

Mobile Apps in Digital Health: Patient Expectations and Factors Influencing Patient Acceptance – a Literature Review

Authors:

Uwe Radtke (Radtke.Uwe@phd.uni-mate.hu)

Hungarian University of Agriculture and Life Sciences – Kaposvár Campus, Kaposvár, Hungary

Atila Wohllebe (atilla.wohllebe@gmail.com)

University of Applied Sciences Wedel, Wedel, Germany

Abstract:

With the digitalization of healthcare, mobile apps are also becoming increasingly relevant. This narrative literature review examines the general expectations and requirements of patients for mobile health apps based on scientific studies from the last 10 years (2014-2024), identifies specific functions and features and summarizes the acceptance factors. The results show that mobile health apps should primarily serve the success of treatment. Specifically desired functions include data entry and automated tracking, reminder and alerting, personalization and customization, education and information as well as data sharing and connectivity. Perceived usefulness and ease of use are among the most important acceptance factors. Personal support from healthcare professionals also plays an important role in some contexts. Various further research directions are discussed. Future research could for example focus on the question of how specific functions affect user satisfaction and user loyalty once they have been implemented.

Keywords:

Mobile Apps, Mobile Applications, Digital Health, Digital Healthcare, User Acceptance.

Submitted: 2024-12-14. Revised: 2025-01-05. Accepted: 2025-01-09.

Introduction

Of the approximately eight billion people on the planet, around five billion people own a smartphone and are therefore able to use mobile apps (Newzoo & Statista, 2023). On average, smartphone users in Germany have 38 apps installed (Ipsos & Payback, 2024). The areas of application for apps are constantly expanding. The relevance of mobile apps is not only increasing in banking, retail and education (Drolia et al., 2022; Thusi & Maduku, 2020; Wohllebe et al., 2022; Wohllebe & Wolter, 2021).

The relevance of mobile health apps is also increasing. Sales of mobile apps in digital health will increase from USD 2.4 billion in 2017 to USD 11.2 billion by 2025, almost fivefold (BIS Research, 2018). According to a survey by Statista Consumer Insights (2023) the most relevant use cases for mobile apps in the healthcare sector in Germany include nutrition apps, apps for measuring physical values and apps for recording menstruation, natural contraception and family planning.

The growing practical relevance of mobile apps in healthcare is also attracting increasing interest from researchers. According to Senjaliya & Corser (2021), mobile healthcare apps are used in various areas, including staff efficiency, communication, data processing and direct patient care. In view of the increased technical possibilities and a shortage of medical professionals in some countries, mobile apps are particularly relevant as a self-service access to medical care. Riaz & Atreja (2016) discuss the use of apps for patient self-monitoring. Lohnari et al. (2016) outline applications in pregnancy tracking, chronic disease management or behavioral therapy, for example. Also using mobile apps for fitness tracking, symptom tracking or for health education are aspects of mobile applications in digital health (Dimitrov, 2016). Lastly, also the use of mobile apps for telemedicine or teleaudiology is a growing field (Ross, 2020; Ross & Wohllebe, 2021).

Various problems in the research of mobile apps in digital health are apparent here: Firstly, the possible applications of mobile apps - even if limited to the healthcare sector - are very diverse. Secondly, the environment is dynamic and complex due to regulation and technological development. Finally, the user group is highly heterogeneous and includes people of all age groups, all genders and at different stages of life.

The aim of this study is therefore to provide an overview of the use of mobile apps in digital health with regard to general expectations, specific expected functions and features and acceptance factors. The focus in each case is on patients. Specifically, this paper will answer three questions:

- What are patients' general expectations of mobile apps in digital health?
- What specific functions do patients expect from mobile apps in digital health?
- What factors lead to patient acceptance of mobile apps in digital health?

Methods and Data

This paper uses a narrative literature review to answer the three research questions of basic expectations, expectations of specific functions and acceptance factors. To find relevant research papers, the meta-search engines Google Scholar and ResearchGate as well as the larger scientific publishers such as Elsevier, Springer and Taylor & Francis and the digital libraries of IEEE and ACM are used.

The following combination of words is used for all three questions: (“mobile apps” OR “mobile applications”) AND (“digital health” OR “digital healthcare”) AND (“patient” OR “user”). For the question about general expectations, the term (“expectations” OR “requirements”) is also added. For the question about specific functions, (“features” OR “functions” OR “functionalities”) is also searched for. The search for acceptance factors is supplemented by “acceptance”. Only studies from the last 10 years (2014 to 2024) are included in the results. The papers found are reviewed in terms of their relevance to the respective research question with regard to title and abstract. The papers are evaluated according to their year of publication (in ascending order). Finally, the relevant statements of the paper are summarized in terms of the respective research question.

