

Internet Treatment is a Blessing or a Curse: Health Knowledge Management

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Abstract: The social distancing, isolation and shortage of health workers, as well as the COVID-19 pandemic, as well as the ageing of the society requiring healthcare, influenced the fast pace of digital innovation and the implementation of new technologies and even digital services in healthcare health. Is this transformation a blessing or a curse for healthcare? To answer this question, we conducted a literature review on new technologies, innovations in medicine and e-health. A research survey was also carried out in three countries and the Servqual analysis made it possible to estimate the trust in modern technologies for e-health and the trust of surveyors in these methods.

keywords: E-Health, Online Telecommunication Knowledge, Health Knowledge Management

1. Introduction

The growing number of health and social problems worsens the health of our society and thus threatens the existence of future generations. The period of the Covid-19 pandemic showed how dependent we are on healthcare (Akrich and Méadel 2009; Brown et al. 2014), often squander resources by purchasing internet products that are labeled as "healthy" or "cost-saving," despite the fact that they are neither pharmaceuticals nor supplements (Bessant 2019). Most consumers ignore the dangers resulting from the deteriorating health situation and rarely visit doctors' offices or undergo check-ups (Chretien et al. 2015). It is also very difficult for Europeans to admit the need for psychological or psychiatric treatment (El Morr and Eftychiou 2017; Doxey 2021), which was also greatly influenced by the pandemic, home office and social isolation. The shame caused by diseases related to the human psyche and mental problems causes unfortunately the abandonment of treatment or looking for home remedies, advice from people with similar diseases on forums, chat rooms or more and more often online advice from unverified "specialists" (Engel et al. 2020; Hays 2021b).

The terms "innovation" and "innovative" are buzz words that are used widely in many different fields, including healthcare (Bessant 2019). So far, however, there is no comprehensive and generally accepted definition of innovation (Wald et al. 2007), and different sciences (Simon 2016)(e.g. economics, public health, geography, sociology) use slightly different concepts (Thoër et al. 2017; van Leijen-Zeelenberg 2015). Schumpeter was one of the first economists to recognise the importance of innovation in any economic system, from a single business unit to entire economies and the world economy (Żywiołek and Schiavone 2021).

He described innovation as any change in the method of production, the production of new products, company structures or entry into a new market, and as "creative destruction" that is the basis of all advances in a capitalist market regime (Żywiołek et al. 2021).

In the health sector, improvements in quality come from service and quality of life innovations (Żywiołek and Schiavone 2021; van Leijen-Zeelenberg 2015), but they are also a constant challenge for existing healthcare providers and systems (Broom 2005). Advances in medicine require new technologies (Slametiningsih et al. 2020)(e.g. drugs, implants and devices), procedures (e.g. new surgical techniques) or forms of organisation (e.g. palliative medicine as an innovative form of care) (Simon 2016; U et al. 2022).

The aim of the literature review was to search for scientific publications that would: present model patient behaviours from the perspective of multiple ailments and access to the Internet (Beck et al. 2014; Boer et al. 2007). The authors conducted extensive literary studies based, among others, on publications on innovation, digitization and digitization of healthcare, e-health development in a very careful way over the past 10 years. The literature review shows that the main focus of the management science issue is the characteristics and behaviour of patients who are consumers at the same time (Chen et al. 2021). Doctors are experts in the field of health (Brown et al. 2014), while patients / consumers are responsible for managing their time (Archambault et al. 2013), health, access to health information and knowledge (Żywiołek et al. 2021). The authors of this paper found that the solutions provided to patients and the typical consumer behaviour of patients were of particular interest.

The National Institute of Health and Care Excellence in the United Kingdom classifies digital medical technologies according to features such as system services (e.g., electronic prescription systems) (Barker and Barker 2022),

active monitoring applications that connect to sensors (Haar and Ernst 2016), and wearable devices that are designed to enable remote monitoring of patients by healthcare professionals, and advanced artificial intelligence programs that use data to guide diagnostic decisions (J. Żywiołek et al. 2021; J. Żywiołek et al. 2021).

