcare services are not implemented in ordinary clinical practice, and have the same market growth and potential ecosystem. The Ministry of Health co-ordinates all healthcare and related welfare activities. The health insurance models are based on the principles of universality and solidarity. Insured by compulsory health insurance, persons can use free healthcare services, but if they want quicker access to a physician or a higher quality of services or if the person is uninsured, it is possible to choose the private sector or paid services in state hospitals. In contrast to Lithuania, in Turkey the number of nurses, health officer and physicians is increasing. Medical schools and universities contribute to this. Also, in Turkey it is permitted to hire foreign physicians. Both countries are still undergoing reforms to balance quality, costs and accessibility of healthcare systems.

4.2. Case study data analysis

The data collected were grouped in thematic categories and analyzed. The analysis involved examination of data under each theme. Results was divided and evaluated based on five main indicators: (1) current knowledge on digital healthcare services, (2) advantages and disadvantages of digital healthcare services, (3) barriers and motivators of digital healthcare services, (4) competencies and resources needed for digital healthcare services, and (5) added value of digital healthcare services.

Introduction and experience related to disruptive mobile technologies in digital healthcare services

A multiple case study approach was adopted and eight individuals were interviewed with an equal split between Lithuania and Turkey and similar gender representation. The mean age of respondents was 38 years, with a minimum and maximum of 26 and 52 years respectively. The mean income of interviewees was 15000 euros per year, with a maximum of 28000 euros per year. Analysis was conducted both within and across cases (Yin, 2017). Most of the respondents were generally aware of telemedicine and 33% had encountered some form prior to interview. Despite the fact that the average age of respondents was close to 40 years, most of them exhibited awareness about the subject and understood its implications for the healthcare environment.

P1. *Explicit knowledge on how digital healthcare services affects patient perception of the value of digital healthcare solutions.*

The first proposition is investigated with the help of two tables that analyze participants' data, their knowledge about digital healthcare services and the perceived value of digital healthcare solutions.

Most of the respondents were generally aware of telemedicine and 33% had encountered some form prior to interview (Yin, 2017). Despite the fact that the average

age of respondents was close to 40 years, most of them exhibited awareness about the subject and understood its implications for the healthcare environment (Baxter and Jack, 2008). 62.5% had a positive experience of telemedicine and the remaining had a neutral perspective, which was mainly due to lack of awareness.

There are numerous value-added benefits of telemedicine and some are cost-effectiveness, improved service delivery, extended coverage, and improved access to the best doctors (Varkey *et al*., 2008; Hu *et al*., 1999; Omachonu & Einspruch, 2010). Cost and time savings and improved service delivery were identified as value additions generated through telehealth programs.

Respondent	Sex, age (years)	Annual income (euros)	Experience	Substantiation	Added value	Substantiation
Lithuania						
Respondent A	Female, 34	12000-14000	Had experience	*I do not use telemedicine directly and in a self-contained manner, but I had to buy medicines with an electronic prescription at the pharmacy*	Time saving and lower costs	*Here we have time saving and lower costs*
Respondent B	Male, 39	14000-16000	No experience	*I do not have experience with it at all*	Time saving, benefits to rural patients, convenience for everyone	*Let's see... time saving for sure, then if we are saving time, we are saving money too (laugh)*
Respondent C	Male, 45	14000-16000	No experience	*I am not very sure what that is exactly*	Cost saving, better service and best doctors have more patients	*(Laugh) Maybe a cost saving and perhaps better service*
Respondent D	Female, 27	N/A	Had experience	*Tthe solution I have encountered is healthcare education*	Cost saving, better service and best doctors have more patients	*(How?) Maybe where the best doctors could have a wider audience!*
Turkey						
Respondent E	Female, 39	15000-17000	No experience	*Personally, I have not been able to engage in any of its programs*	Cost saving, better service and best doctors have a wider audience	*(Laugh) Maybe a cost saving and perhaps better service*
Respondent F	Male, 26	13000-15000	Had experience	*I have used online healthcare subscriptions*	Lower costs, increased coverage and better service	*Aah, definitely there will be some reduction in the overall costs of healthcare*
Respondent G	Female, 45	12000-13000	Had experience	*Sometimes I call our family doctor, which is somehow a form of telemedicine, right? (laughs)*	Time saving, lower costs and convenience.	*The best thing of that it is do not need to visit doctor physically*
Respondent H	Male, 52	25000-28000	Had experience	*This interview is like an introduction to the topic (telehealth) (laughs)*	Cost effective and improved service delivery	*(Laugh) I would look at it in terms of being cost-effective*

Table II: General data and experience related to disruptive mobile technologies in healthcare services and added value outputs

Cost, time savings and improved service delivery were identified as value additions generated through telehealth programs. These comments were shared by almost all the respondents, irrespective of their knowledge level regarding digital healthcare services.