Results and Discussion

General Expectations and Requirements of Patients

A total of 13 papers are evaluated in order to summarize the general expectations and requirements of patients for mobile health apps.

Becker et al. (2014) provide an overview of mHealth2.0. The authors are able to show that patients want to overcome barriers to access and expect more effective treatments through the use of mobile apps. Mendiola et al. (2015) evaluate the reviews of digital health applications and look for functionalities that lead to particularly good app ratings. According to their analysis, it is primarily time savings, simple and intuitive use and connectivity to other applications that make an app successful with users. Yuan et al. (2015) examine the user perception of health and fitness apps based on an extension of the UTAUT2 model. They can show that performance expectancy, hedonic motivation, price value and habit are relevant factors that positively influence the user's intention to continue using health apps. A qualitative study by Anderson et al. (2016) shows that users expect mobile apps in digital health to facilitate engagement and to be easy to use. Furthermore, users expect data management that allows effective self-monitoring. With the help of focus groups and interviews, Peng et al. (2016) found that users of mobile health apps expect the apps to provide information and give personalized advice. Reminders and the ability to set goals also help with adoption and continued use. In the context of mobile health

tracking apps in the area of chronic diseases, Birkhoff & Smeltzer (2017) show that the apps need strong usability to motivate people to use them in the long term. Pan & Zhao (2018) also emphasize the importance of an easy-to-use interface as well as data security and the integration of data from wearables. The authors examine the user acceptance of mobile health technologies against the backdrop of the observation that many patients have so far refrained from using mhealth technologies. Although usability is identified as an important topic among mobile health experts in a study by Liew et al. (2019), it is only of secondary importance to users - after satisfaction. The concern about in-app charges and advertisements on the part of patients is interesting: This concern is not shared by the mobile health experts in the comparative study. Based on the app reviews of mental health apps, Alqahtani & Orji (2020) emphasize that users expect good usability as well as extensive content, personalization, privacy and security. Similar to Ross et al. (2022) Torbjørnsen et al. (2019) not only emphasize the importance of usability in their study, but also point out in particular that patients expect personal support from healthcare personnel. Lazard et al. (2021) examine app designs and interactive features against the background of the question of how mobile health adoption can be increased. Their work deals in particular with specific requirements for user interface design, whereby the results can be summarized in such a way that patients are used to a certain arrangement of certain elements (e.g. navigation menu) from other contexts and also expect this in digital health apps. This recognition of UI elements can be understood as an aspect of ease of use. The work of Chan & Honey (2022) emphasizes that mobile apps in digital healthcare must be helpful and easy to use. Personalization in the sense of adapting the app to one's own needs is also an important expectation. Above all, patients expect an app to support the treatment of spinal cord injuries to have a positive impact on the success of treatment. Furthermore, according to a study by Singh et al. (2022), the app should support the learning of techniques and methods for dealing with the disease.

The evaluation of the literature can be summarized as follows:

- By far the most frequent studies emphasize that patients primarily expect ease of use, which is expressed in good usability (Alqahtani & Orji, 2020; Anderson et al., 2016; Birkhoff & Smeltzer, 2017; Chan & Honey, 2022; Lazard et al., 2021; Liew et al., 2019; Mendiola et al., 2015; Pan & Zhao, 2018; Torbjørnsen et al., 2019).
- Furthermore, the literature shows that patients expect the apps to have a positive influence on treatment success (Anderson et al., 2016; Becker et al., 2014; Singh et al., 2022; Yuan et al., 2015).
- Accordingly, users expect an app to be helpful (Chan & Honey, 2022) which is reflected, among other things, in helpful, personalized content and functions (Alqahtani & Orji, 2020; Peng et al., 2016).

- In certain situations, patients appear to have a need for personal support in setting up or finding their way around a mobile health app (Ross et al., 2022; Torbjørnsen et al., 2019).
- Finally, several authors point out the particular relevance of security, data protection and privacy in the context of mobile apps in digital health (Alqahtani & Orji, 2020; Liew et al., 2019; Pan & Zhao, 2018)

Expectations of Specific Functions and Features

To better understand patients' expectations with regard to specific functions and features (hereinafter referred to as functions), a total of 18 papers were evaluated. The identified functions are assigned to seven categories, which are shown in Figure 1.