There is so much choice today that healthcare organisations must be able to (J. Żywiołek and F. Schiavone 2021; Krishna and Thompson 2021; Moore et al. 2021): ensure that the digital technologies they implement are functional, safe and effective. Websites have been set up across Europe to focus on a comprehensive, innovation-driven approach to this with the overarching goal of increasing the health life expectancy of European Union (EU) citizens by two years by 2020. It is still unclear whether this goal has been achieved. achieved but efforts are ongoing (Smit et al. 2021).

Regarding the WHO, universal health insurance cannot be achieved without the support of e-health because digitization enables the delivery of scalable solutions to many people, even remotely (Chen et al. 2021; Chretien and Kind 2013). The rapid development of new digital technologies in healthcare, the current COVID19 pandemic, and the heavy burden on healthcare systems around the world are fuelling the digitization of healthcare. How does digitization affect diagnostics, pharmacotherapy, psychotherapy, the doctor-patient relationship, and administrative tasks in psychiatry? Is digitization? blessing or glue?

However, the proposed solutions are either too general or incomplete. Here are some examples of such findings.

The considerations show the following about the patient / consumer (Chen et al. 2021):

- want to be served at the highest level,
- are focused on the future,
- health is more important to them than service time,
- seek to control the impact of their health efforts,
- try to minimise the negative impact of access to technology and knowledge on their health.

The following hypotheses were developed as a result of the specified goal, together with literature study and practical observations connected to online treatment awareness and knowledge:

Hypothesis (H1). The amount of understanding of online treatments boosts trust in these treatments and therapies.

Hypothesis (H2). Modern e-health technologies have increased accessibility to online therapy and treatment.

The text illustrates the intricate interplay between social health challenges and innovation in healthcare. It highlights society's dependence on healthcare systems, especially evident during crises like the COVID-19 pandemic, emphasizing the need for innovative solutions to address existing issues and adapt to changing circumstances. Consumer behaviour, influenced by factors such as stigma surrounding mental health treatment and the desire for convenience, shapes the demand for innovative healthcare solutions. These innovations, ranging from digital technologies to new care models, aim to improve healthcare quality, service delivery, and patient outcomes while addressing complex health challenges. Overall, the rapid digitization of healthcare presents opportunities and challenges, with efforts focused on achieving specific goals such as increasing life expectancy and expanding access to care.

2. Materials and Methods

The researchers in this study implemented the following research methodology: creating a model customer/consumer profile and delineating its behaviours and traits, specifically those pertaining to e-health. The profile of the patient or consumer is presented in the second section of the article. The authors built it based on their own unique concept. The second phase of the study process necessitated empirical investigation. The objective of the study was to ascertain the perspectives and sentiments of patients and consumers who utilise internet solutions for health and treatment. In order to accomplish the established study objective, we have devised a research strategy, executed the investigation, synthesised the findings, scrutinised them, and subsequently derived conclusions. We conducted the study in the latter half of 2021. The study involved patients reporting the utilisation of contemporary technologies in the realm of healthcare and therapy. The individuals ranged in age from 18 to 70 and were from Poland, UK, and Sweden. As a result of the ongoing COVID-19 outbreak, we have discontinued in-person interactions with managers. Alternatively, we employed the survey methodology. We employed a questionnaire as the study instrument. In order to get patient feedback, we employed an online survey and examined a total of 13,6157 individuals residing in these specific nations. The

authors of the publication determined that the use of the research method and research tool in the form of a survey should use a 5-point Likert scale (Sayili et al. 2024), which will allow obtaining reliable research results. The majority of respondents, at 34%, fell between the age range of 40 and 49.