Disruptive mobile technologies in healthcare services: added value, barriers and motivators

The advantages of telemedicine are widely acknowledged and the participants' knowledge was tested on this point. Their opinion was also sought on any possible disadvantages.

P2: *Lack of explicit knowledge on digital healthcare services is substituted by prejudices about advantages and disadvantages of as well as barriers to and motivators for adoption of digital healthcare solutions.*

The second proposition explores whether prejudices about advantages and disadvantages substitute lack of explicit knowledge about digital healthcare services. Two tables containing data about the impact of barriers to digital healthcare services and the major drivers therein are analyzed in this context.

Most of the participants identified lower healthcare costs, better services and time saving as the main benefits of telemedicine (Win *et al*., 2016; Maarop and Win, 2012; Zuniga *et al*., 2010). No disadvantages were identified by any of the participants; therefore, even a lack of explicit knowledge about digital healthcare services did not result in the emergence of any disadvantages.

To understand the main barriers faced by telemedicine, the participants' opinions were sought. Furthermore, they were also asked about the main drivers/motivators that can support telemedicine.

Cultural barriers and lack of widespread technological adoption were identified as key barriers to the process (Alsyouf and Ishak, 2017). Most of the respondents were unaware about how performance assessment of telehealth services is performed but 25% reported that it could be done through surveys, with focus on whether or not it can be recommended to family/friends. The primary drivers identified were change in business model (Christensen and Hwang, 2008), cheaper services, busier lives and government initiatives that can develop programs through the EU (Free *et al*., 2013, p. 2).

The impact of drivers of digital healthcare services outweighs the few barriers to it and participants agreed that the move to a digital healthcare environment is much needed and inevitable. Most of them agreed that it's a shift in business models that produces efficiencies and convenience for everyone.

Respondent	Added value/ advantages	Substantiation	Disadvantages	Barriers/ obstacles	Substantiation in the content	Drivers/ motivators	Substantiation
Lithuania							
Respondent A	Time saving and lower costs	*Here we have time saving and lower costs*	n/a	Fear of changing usual order (Alsyouf and Ishak, 2017), lack of trust in technology	*The first is the fear of changing the usual order, because innovation needs to be taken into account. and also the lack of trust in technology*	Remote consultation, opportunity to consult on vacation leave, time saving	*The main factor determining the popularity of such services is the fact that people are increasingly working, are busy with online advice on how to save time*
Respondent B	Time saving, benefits to rural patients, convenience for everyone	*Let's see, time saving for sure, then if we are saving time, we are saving money too (laugh)*	n/a	Lack of trust in technology (Alsyouf and Ishak, 2017), government initiative, lack of information and people are conservative	*Government is not ready to start this process too, because there is lack of knowledge how to start implementation process*	Government initiative required from EU programs	*Main driver is government intention to absorb the money from the European Union programs*
Respondent C	Cost saving, better service and best doctors have more patients	*(Laugh) Maybe a cost saving and perhaps better service*	n/a	Lack of knowledge, prevalence of personalized healthcare	*Here is not much knowledge about the program (telehealth)*	Shift in business model, cheaper options available	*Technology has been very disruptive and entities are trying to survive through cheaper options available through technology*
Respondent D	Cost saving, better service and best doctors have more patients	*(How?) Maybe where the best doctors could have a wider audience!*	n/a	A telehealth programs that works for everyone	*Greatest challenge is coming up with a telehealth program that works for everybody*	Busy lives, less access to traditional healthcare	*Life is getting busier and people may no longer have time to access traditional personalized healthcare*
Turkey							
Respondent E	Time saving and lower costs	*(Laugh) Maybe a cost saving and perhaps better service*	n/a	Lack of awareness, prevailing personalized healthcare	*There is not much knowledge about the program (telehealth.*	A shift in business model, entities looking for	*I think it is just a shift in the business model.*