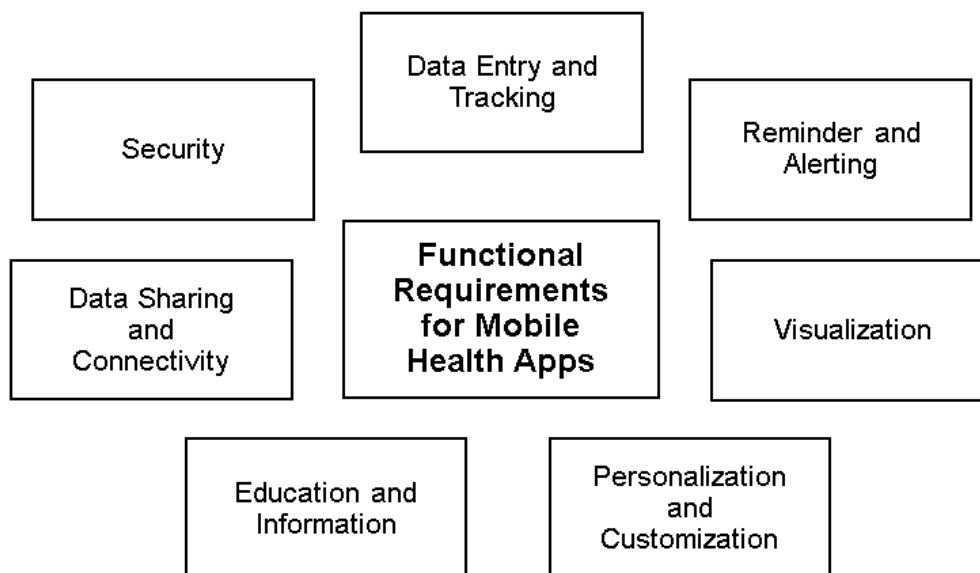


Figure 1: Functional Requirements for Mobile Health Apps

The seven categories are each briefly described below and relevant findings from individual papers are briefly mentioned. It is particularly interesting that many functions are desired by users across different areas of mobile health apps - for example, in the context of diabetes apps as well as in the context of cancer or cardiovascular apps.

Data Entry and Tracking

One of the most important functional requirements for mobile apps in healthcare is the ability to manually and automatically record data for effective self-monitoring (Anderson et al., 2016).

Apps for tracking nutrition and physical activity should enable simple input of all data and automatic recognition of physical activities. It should also be possible to record vital parameters (Villasana et al.,

2019). Diabetes apps should make it possible to record blood glucose levels (Salari et al., 2019). Apps for cancer patients should enable the tracking of symptoms and medication (Vaffis et al., 2023). Apps to support the treatment of chronic obstructive pulmonary disease (COPD) are also expected to collect data and track treatment progress (Alwashmi et al., 2020). Apps for the treatment of sleep disorders should be able to measure sleep and sleep quality (Aji et al., 2019).

If data has to be entered manually, patients expect a simple, i.e. intuitive and fast, process for data entry (Philip et al., 2022).

Reminder and Alerting

A repeatedly mentioned function is linked to the entry and recording of data. Patients want reminders and alerting functions in many contexts (Peng et al., 2016). This includes, for example, reminders to take medication, such as for senior citizens (Liu et al., 2021). Patients also want reminders to do exercises, for example in the context of mental health apps (Alqahtani & Orji, 2020). Finally, users of mobile sleep disturbance apps also want an alarm function (Aji et al., 2019).

Visualization

The category of visualization is also linked to the input and recording of data: The summary and visualization of the data recorded by the app is one of the essential functions of mobile health apps in general for patients (Jeminiwa et al., 2019; Lazard et al., 2021). Data visualization is explicitly mentioned in the context of mobile apps in the context of heart failure treatment (Woods et al., 2019).

Personalization and Customization

Personalization is one of the common functional requirements for mobile health apps. The spectrum ranges from personal settings (Lazard et al., 2021) to a high degree of customizability of the app to individual needs (Jeminiwa et al., 2019; Philip et al., 2022). The desire for personalization is also explicitly mentioned in the context of mobile health apps for seniors (Liu et al., 2021) and in connection with COPD apps (Alwashmi et al., 2020).

In the context of physical activity tracking, users want personalized planning and the ability to set individual goals and receive personalized reminders (Carroll et al., 2017; Kamel Boulos & Yang, 2021; Peng et al., 2016).