The study questionnaire had twenty-three inquiries sent to patients with the aim of resolving the research quandary. A point scale indicated the answers to each question. The research is centred around studying individuals' preferences and their anticipated actions in the future, as well as the acquisition of knowledge and the establishment of trust. The study centred on individuals' preferences and behaviours and was carried out using representative methodology. The sample fulfils the condition of being representative, although the absence of a breakdown of the data by particular countries is due to their similar geographic location and the comparable level of social awareness regarding the availability of e-health, which is present in 33% of the population across all countries. They have common objectives, strategies, and presumptions in relation to this matter. Encouraging proper conduct within their communities and providing individuals with education result in favourable societal reactions. European inhabitants share comparable levels of economic development and cultural characteristics. The ability to freely migrate between European Union or Schengen zone countries allows for the sharing of knowledge, perspectives, and ideas on problem-solving. The second phase of the investigation involved nine specific inquiries utilising the Servqual approach. To demonstrate the similarities in the behaviour and organisation of national health systems across different countries, the authors have compiled an overview. Although countries vary in size, a notable shared characteristic is the level of knowledge, forces, and resources that each country dedicates. Table 1 displays the parameters that were evaluated to determine the similarities in prevalence as well as the proportion of nation involvement and the utilisation of society.

Table 1: The similarities in the use of e-health methods and the percentage of use by society. (data from 2021)

Health factors	Poland		UK		Sweden	
	Average Value					
Source of e-Health financing - public funds	77%		77%		77%	
eHealth capacity building:						
Health sciences students	50-75%		<25%		25-50%	
Health professionals	25-50%		25-50%		<25%	
	know	use	know	use	know	use
Applications, national programs	84%	79%	89%	84%	91%	82%
Social media and health	86%	83%	93%	83%	93%	90%
Big data and health	78%	63%	82%	76%	89%	88%
Electronic Health Records (EHRs) (year of creation)	2009		1978		1996	

Source: Own study based on WHO data from 2021 (; ;).

Table 1 shows the structure of the country's involvement in e-health activities. Knowledge and use of these new forms of access to "health" are manifestations of service consumerism and public awareness. The huge interest in accessing health services and advice also raises problems, as shown in Figure 1.

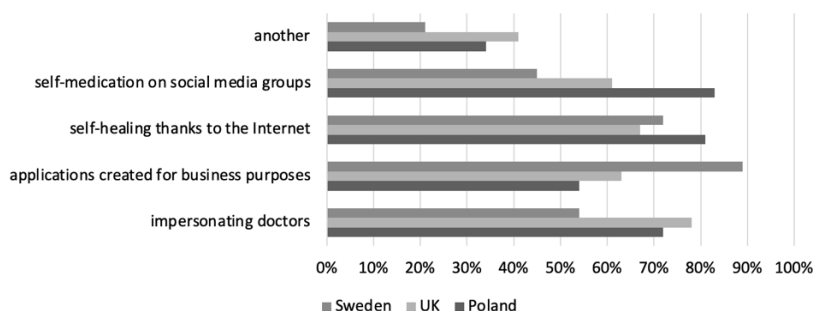


Figure 1: E-health problems in selected countries.

Source: WHO data from 2020 (; Hays 2021a).

3. Results

The identification of barriers and problems made it possible to define the method of proceeding to solve the problem. The scope and effectiveness of self-treatment with the use of the Internet, online treatment, support methods, and applications supporting the treatment are presented in Table 1. The descriptive statistics for all analysed constructs in the article are related to each other in terms of the effectiveness of the activities carried out on the management of remote treatment methods. Based on the results in Table 2, we can see the moderate mean value for the construction of knowledge and information in the field of treatment (3.53). The mean values for the remaining four constructs that measure the range of remote treatment management methods are low to moderate at best. Average values are: responsibility for treatment (2.83), implementation of solutions (2.90), availability of information and creation of knowledge (2.87), treatment support, and modern methods (2.89). Our part of the research focused on taking action for e-health.

Table 2: Mean values and Cronbach's α coefficient.