						cheaper solutions	
Respondent F	Time saving, benefits to rural patients, convenience for everyone	*Aah, definitely there will be some reduction in the overall costs of healthcare*	n/a	Minimal knowledge about telemedicine and traditional healthcare services	*I believe there is minimal information regarding the program*	Entities looking for cheaper solutions, shift in business model	*Technology has been very disruptive and entities are trying to survive through cheaper options available through technology*
Respondent G	Cost saving, better service and best doctors have more patients	*The best thing of that it is do not need to visit doctor physically*	n/a	Fear of changing usual order (Alsyouf and Ishak, 2017) and lack of trust in technology	*The first is the fear of changing the usual order, because innovation needs to be taken into account. and also the lack of trust in technology*	Moving to digital space and remote working	*The world is changing and most things have moved to the digital space and if it is possible to work remotely, it could be a good thing*
Respondent H	Cost saving, better service and best doctors have more patients	*(Laugh) I would look at it in terms of being cost-effective*	n/a	Less awareness of telehealth program	*There is less awareness about the program (telehealth)*	Need to cut costs, experimentation and reaching wider audience	*The drivers could be the need to cut on costs, or reach a wider audience, or purely experimentation*

Table III: Advantages, disadvantages and main barriers to and drivers of implementation of disruptive mobile technologies in healthcare services

Competencies needed for adoption and use

Digital healthcare solutions cannot flourish without the identification of required competencies and resources (Grady, 2014). Despite the fact that there are multiple benefits of digital healthcare services, it has not flourished in all contexts, therefore new perspectives are required.

P3. *To reveal the relevant competencies and resources that are needed for digital healthcare services*

Respondent	Added value/ advantages	Substantiation	Competencies and resources	Substantiation
Lithuania				
Respondent A	Time saving and lower costs	*Here we have time saving and lower costs*	Ability to use technology, clear communication, information privacy	*Clear communication is important. It is important that there is sufficient information on data protection*
Respondent B	Time saving, benefits to rural patients, convenience for everyone	*Let's see... time saving for sure, then if we are saving time, we are saving money too (laugh)*	Patient awareness, doctors' training, pace of change	*First of all patients needs to understand the benefits. Then it is important that doctors would be ready and educated for that*
Respondent C	Cost saving, better service and the best doctors have more patients	*(Laugh) Maybe a cost saving and perhaps better service*	Strong regulatory regime	*But I think the most important thing is a strong regulatory regime*
Respondent D	Cost saving, better service and the best doctors have more patients	*(How?) Maybe where the best doctors could have a wider audience!*	Experts' response required	*Mhm (laughs), don't you think that can best be answered by experts?*
Turkey				
Respondent E	Time saving and lower costs	*(Laugh) Maybe a cost saving and perhaps better service*	No comments	*I am not the best person to comment*
Respondent F	Time saving, benefits to rural patients, convenience for everyone	*Aah, definitely there will be some reduction in the overall costs of healthcare*	Strong regulatory regime	*But I think the most important thing is a strong regulatory regime*
Respondent G	Cost saving, better service and best doctors have more patients	*The best thing of that it is do not need to visit doctor physically*	Clear communication, data protection	*Clear communication is important*
Respondent H	Cost saving, better service and best doctors have more patients	*(Laugh) I would look at it in terms of being cost-effective*	No comments	*Therefore, I am not in a position to state what is really needed in this regard*

Table IV: Competencies needed for adoption and use of disruptive mobile technologies in healthcare services

The core competencies identified are clear communication, data privacy, strong regulations, patients' awareness and doctors training (Grady, 2014). 37% of respondents were reluctant to share their point of view and deferred to experts.

5. Discussion, conclusions, limitation and future research

Digital healthcare services are perceived positively by both Lithuanian as well as Turkish patients. Respondents acknowledged that the time vs. cost savings and improved service delivery are of benefit and create clear added value. The major issues are a strong regulatory framework, building trust in doctor-patient relationships and technological problems in remote areas. A strong regulatory framework would increase transparency, as it was believed that EU grants need to be utilized properly.

Creating public awareness and ensuring that all stakeholders play their role in development of telemedicine will further bolster the programs. Research institutions and Governments can play a strong role in awareness efforts and each stakeholder would understand how and why the technology should be applied. None of the respondents denied the advantages of telemedicine and instead wanted to give it a try, provided that strong structures are in place.

For future research, some of the limitations of the current study should be considered. One of the limitations is the size of the research sample, which should be increased and cover specific clinical areas of digital healthcare services, for example tele-stroke or tele-dermatology. A more homogenous sample comprised of people with similar diseases and demographics would yield improved results. Pre-awareness and training of doctors and patients can result in better responses and hence more effective discussions for future studies on the subject.

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