In the case of mental health apps, the desire is expressed to be able to choose between different voices and customize the background music, for example. It is also explicitly stated that the apps should be adapted to current smartphones (Alqahtani & Orji, 2020).

AI-powered mobile health apps should offer personalized recommendations, have human-like conversational agents and offer high accuracy for recognition and prediction (Su et al., 2020).

Education and Information

Interestingly, many patients want mobile health apps that are directly linked to their illness to provide education and information about their illness. Specifically, this is described in the case of diabetes (Salari et al., 2019), cancer (Vaffis et al., 2023) and COPD (Alwashmi et al., 2020). In the case of mental health apps, users often want better guidelines that enable more effective use (Alqahtani & Orji, 2020).

Data Sharing and Connectivity

With the increasing digitalization of healthcare, the requirements for the integration of mobile health apps into the entire treatment process are also increasing. Basic connectivity - for example fitness trackers - is expected (Mendiola et al., 2015). In the context of mobile health apps, users expect to be able to share data with their doctor and also port data between devices in the event of a device change (Alqahtani & Orji, 2020). The desire to share data with the doctor is also expressed in the case of sleep disturbance apps (Aji et al., 2019).

Security

Interestingly, security in the context of mobile health apps is rarely examined with regard to specific functions. Concrete patient requirements include the request for regular password updates and access control to the app (Zhou et al., 2019).

Factors Driving Patient Acceptance of Mobile Apps in Digital Health

After examining the basic requirements and expectations of mobile apps in digital health and the compilation of specific functions, the final question is what factors drive patient acceptance.

The most important acceptance factor appears to be perceived usefulness (Binyamin & Zafar, 2021; Gagnon et al., 2016; Heo, 2020), which is closely linked to performance expectancy (Apolinário-Hagen et al., 2018; Breil et al., 2019; Salgado et al., 2020; Sun et al., 2013). Ease of use (Binyamin & Zafar, 2021; Gagnon et al., 2016; Heo, 2020), connected, among other things, with intuitiveness (Wiest et al., 2024) and effort expectancy (Breil et al., 2019; Sun et al., 2013) are important acceptance factors, with patients weighing up their user against the cost of time (Gagnon et al., 2016).

In addition to privacy (Gagnon et al., 2016) and trust (Schomakers et al., 2022) also subjective norms (Binyamin & Zafar, 2021) are mentioned as an important acceptance factor. Individual factors (Wang & Qi, 2021) such as age and gender (Nunes et al., 2019), smartphone experience (Nunes et al., 2019) and – more general – digital literacy (Fan et al., 2024) can be considered part of individual factors. Besides openness to new experiences (Breil et al., 2019) cognition and physical ability (Wildenbos et al., 2018) also play an important role, especially for older people. Social factors (Wang & Qi, 2021) and social influence (Apolinário-Hagen et al., 2018; Sun et al., 2013) as well as social acceptability

(Torbjørnsen et al., 2019) play a role. In addition, support from healthcare personnel is mentioned as an important acceptance factor, as described in the context of hearing aids and teleaudiology (Ross et al., 2022).

It is striking that many of these studies are based on the Technology Acceptance Model (TAM) according to Davis (1985) and the corresponding further developments. The Unified Theory of Acceptance and Use of Technology also forms at least part of the theoretical basis in many studies (Venkatesh et al., 2012). The variables mentioned in both models correspondingly shape the result on the question of the acceptance factors of mobile apps in digital healthcare.

Conclusion

Against the background of the widespread use of smartphones and mobile apps and with a view to the constantly advancing digitalization in healthcare, this paper uses existing research to provide an overview of the use of mobile apps in digital health with a view to general expectations, specific expected functions and features and acceptance factors.

- Regarding basic expectations, it should be emphasized that mobile apps in digital health should primarily serve the success of treatment.
- Regarding specific functionalities, the categories of data entry and tracking, reminder and alerting, visualization, personalization and customization, education and information, data sharing and connectivity as well as security were identified.
- The most important acceptance factors include usefulness and ease of use. Personal support when setting up the apps is also named as an important criterion, depending on the use case.