Variable	Average value	Cronbach's α
Online treatment knowledge	3,53	0,82
Responsibility for management	2,83	0,87
Implementation of solutions	2,90	0,76
Availability of information creating knowledge	2,87	0,81
Treatment support, modern methods	2,89	0,85
Improved communication	4,43	0,69
High awareness among patients	5,53	0,79
Strengthened cooperation in the field of applied treatments	3,59	0,71

The initial phase of the study was establishing the presence and magnitude of the relationship. In the initial stage of the Servqual study, we calculated the discrepancies between the levels of energy management perception and consumer awareness and the expected levels for the five dimensions. Table 3 presents the outcomes.

Table 3: Differences in perceptual levels were studied using Servqual.

Features	P	E	Servqual Results "SS" Is the Level of Satisfaction $SS = E - P$
Online treatment knowledge			
Average Servqual: 0,81			
1 Patient involvement in treatment	9	9,24	0,31
2 Constant monitoring of the health level and disease progression	8	8,16	0,22
3 Knowledge of online treatment options	9	8,52	-0,21
4 Patient involvement in changing attitudes	9	9,49	0,63
Responsibility for e-health management			
Average Servqual: 2,68			
5 Access to information and knowledge	7	6,77	-0,11
6 Usefulness and ease of interpretation of information and knowledge	9	9,38	0,39
7 Patient's level of knowledge	7	8,36	1,24
8 Possibility of combining different treatments	7	8,51	1,38
Availability of information creating knowledge, improved communication			
Average Servqual: 0,21			
9 Alternative ways of communication	8	7,78	-0,39
10 Information systems enabling the search for help	7	5,98	-0,41
11 Organizational activities to disseminate information and knowledge	6	5,56	-0,72

Features		P	E	Servqual Results "SS" Is the Level of Satisfaction SS = E - P
12	Online treatment culture	9	9,51	0,62
13	Managing medications and supplements	7	7,59	0,81
High awareness among patients				
Average Servqual: 0,52				
14	A high level of self-healing confidence	7	7,89	0,67
15	Trust in online therapy / treatment	9	9,73	0,75
16	Patient information campaigns	8	7,39	-0,41
17	Monitoring applications	6	5,22	-0,43
Strengthened cooperation in the field of applied treatments				
Average Servqual: 0,37				
18	Errors in reasoning and application of solutions	6	6,26	0,32
19	Lack of trust	8	6,27	-1,59
20	Use of medications and therapy based on similar symptoms of friends / family	8	8,46	0,58
21	Ignorance / fear of alternative treatments	6	6,16	0,43
22	Online search for symptoms and self-treatment	6	6,19	0,26
23	Fear of a serious disease	7	6,48	-0,52
24	No treatment	7	7,06	0,13

A graph was produced based on the Table 3 data, which included the results of the Servqual method of perception and expectancies analysis. Figure 3 depicts the graphical representation of the Servqual method's outcomes.

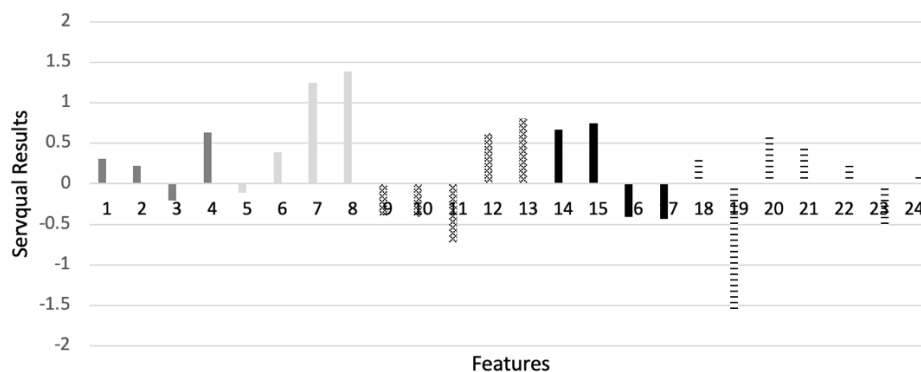


Figure 3: Results of the Servqual analysis.