However, the results of the literature review also reveal gaps in the research and raise new research questions:

- The importance of privacy and data protection is repeatedly emphasized. However, research results also show that users are not very privacy-conscious, contrary to their declared attitude. This privacy-related attitude-behavior gap could find its way into research into the acceptance of mobile health apps.
- Many of the functional requirements for mobile health apps were extracted from app reviews. This raises the question of whether the desired functions can be further classified, e.g. with the help of the Kano model with regard to the effect on user satisfaction.
- The influence of individual functions on user satisfaction or the willingness to recommend (as part of user loyalty) also represents a possible approach for further research.
- Finally, the requirement for a high level of ease of use raises the question of how usability can be specifically increased on the design side for different types of apps.

Overall, the literature review provides a compact overview of current research on mobile apps in digital health and offers approaches for further research.

References

- Aji, M., Gordon, C., Peters, D., Bartlett, D., Calvo, R. A., Naqshbandi, K., & Glozier, N. (2019). Exploring User Needs and Preferences for Mobile Apps for Sleep Disturbance: Mixed Methods Study. *JMIR Mental Health*, 6(5), e13895. <https://doi.org/10.2196/13895>
- Alqahtani, F., & Orji, R. (2020). Insights from user reviews to improve mental health apps. *Health Informatics Journal*, 26(3), 2042–2066. <https://doi.org/10.1177/1460458219896492>
- Alwashmi, M. F., Fitzpatrick, B., Davis, E., Farrell, J., Gamble, J.-M., & Hawboldt, J. (2020). Features of a mobile health intervention to manage chronic obstructive pulmonary disease: A qualitative study. *Therapeutic Advances in Respiratory Disease*, 14, 1753466620951044. <https://doi.org/10.1177/1753466620951044>
- Anderson, K., Burford, O., & Emmerton, L. (2016). Mobile Health Apps to Facilitate Self-Care: A Qualitative Study of User Experiences. *PLOS ONE*, 11(5), e0156164. <https://doi.org/10.1371/journal.pone.0156164>
- Apolinário-Hagen, J., Menzel, M., Hennemann, S., & Salewski, C. (2018). Acceptance of Mobile Health Apps for Disease Management Among People With Multiple Sclerosis: Web-Based Survey Study. *JMIR Formative Research*, 2(2), e11977. <https://doi.org/10.2196/11977>
- Becker, S., Miron-Shatz, T., Schumacher, N., Krocza, J., Diamantidis, C., & Albrecht, U.-V. (2014). mHealth 2.0: Experiences, Possibilities, and Perspectives. *JMIR mHealth and uHealth*, 2(2), e24. <https://doi.org/10.2196/mhealth.3328>
- Binyamin, S. S., & Zafar, B. A. (2021). Proposing a mobile apps acceptance model for users in the health area: A systematic literature review and meta-analysis. *Health Informatics Journal*, 27(1), 1460458220976737. <https://doi.org/10.1177/1460458220976737>

- Birkhoff, S. D., & Smeltzer, S. C. (2017). Perceptions of Smartphone User-Centered Mobile Health Tracking Apps Across Various Chronic Illness Populations: An Integrative Review. *Journal of Nursing Scholarship*, 49(4), 371–378. <https://doi.org/10.1111/jnu.12298>
- BIS Research. (2018, February). *Mobile Gesundheit-Apps—Marktvolumen bis 2025*. Statista. <https://de.statista.com/statistik/daten/studie/1184929/umfrage/umsatz-des-mobilengesundheit-apps-marktes-weltweit/>
- Breil, B., Kremer, L., Hennemann, S., Apolin, & rio-Hagen, J. (2019). Acceptance of mHealth Apps for Self-Management Among People with Hypertension. In *German Medical Data Sciences: Shaping Change – Creative Solutions for Innovative Medicine* (pp. 282–288). IOS Press. <https://doi.org/10.3233/SHTI190839>
- Carroll, J. K., Moorhead, A., Bond, R., LeBlanc, W. G., Petrella, R. J., & Fiscella, K. (2017). Who Uses Mobile Phone Health Apps and Does Use Matter? A Secondary Data Analytics Approach. *Journal of Medical Internet Research*, 19(4), e125. <https://doi.org/10.2196/jmir.5604>
- Chan, A. H. Y., & Honey, M. L. L. (2022). User perceptions of mobile digital apps for mental health: Acceptability and usability - An integrative review. *Journal of Psychiatric and Mental Health Nursing*, 29(1), 147–168. <https://doi.org/10.1111/jpm.12744>
- Davis, F. (1985). *A technology acceptance model for empirically testing new end-user information systems—Theory and results* [PhD Thesis]. Massachusetts Inst. of Technology.
- Dimitrov, D. V. (2016). Medical Internet of Things and Big Data in Healthcare. *Healthcare Informatics Research*, 22(3), 156. <https://doi.org/10.4258/hir.2016.22.3.156>
- Drolia, M., Papadakis, S., Sifaki, E., & Kalogiannakis, M. (2022). Mobile Learning Applications for Refugees: A Systematic Literature Review. *Education Sciences*, 12(2), 96. <https://doi.org/10.3390/educsci12020096>

- Fan, S., Jain, R. C., & Kankanhalli, M. S. (2024). A Comprehensive Picture of Factors Affecting User Willingness to Use Mobile Health Applications. *ACM Transactions on Computing for Healthcare*, 5(1), 1–31. <https://doi.org/10.1145/3626962>
- Gagnon, M.-P., Ngangue, P., Payne-Gagnon, J., & Desmartis, M. (2016). m-Health adoption by healthcare professionals: A systematic review. *Journal of the American Medical Informatics Association*, 23(1), 212–220. <https://doi.org/10.1093/jamia/ocv052>
- Heo, C.-M. (2020). Factors Affecting Acceptance of Sports Healthcare Applications. *Korean Journal of Sports Science*, 29(5), 105–118. <https://doi.org/10.35159/kjss.2020.10.29.5.105>
- Ipsos & Payback. (2024, June). *Deutschland—Anzahl Smartphone-Apps 2024*. Statista. <https://de.statista.com/statistik/daten/studie/1476684/umfrage/durchschnittliche-anzahl-smartphone-apps-in-deutschland/>
- Jeminiwa, R. N., Hohmann, N. S., & Fox, B. I. (2019). Developing a Theoretical Framework for Evaluating the Quality of mHealth Apps for Adolescent Users: A Systematic Review. *The Journal of Pediatric Pharmacology and Therapeutics*, 24(4), 254–269. <https://doi.org/10.5863/1551-6776-24.4.254>
- Kamel Boulos, M. N., & Yang, S. P. (2021). Mobile physical activity planning and tracking: A brief overview of current options and desiderata for future solutions. *mHealth*, 7, 13–13. <https://doi.org/10.21037/mhealth.2020.01.01>
- Lazard, A. J., Babwah Brennen, J. S., & Belina, S. P. (2021). App Designs and Interactive Features to Increase mHealth Adoption: User Expectation Survey and Experiment. *JMIR mHealth and uHealth*, 9(11), e29815. <https://doi.org/10.2196/29815>
- Liew, M. S., Zhang, J., See, J., & Ong, Y. L. (2019). Usability Challenges for Health and Wellness Mobile Apps: Mixed-Methods Study Among mHealth Experts and Consumers. *JMIR mHealth and uHealth*, 7(1), e12160. <https://doi.org/10.2196/12160>

- Liu, N., Yin, J., Tan, S. S.-L., Ngiam, K. Y., & Teo, H. H. (2021). Mobile health applications for older adults: A systematic review of interface and persuasive feature design. *Journal of the American Medical Informatics Association*, 28(11), 2483–2501. <https://doi.org/10.1093/jamia/ocab151>
- Lohnari, T., Patil, S., & Patil, S. (2016). *Use of Mobile Applications in Healthcare: A Review*. <https://www.semanticscholar.org/paper/Use-of-Mobile-Applications-in-Healthcare%3A-A-Review-Lohnari-Patil/cccb80eb064a6f0c5ca2615f9c58c00fa744615f>
- Mendiola, M. F., Kalnicki, M., & Lindenauer, S. (2015). Valuable Features in Mobile Health Apps for Patients and Consumers: Content Analysis of Apps and User Ratings. *JMIR mHealth and uHealth*, 3(2), e40. <https://doi.org/10.2196/mhealth.4283>
- Newzoo & Statista. (2023, August). *Smartphones—Nutzer weltweit 2016-2028*. Statista. <https://de.statista.com/statistik/daten/studie/309656/umfrage/prognose-zur-anzahl-der-smartphone-nutzer-weltweit/>
- Nunes, A., Limpo, T., & Castro, S. L. (2019). Acceptance of Mobile Health Applications: Examining Key Determinants and Moderators. *Frontiers in Psychology*, 10, 2791. <https://doi.org/10.3389/fpsyg.2019.02791>
- Pan, A., & Zhao, F. (2018). User Acceptance Factors for mHealth. In M. Kurosu (Ed.), *Human-Computer Interaction. Interaction in Context* (Vol. 10902, pp. 173–184). Springer International Publishing. https://doi.org/10.1007/978-3-319-91244-8_14
- Peng, W., Kanthawala, S., Yuan, S., & Hussain, S. A. (2016). A qualitative study of user perceptions of mobile health apps. *BMC Public Health*, 16(1), 1158. <https://doi.org/10.1186/s12889-016-3808-0>
- Philip, B., Abdelrazek, M., Barnett, S., Bonti, A., & Grundy, J. (2022). Towards better mHealth apps: Understanding current challenges and user expectations. *Proceedings of the 9th IEEE/ACM International Conference on Mobile Software Engineering and Systems*, 33–37. <https://doi.org/10.1145/3524613.3527804>