The results show that 15 of the 24 feasible scenarios achieved satisfaction, whereas the other cases showed no level of satisfaction with the actions associated with information systems aimed at patient assistance. For knowledge dissemination organisations, health monitoring applications, loss of trust in treatments and doctors, and fear of disease, dissatisfaction is critical. However, as you can see, the sources of discontent were lack of understanding, anxiety, and maybe a terrible treatment experience. As a result, it's safe to infer that they're a good area to run social marketing and gain patients' confidence and knowledge. Taking action on your own, such as taking drugs or supplements like people who have similar symptoms, is a very risky phenomenon. It's just as risky to try to heal yourself by typing your symptoms into a search engine. The findings of the study allowed for the identification of the factors that influence the determination of what constitutes online treatment.

4. Discussion and Conclusions

The study showed that a change in approach is necessary, and knowledge in this area has increased awareness of caring for one's health. Older people constitute an increasingly important and growing part of the general population. Digital health and wellness programmes offer the potential to strengthen and facilitate support and

healthy prevention strategies (J. Żywiołek and F. Schiavone 2021). Using a digital health platform that includes integrated functions for both health recommendations and accountability (e.g., by a behavioural trainer) can be a unique feature to encourage patients to be motivated and accountable (Żywiołek 2018; Matsushita 2021; Mann et al. 2020). Future work should build on the concept of a "user-centric" approach, using both qualitative data (e.g., focus groups and surveys) and other data-driven approaches to identify key aspects of eHealth.

It was vital to make adjustments in the medical services industry at a time when societies are ageing at an alarming rate and hospitals and public institutions are unable to absorb patients (Shaheen 2004; Żywiołek et al. 2021). Modern health technology has been employed to take effective measures leading to patient care and access to a specialist. The purpose of the modern approach to raising patient awareness and providing new chances to support the battle against sickness and self-healing via the Internet is to integrate these elements.

The findings are negative, revealing widespread illiteracy, a lack of information, and a fear of taking drugs without contacting a doctor. Future research on this topic should focus on the following areas:

- the adaptation of e-health management methods for different age groups, knowledge and social campaigns to help patients acquire skills,
- activities to better prepare the younger generation to use e-health services,
- the inclusion of sustainable development in educational programs.

The results of qualitative and quantitative research on treatment and therapy in terms of distance and modern instruments utilized in the investigated nations are presented in this article. The employment of specific approaches was linked to the fact that quantitative research allows for the creation of a broad picture of the research topic. Qualitative research, on the other hand, allows you to obtain additional understanding about the identification of components associated with the investigated area and their relationships. The survey's preparation also necessitated the acquisition of specialised knowledge as well as the identification and comprehension of certain components and their relationships (Żywiołek et al. 2021; Simon 2016; Menvielle et al. 2017). This necessitated the application of qualitative research methods. Quantitative research allows for generalisations, but qualitative research based on the principle of ethnographic study allows for a greater grasp of the intricacies of non-human phenomena. The application of research is inextricably linked to the emergence of unique issues and limits. The inability to compare the data to another research period was a weakness of this study. The authors decided that this is a viable research topic for the future and plan to perform a comparison study within the next 2–3 years.

References

- Available at: <https://www.euro.who.int/en/health-topics/Health-systems/digital-health> (Accessed 4 January 2022).
- Available at: <https://www.who.int/publications/i/item/9789241565219> (Accessed 6 February 2022).
- Available at: <https://www.euro.who.int/en/health-topics/noncommunicable-diseases/pages/who-european-office-for-the-prevention-and-control-of-noncommunicable-diseases-ncd-office/data-publications-and-tools/latest-publications/factsheet-tackling-noncommunicable-diseases-with-digital-solutions-2021> (Accessed 12 January 2022).
- Akrich, M. and Méadel, C. (2009), Les échanges entre patients sur l'Internet, *Presse médicale (Paris, France 1983)* 38: 1484–1490.
- Archambault, P.M., van de Belt, T.H., Grajales, F.J., Faber, M.J., Kuziemy, C.E., Gagnon, S., Bilodeau, A., Rioux, S., Nelen, W.L.D.M. and Gagnon, M.-P., et al. (2013), Wikis and collaborative writing applications in health care: a scoping review, *Journal of Medical Internet Research* 15: e210.
- Barker, G.G. and Barker, E.E. (2022), Online therapy: lessons learned from the COVID-19 health crisis, *British Journal of Guidance & Counselling* 50: 66–81.
- Beck, F., Richard, J.-B., Nguyen-Thanh, V., Montagni, I., Parizot, I. and Renahy, E. (2014), Use of the internet as a health information resource among French young adults: results from a nationally representative survey, *Journal of Medical Internet Research* 16: e128.
- Bessant, J. (2019), The future of responsible innovation. In Iakovleva, T., Oftedal, E. and Bessant, J. (Eds.), *Responsible Innovation in Digital Health*, Edward Elgar Publishing, pp. 232–250.
- Boer, M.J. de, Versteegen, G.J. and van Wijhe, M. (2007), Patients' use of the Internet for pain-related medical information, *Patient Education and Counseling* 68: 86–97.
- Broom, A. (2005), Virtually he@lthy: the impact of internet use on disease experience and the doctor-patient relationship, *Qualitative Health Research* 15: 325–345.
- Brown, J., Ryan, C. and Harris, A. (2014), How doctors view and use social media: a national survey, *Journal of Medical Internet Research* 16: e267.
- Chen, Z., Tarazi, J.M., Salem, H.S., Scuderi, G.R. and Mont, M.A. (2021), The Utility of Telehealth in the Recovery From the COVID-19 Pandemic, *Surgical technology international* 39.