- Riaz, M. S., & Atreja, A. (2016). Personalized Technologies in Chronic Gastrointestinal Disorders: Self-monitoring and Remote Sensor Technologies. *Clinical Gastroenterology and Hepatology*, 14(12), 1697–1705. <https://doi.org/10.1016/j.cgh.2016.05.009>
- Ross, F. (2020). Hearing Aid Accompanying Smartphone Apps in Hearing Healthcare. A Systematic Review. *Applied Medical Informatics*, 42(4). <https://ami.info.umfcluj.ro/index.php/AMI/article/view/792>
- Ross, F., & Wohllebe, A. (2021). Evaluating the Service Quality of Mobile Health Versus Clinic Based Intervention in Hearing Healthcare. A Comparative Study. *International Journal of Interactive Mobile Technologies (iJIM)*, 15(10), 21–32. <https://doi.org/10.3991/ijim.v15i10.21725>
- Ross, F., Wohllebe, A., & Diez, E. (2022). The Role of Personal Assistance in the Uptake of Smartphone-Based Tele-Audiology – An Extension of the Technology Acceptance Model. *International Journal of Interactive Mobile Technologies (iJIM)*, 16(12), 18–31. <https://doi.org/10.3991/ijim.v16i12.30133>
- Salari, R., Niakan Kalhori, S. R., Fatehi, F., Ghazisaeedi, M., & Nazari, M. (2019). Determining minimum set of features for diabetes mobile apps. *Journal of Diabetes & Metabolic Disorders*, 18(2), 333–340. <https://doi.org/10.1007/s40200-019-00417-y>
- Salgado, T., Tavares, J., & Oliveira, T. (2020). Drivers of Mobile Health Acceptance and Use From the Patient Perspective: Survey Study and Quantitative Model Development. *JMIR mHealth and uHealth*, 8(7), e17588. <https://doi.org/10.2196/17588>
- Schomakers, E.-M., Lidynia, C., Vervier, L. S., Calero Valdez, A., & Ziefle, M. (2022). Applying an Extended UTAUT2 Model to Explain User Acceptance of Lifestyle and Therapy Mobile Health Apps: Survey Study. *JMIR mHealth and uHealth*, 10(1), e27095. <https://doi.org/10.2196/27095>
- Senjaliya, N. R., & Corser, G. P. (2021). Classification of Mobile Healthcare App Research. *SoutheastCon 2021*, 1–5. <https://doi.org/10.1109/SoutheastCon45413.2021.9401820>

- Singh, G., Simpson, E., MacGillivray, M. K., Sawatzky, B., Adams, J., & Ben Mortenson, W. (2022). Expectations of a Health-Related Mobile Self-Management App Intervention Among Individuals With Spinal Cord Injury. *Topics in Spinal Cord Injury Rehabilitation*, 28(2), 205–215. <https://doi.org/10.46292/sci21-00022>
- Statista Consumer Insights. (2023, July). *Nutzung von Gesundheits-Apps in Deutschland nach Geschlecht 2023*. Statista. <https://de.statista.com/prognosen/1341140/beliebteste-arten-von-gesundheits-apps-in-deutschland-nach-geschlecht>
- Su, Z., Figueiredo, M. C., Jo, J., Zheng, K., & Chen, Y. (2020). Analyzing Description, User Understanding and Expectations of AI in Mobile Health Applications. *AMIA ... Annual Symposium Proceedings. AMIA Symposium, 2020*, 1170–1179.
- Sun, Y., Wang, N., Guo, X., & Peng, Z. (2013). UNDERSTANDING THE ACCEPTANCE OF MOBILE HEALTH SERVICES: A COMPARISON AND INTEGRATION OF ALTERNATIVE MODELS. *Journal of Electronic Commerce Research*. <https://www.semanticscholar.org/paper/UNDERSTANDING-THE-ACCEPTANCE-OF-MOBILE-HEALTH-A-AND-Sun-Wang/d82fb57f181de5a44a9baf0f9837b266c106c662>
- Thusi, P., & Maduku, D. K. (2020). South African millennials' acceptance and use of retail mobile banking apps: An integrated perspective. *Computers in Human Behavior*, 111, 106405. <https://doi.org/10.1016/j.chb.2020.106405>
- Torbjørnsen, A., Ribu, L., Rønnevig, M., Grøttland, A., & Helseth, S. (2019). Users' acceptability of a mobile application for persons with type 2 diabetes: A qualitative study. *BMC Health Services Research*, 19(1), 641. <https://doi.org/10.1186/s12913-019-4486-2>
- Vaffis, S., Whaley, S., Axon, D. R., Hall-Lipsy, E., Hincapie, A., Slack, M., & Warholak, T. (2023). Features of Cancer mHealth Apps and Evidence for Patient Preferences: Scoping Literature Review. *JMIR Cancer*, 9, e37330. <https://doi.org/10.2196/37330>