- Chretien, K.C. and Kind, T. (2013), Social media and clinical care: ethical, professional, and social implications, *Circulation* 127: 1413–1421.
- Chretien, K.C., Tuck, M.G., Simon, M., Singh, L.O. and Kind, T. (2015), A Digital Ethnography of Medical Students who Use Twitter for Professional Development, *Journal of General Internal Medicine* 30: 1673–1680.
- Doxey, C.H. (Ed.) (2021), *The Controller's Toolkit*, Wiley.
- El Morr, C. and Eftychiou, L. (2017), Evaluation Frameworks for Health Virtual Communities. In Menvielle, L., Audrain-Pontevia, A.-F. and Menvielle, W. (Eds.), *The Digitization of Healthcare*, Palgrave Macmillan UK, London, pp. 99–118.
- Engel, N., Meershoek, A. and Krumeich, A. (Eds.) (2020), *Science, Technology, and Innovation for Sustainable Development Goals*, Oxford University Press.
- Haar, J. and Ernst, R. (Eds.) (2016), *Innovation in Emerging Markets*, Palgrave Macmillan UK, London.
- Hays, P. (Ed.) (2021a), *Advancing Healthcare Through Personalized Medicine*, Springer International Publishing, Cham.
- Hays, P. (2021b), Alliances: Knowledge Infrastructures, and the Digitization of Precision Health. In Hays, P. (Ed.), *Advancing Healthcare Through Personalized Medicine*, Springer International Publishing, Cham, pp. 99–139.
- J. Żywiótek, J. Rosak-Szyrocka and B. Jereb (2021), Barriers to Knowledge Sharing in the Field of Information Security, *Management Systems in Production Engineering* 29.
- J. Żywiótek and F. Schiavone (2021), Perception of the quality of smart city solutions as a sense of residents' safety, *Energies* 14.
- J. Żywiótek, J. Rosak-Szyrocka and M. Mrowiec (2021), Knowledge management in households about energy saving as part of the awareness of sustainable development, *Energies* 14.
- Krishna, A. and Thompson, T.L. (2021), Misinformation About Health: A Review of Health Communication and Misinformation Scholarship, *American Behavioral Scientist* 65: 316–332.
- Mann, D.M., Chen, J., Chunara, R., Testa, P.A. and Nov, O. (2020), COVID-19 transforms health care through telemedicine: Evidence from the field, *Journal of the American Medical Informatics Association JAMIA* 27: 1132–1135.
- Matsushita, H. (Ed.) (2021), *Health Informatics, Translational Systems Sciences*, Vol. 24, Springer Singapore, Singapore.
- Menvielle, L., Audrain-Pontevia, A.-F. and Menvielle, W. (2017), *The Digitization of Healthcare*, Palgrave Macmillan UK, London.
- Moore, E., Stanton, T.R., Traeger, A., Moseley, G.L. and Berryman, C. (2021), Determining the credibility, accuracy and comprehensiveness of websites educating consumers on complex regional pain syndrome accessible in Australia: a systematic review, *Australian journal of primary health* 27: 485–495.
- Sayili, U., Siddikoglu, E., Turgut, D., Arisli, H.E., Ceyhan, B., Gunver, M.G., Ozel Yildiz, S., Yurtseven, E. and Erginoz, E. (2024), Does categorizing scale scores with cutoff points affect hypothesis-testing results?, *Discover mental health* 4: 14.
- Shaheen, S.I. (2004), E-health in egypt: challenges and opportunities. In *Proceedings. 2004 International Conference on Information and Communication Technologies: From Theory to Applications, 2004, 19-23 April 2004*, Damascus, Syria, IEEE, pp. 35–36.
- Simon, F. (2016), Health-Care Innovation in Emerging Markets. In Haar, J. and Ernst, R. (Eds.), *Innovation in Emerging Markets*, Palgrave Macmillan UK, London, pp. 233–252.
- Slametiningsih, S., Yunitri, N., Hendra, H., Nuraenah, N. and Kamil, A.R. (2020), IMPROVING HEALTHCARE SERVICES USING MOBILE TECHNOLOGY: NEEDS AND EXPECTATION ASSESSMENT FOR THE DEVELOPMENT OF MOBILE HEALTH APPS FOR MENTAL HEALTH SERVICES IN TECHNOLOGY, *IJNMS* 4: 170–176.
- Smit, D., Vrijisen, J.N., Groeneweg, B., Vellinga-Dings, A., Peelen, J. and Spijker, J. (2021), A Newly Developed Online Peer Support Community for Depression (Depression Connect): Qualitative Study, *Journal of Medical Internet Research* 23: e25917.
- Thoër, C., Millerand, F. and Duque, N. (2017), When Medicine Is Becoming Collaborative: Social Networking Among Health-Care Professionals. In Menvielle, L., Audrain-Pontevia, A.-F. and Menvielle, W. (Eds.), *The Digitization of Healthcare*, Palgrave Macmillan UK, London, pp. 119–134.
- U, A.S., F, A. and Philip, F.M. (2022), Using IoTs-Based Monitoring System in a Smart Ambulance for E-Healthcare Applications. In Giannoccaro, I., Salunkhe, S., Hussein, H.M.A.M. and Davim, J.P. (Eds.), *Applications of Artificial Intelligence in Additive Manufacturing, Advances in Computational Intelligence and Robotics*, IGI Global, pp. 42–67.
- van Leijen-Zeelenberg, J.E. (2015), *Healthcare quality improvement by redesign*.
- Wald, H.S., Dube, C.E. and Anthony, D.C. (2007), Untangling the Web--the impact of Internet use on health care and the physician-patient relationship, *Patient Education and Counseling* 68: 218–224.
- Zywiótek, J., Molenda, M. and Rosak-Szyrocka, J. (2021), Satisfaction with the Implementation of Industry 4.0 Among Manufacturing Companies in Poland, *ERSJ XXIV*: 592–603.
- Żywiótek, J. (2018), Monitoring of information security system elements in the metallurgical enterprises, *MATEC Web Conf.* 183: 1007.
- Żywiótek, J., Rosak-Szyrocka, J. and Jereb, B. (2021), Barriers to Knowledge Sharing in the Field of Information Security, *Management Systems in Production Engineering* 29: 114–119.
- Żywiótek, J. and Schiavone, F. (2021), Perception of the Quality of Smart City Solutions as a Sense of Residents' Safety, *Energies* 14: 5511.