- Venkatesh, Thong, & Xu. (2012). Consumer Acceptance and Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology. *MIS Quarterly*, 36(1), 157. <https://doi.org/10.2307/41410412>
- Villasana, M. V., Pires, I. M., Sá, J., Garcia, N. M., Zdravevski, E., Chorbev, I., Lameski, P., & Flórez-Revuelta, F. (2019). Mobile Applications for the Promotion and Support of Healthy Nutrition and Physical Activity Habits: A Systematic Review, Extraction of Features and Taxonomy Proposal. *The Open Bioinformatics Journal*, 13(1), 50–71. <https://doi.org/10.2174/1874196701907010050>
- Wang, C., & Qi, H. (2021). Influencing Factors of Acceptance and Use Behavior of Mobile Health Application Users: Systematic Review. *Healthcare*, 9(3), 357. <https://doi.org/10.3390/healthcare9030357>
- Wiest, I. C., Sicorello, M., Yesmembetov, K., Ebert, M. P., & Teufel, A. (2024). Usage Behaviour and Adoption Criteria for Mobile Health Solutions in Patients with Chronic Diseases in Gastroenterology. *Visceral Medicine*, 40(2), 61–74. <https://doi.org/10.1159/000534191>
- Wildenbos, G. A., Peute, L., & Jaspers, M. (2018). Aging barriers influencing mobile health usability for older adults: A literature based framework (MOLD-US). *International Journal of Medical Informatics*, 114, 66–75. <https://doi.org/10.1016/j.ijmedinf.2018.03.012>
- Wohllebe, A., Hübner, D.-S., Kämpf, D., & Podruzsik, S. (2022). Classification of Mobile App Users in Multi-Channel Retail – an Exploratory Analysis. *International Journal of Recent Contributions from Engineering, Science & IT (iJES)*, 10(1). <https://doi.org/10.3991/ijes.v10i1.28071>
- Wohllebe, A., & Wolter, N. (2021). *Smartphone Apps im Einzelhandel: Einsatzmöglichkeiten, Praxisbeispiele & Herausforderungen* (1st ed.). Springer Gabler. <https://link.springer.com/book/10.1007/978-3-658-36500-4>
- Woods, L. S., Duff, J., Roehrer, E., Walker, K., & Cummings, E. (2019). Patients' Experiences of Using a Consumer mHealth App for Self-Management of Heart Failure: Mixed-Methods Study. *JMIR Human Factors*, 6(2), e13009. <https://doi.org/10.2196/13009>

International Journal of Digital Health and Telemedicine (ISSN: 2944-5582)

an Open Access journal by Wohllebe & Ross Publishing, Germany.

Volume: 01 Issue: 01 Year: 2025

<https://doi.org/10.51137/wrp.ijdht.2025.urmw.45663>

Yuan, S., Ma, W., Kanthawala, S., & Peng, W. (2015). Keep Using My Health Apps: Discover Users' Perception of Health and Fitness Apps with the UTAUT2 Model. *Telemedicine and E-Health*, 21(9), 735–741. <https://doi.org/10.1089/tmj.2014.0148>

Zhou, L., Bao, J., Watzlaf, V., & Parmanto, B. (2019). Barriers to and Facilitators of the Use of Mobile Health Apps From a Security Perspective: Mixed-Methods Study. *JMIR mHealth and uHealth*, 7(4), e11223. <https://doi.org/10.2196/11223>